Handbook of Research on

Teacher Education and Professional Development

Christie Martin and Drew Polly

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Handbook of Research on Teacher Education and Professional Development

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A volume in the Advances in Higher Education and Professional Development (AHEPD) Book Series

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List of Contributors

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embedded field experiences because they are designed to offer intentional and systematic opportunities for teacher candidates to theorize from practice each and every class period. Using as an example Brett, a former teacher candidate and now early career 2nd grade teacher, we illustrate Brett's meaning-making of classroom based experiences both within the teacher education program and into her own classroom as we describe the design of English-language arts and mathematics methods courses for preservice teachers that leverage embedded field experiences.

The purpose of this chapter is to describe a collaboration process between a teacher education program and a university ESL program that attempts to increase teacher candidates' exposure to ELLs with "third space" as a theoretical framework. In third spaces, boundaries of teacher and student get blurred, and new ways of thinking about teaching and learning emerge. In the collaboration project that this chapter describes, the two teacher candidates regularly volunteered in the university ESL classes and taught mini-lessons to the ELLs while taking a class about ELL teaching. The qualitative analysis of the participants indicates that in the collaboration project, a university-based class and a field-based class were in sync by providing the participants with opportunities to immediately implement what they learned in a traditional class with the ELLs. In this boundary blurriness, the ELLs became from abstract to concrete in the participants' mind, and the participants became reflective practitioners.

In this piece, the author describes an alternative teacher certification program to achieve two objectives. The first is to counter an argument that current programs in this category do not fit the criteria of alternative certification pathways that were established in the 1980s. The author will use this established framework to demonstrate that such programs still frame these criteria. The second objective is to refute the seemingly wide-spread negative perception that alternative teacher certification programs often carry due to the generalization of these types of programs. This will be accomplished by describing SUNY Empire State College's Master of Arts in Teaching Program and demonstrating that it meets the high standards expected from any teacher preparation program. It is the author's hope that stakeholders with an investment in education and in teacher preparation, in particular, will not make unfounded assumptions of alternative preparations and instead understand that there are high quality programs that support the profession of teaching.

Social Studies as a subject was introduced in several countries to meet certain specific needs and aspirations of the people. In Britain for instance, Social Studies was introduced into the school curriculum after the first and second world wars, as a panacea for social problems. While in America, Social Studies was introduced with the intent of social competency and citizenship education. Social Studies is called different names in different countries, such as cultural studies, oriental studies, environmental education/ studies, citizenship education or social science. In this chapter Social Studies in Nigeria is discussed with a focus on teacher education and professional development.

Section 2
Supporting Candidates' Efficacy, Identities, and Dispositions

The purpose of this chapter is to sensitize the public about the importance of research on personality in the process of teaching and learning, regardless of whether it refers to the personality/temperament of children or teachers. By analysing the personality of teachers, the job-fit theory and different theoretical models of personality and temperament in psychology are showcased. With the aim of a better understanding of the moderator's role of personality in the context of education, a systematic review of relevant studies is presented within Croatian cultural context. Finally, an empirical study is presented which was conducted on future preschool teachers who evaluated their personality as well as their best and worst teachers' personalities. It was determined that there are significant differences in estimated personality traits of the best and worst teachers. Finally, further guidance in exploring the role of personality in education was provided, with an emphasis on methodological aspects and some specific scientific research designs.

This chapter discusses the barriers to achieving the myriad benefits often attributed to collaborative group projects. It begins with an explanation of what collaboration is and the value the method offers to both learners and instructors. It then presents a variety of ways in which these projects can fail to achieve their goals and even have a negative effect on student performance, attitudes towards collaboration and self-efficacy. It also explores some of the ethical concerns that accrue when these problems are not addressed. It then explains how instructors can mitigate these problems today.

to a conference, 3) writing support circles, and 4) individual consultations. The chapter provides a description of each of this service, including the purpose and the design, highlights outcomes of these professional development services, and discusses challenges in its design and implementation.

Section 3
Technology-Enhanced Teacher Education Initiatives

Institutions struggle to develop online curriculum that meets increasing student demands for online education. The explosive growth of online learning necessitates that many higher education faculty transition from a traditional classroom to a web-based format, sometimes with little or no training. This chapter describes a holistic online faculty professional development (PD) model developed through use of a concerns-based adoption model (CBAM). The CBAM model provides an affective and behavioral lens for managing change. Through two of CBAM's components called stages of concern and levels of use, a PD plan was constructed that approaches the transition to distance learning as an ongoing process rather than simply as technology training. The holistic PD model considers each faculty member as an individual with unique needs. Components of the PD model and new Center for E-Learning (CeL) development and program building are explained. Impact on faculty and students and recommendations for program planning and future research are included.

This article describes a tool that can be used in teacher education called Content Acquisition Podcasts (CAPs). CAPs are short multimedia vignettes designed to teach targeted, specific concepts. They are developed in accordance with design principles that are intended to reduce learners' cognitive load. CAPs are simple to create and can be made with readily-available software; this accessibility and their flexible design makes them extremely versatile. They can easily be incorporated into flipped or blended classes. In this article, the authors explain how CAPs are created, describe three ways to integrate CAPs into teacher education and professional development, and explore how CAPs can begin to address the challenges of preparing teachers for a complex working environment.

The purpose of this chapter is to describe and report on the development of original theoretical work which emerged from comparative and international empirical research. The theory is called, "Technological Play Theory." In sharing about Technological Play Theory, this study has three purposes. First, the study

theory from Behaviorism to Constructivism, and the impact of the evolving understanding of how we learn on changing professional development delivery. The authors share technological advances from the sciences that have influenced the design and delivery of learning and offer a brain-based approach for delivering PD. A recent phenomenon, the unconference, or EdCamp as some have been called, represents a constructivist approach to professional development which is more closely aligned with brain-based principles of how we learn. (Both authors planned, administered, and evaluated an EdCamp Professional Development day for a program of aspiring high school principals in the spring of 2015.)

Several schools in the United States are adapting to incorporate 21st century skills, active learning pedagogical approaches, and new technological innovation to advance student learning. Creating physical and virtual spaces and support for creativity, collaboration, critical thinking, and innovation is vital. Yet, designing and offering meaningful professional development to teachers in these new learning ecosystems is a challenge. This chapter explores the application of Agile methodologies to professional development planning, design, and facilitation in a school district that implemented a new learning ecosystem. The Agile approach resulted in customized professional development opportunities that were rigorous, relevant, iterative, and flexible enough to meet district needs. Data were collected on teacher technology efficacy, and initial results indicated success. This has generated an agenda for further research.

This descriptive case aimed to examine a new model of job-embedded and on-going professional development using both blended learning and gamification approach as a delivery method. Qualitative and quantitative data collected for the study were from different sources to ensure the validity and reliability of the findings. The quantitative data findings indicated that participating in the PD first module impacted both the teachers learning of effective mathematics teaching, as well as their mathematical content knowledge. Furthermore, they planned to implement what they learned from the PD into their classroom teaching. Qualitative data findings identified three common themes emerging from the data analysis including awareness of high quality resources, students' engagement through the use of games and technology, and tasks to promote students' mathematical thinking.

Section 5
Professional Development Pedagogies, Resources and Strategies

This chapter focused on the effectiveness of a professional development initiative on the planning, designing, and implementing project-based learning in mathematics, science, and special education classrooms. The purpose was to highlight project-based learning and the development of a professional development learning community that provided unique ways in which teachers engaged with a variety of learning tasks, assessments, and resources while practicing vital mathematics and science skills with diverse students. Attention was given to the importance of teacher attitude and confidence, collaboration, school support, barriers, and increasing student engagement. The case study method was used to amass and probe data. The results indicated valuable suggestions about the effectiveness of professional development for active engagement in project-based learning through networking, differentiating instructional strategies, creating new assessment tools, and gaining content knowledge and pedagogical skills.

The purpose of this chapter is to discuss a multi-case study on how middle school teachers constructed understandings of their job-embedded learning experiences. The aim of the study was to explore how teachers made sense of and gave meaning to their learning experiences that occurred during the school day as they engaged in the work of being a teacher. Job-embedded learning experiences referred to any formal or informal learning opportunity that was grounded in the context of the school day and characterized by active learning and reflection. This chapter includes a detailed overview of the literature on effective professional development and the characteristics of job-embedded learning as each relates to the middle school context; the background and significance of the study; a description of the research design, methods, and procedures; a discussion of the research findings and subsequent implications for educators; and suggestions and recommendations for practice and future research.

This chapter offers preservice candidates and inservice teachers a portrait into a classroom context where one teacher: 1. Identified the experiences and backgrounds of 20 culturally and linguistically diverse students; 2. Used critical literacy as a theory to purposefully select literature grounded in the lives and experiences of her culturally and linguistically diverse third graders; and 3. Used critical literacy and multimodal text types to enhance students meaning making and talk. Implications for practice and research are provided.

the professional development, share the aspects of the professional development the teachers identified as supportive when planning and implementing high cognitive demand tasks in their mathematics classrooms, and discuss ideas for future professional development aimed at providing teachers with instructional practices to incorporate into classrooms.

Chapter 31

An effective mathematics program may be defined as one in which classroom teachers implement tasks and activities that allow all students opportunities to engage in high levels of mathematical thinking and reasoning (NCTM, 2014). In the chapter, we describe background information regarding the preparation of practicing and prospective teachers when implementing research-based practices in the inclusive classroom. Specifically, we provide explicit background information from the extant literature regarding: 1. Equity, 2. Universal Design for Learning, and 3. How to use games as classroom activities to promote the development of mathematical concepts, skills, and conceptual reasoning.

Chapter 32

This chapter discusses the philosophies and practices that drive the MSUrbanSTEM Leadership & Teaching Fellowship Program. This multi-year project offers a professional development program to a selected cohort of K-12 STEM educators from Chicago Public Schools, one of the largest urban districts in the U.S. This chapter provides a holistic view of the program, shares the fellow selection process, and focuses on the strategically developed curriculum and the theoretical bases for the chosen pedagogy. This allows the authors to explore the psychological and philosophical principles, based on the idea of accepting confusion, and embracing failure in beliefs about pedagogy and STEM instruction, which are used to expand the skills and abilities of these selected urban school teachers. Finally, we provide some initial findings about the teachers' growth and development both in their efficacy and leadership abilities.

Chapter 33

The aim of this chapter is to provide pre-service and in-service teaching with an understanding of who emergent bilingual students are and how they can adapt their practice in order to use students' home language as a resource rather than as a deficit. The chapter will share findings from a study conducted with emergent bilingual students in a kindergarten writing workshop. It will also focus on how teachers should adopt an additive approach to language that expands children's linguistic, social, and cultural resources while supporting learning a new language as well and literacy development.

Preface

RATIONALE FOR THIS BOOK

The current climate of education around the world necessitates that teacher educators, professional developers, and those who research issues around teacher learning collaborate and share their work. In an era of high-stakes assessment driven by international tests, such as the Programme for International Student Assessment ([PISA], OCED, 2013), educators, policy makers, and researchers are looking for research-based or evidence-based initiatives and approaches to enhancing teacher learning, which will in turn impact student learning.

As we thought about the purposes and goals of this book, we sought to include a variety of research studies and research-based theoretical chapters about innovative projects related to teacher education and professional development. We commend and thank the authors for their diligence in writing and revising their chapters, which have potential to make important contributions to the field of teacher learning.

Overview of Chapters

Section 1 focuses on programmatic efforts and other strategies used in teacher education programs. In the first chapter, Guise and colleagues explain the impact of a co-teaching model in a post-baccalaureate teacher education program in *The Evolution of Clinical Practice: Moving from Traditional Student Teaching to Co-Teaching*. The authors explore the contextual factors in which co-teaching occurred, the impact of these experiences, and discuss how teacher education programs might effectively implement co-teaching pairs in their own programs. Next, in *Learning to Theorize From Practice: The Power of Embedded Field Experiences*, Hodges and his colleagues describe how university faculty and teachers collaborated to establish intensive field experiences in both literacy and mathematics to support teacher candidates' development. Following that chapter in *Teaching and Learning Simultaneously: Collaboration Between Teacher Education and a University ESL program*, Amos and Kukar describe a collaboration process between a teacher education program and a university ELL program that attempts to increase teacher candidates' exposure to ELLs with "third space" as a theoretical framework. In the collaboration project that is described, the three teacher candidates regularly volunteered in the university ESL classes and taught mini-lessons to the ELLs while taking a class about ELL teaching. Further, the qualitative analysis of the participants indicates that in the collaboration project, a university-based class and a field-based class were in sync by providing the participants with opportunities to immediately implement what they learned in a traditional class with the ELLs.

Next, in *Alternative and Authentic: A close look at a successful, nontraditional teacher certification program*, Wagle describes an alternative teacher certification program designed for two purposes: to counter the argument that current programs in this category do not fit the criteria of alternative certification pathways and to also refute the seemingly widespread negative perception that alternative teacher certification programs often carry. Wagle demonstrates the framework and sound theoretical foundation of the specific alternative certification pathway in the chapter. In the next chapter, *edTPA is a Rock in My Shoe: Alleviating the Pain of edTPA with the edPASR Strategy,* Byker, Good, Putman, and Polly describe a framework for supporting teacher candidates with the comprehensive edTPA project completed by teacher candidates during students. The edPASR model makes the argument that students' self-assessment and reflection positively influences the quality of their projects. In the next chapter, *Evaluating teacher training programs for philology students*, Presada and Badea discuss efforts in Romania to train philology students to become language and literature teachers. Through their concurrent model candidates complete their teacher certification over an extended period of time while undergraduates and also as graduate students. Following that, Kasemap provides an overview of research-based strategies for teacher learning in *Teacher Education and Teacher Professional Development: Current Issues and Approaches*. Section One closes with *Prospects and challenges of Social Studies Teachers Professional Development in Nigeria*, where Oyewo describes the history of teaching Social Studies concepts in Nigeria and their evolution over time. The chapter includes a specific focus on issues related to teacher education and professional development.

Section Two opens with *Personality and Education: Contemporary issues in psychological science about personality in teacher education* by Vorkapic. In this chapter she argues about the importance of research on personality in the process of teaching and learning by analyzing the personality of teachers using the job-fit theory and different theoretical models of personality and temperament in psychology. Next, in *Learning to Lead Collaborative Student Groups to Success*, Modell discusses the benefits and challenges of collaborative group projects in courses. Modell also explores some of the ethical concerns that accrue and provides recommendations to course instructors about how they can mitigate these problems. Following that chapter in *Fostering Diverse Praxis: Pre-service Teachers' Perceptions of Efficacy*, Rodriguez, Adams, and Zimmer describe a partnership between a local university and a summer academy that provided a space for students to work with students from diverse backgrounds. Teacher candidates in a literacy assessment course assessed and tutored students in this summer academy. Findings indicate that after the tutoring experience, teacher candidates felt more competent to engage students and to use literacy strategies with the students. Next, in *Preparing Teacher-Scholars to Inquire: Constructing the Inquiry Processing Cycle*, Byker and colleagues introduce and discuss the Inquiry Processing Cycle, which is a theoretical model for engaging in inquiry. The study found that although the participants perceived that the process of inquiry was a fundamental part of being a successful college student as well as being an effective teacher they were unclear about how to actually proceed with an inquiry. Section Two closes with *Developing Academic Writing Skills of In-Service and Pre-Service Teachers: Approaches, Outcomes, and Challenges*, Plakhotnik and Ershova share findings from a study in which they worked with both teacher candidates and current teachers on an intensive project to develop their use of academic language and their academic writing skills. Through workshops and intensive support both populations showed gains in their writing skills.

Section Three opens with *A Holistic Professional Development Model: A Case Study to Support Faculty Transition to Online Teaching*, in which Golden and Brown describe a holistic online faculty professional development (PD) model developed through use of a concerns-based adoption model (CBAM). The

holistic PD model considers each faculty member as an individual with unique needs and the impact on faculty and students and recommendations for program planning and future research are included. Next in *A Multimedia Tool for Teacher Education and Professional Development*, Rodgers, Kennedy, Alves, and Romig describe Content Acquisition Podcasts (CAPs), short multimedia vignettes designed to teach targeted, specific concepts and are developed in accordance with design principles that are intended to reduce learners' cognitive load. The authors describe how to design and implement CAPs in teacher education programs. Section Three closes with *I Play I Learn: Introducing Technological Play Theory,* where Byker describes and reports on the development of the theoretical framework "Technological Play Theory," The chapter examines the contours of the Technological Play Theory in relationship to empirical findings and considers how it could be utilized as an "agent of change" in education and schooling.

Section Four focuses on constructs and frameworks of teacher professional development. The section opens with *Culturally Relevant Literacy Instruction: Promoting Shifts in Teachers' Beliefs and Practices*, in which Thornton examined teachers' changing beliefs and practices as they engaged in professional development on issues related to CRP and literacy instruction. Findings indicated that theoretical learning, critical self-reflection, collaboration, and longevity are integral to support shifts in teachers beliefs and practices around CRP. Next, in *Potato, Pot-Ar-To. Tomato, Tom-Ar-To: Is Teacher Quality and Teaching Quality the same?*, Velliaris presents narrative data from teachers to support the argument that the quality of teachers and the quality of teaching are in fact similar but different constructs. She contends that the focus should be on enhancing the quality of teaching practices rather than teacher characteristics. Following that chapter, Shore and Morris describe the theory and process of developing and implementing an Unconference or an edCamp professional development experience for aspiring Principals in *The Unconference: A Constructivist Approach to Professional Development*. The edCamp approach reflects an application of brain-based research and constructivist learning theory. In the next chapter, *An Agile K-12 Approach: Teacher PD for New Learning Ecosystems*, Mumford and Fiala explore the application of Agile methodologies to professional development planning, design, and facilitation in a school district that implemented a new learning ecosystem. Several schools in the United States are adapting to incorporate 21st century skills, creating physical and virtual spaces that support creativity, collaboration, critical thinking, and innovation. The Agile approach resulted in professional development opportunities that were rigorous, relevant, iterative, and flexible enough to meet project needs.

Next, in *Gamified - Blended Learning Professional Development - A Descriptive Case Study,* Vu and colleagues examine a new model of job-embedded and on-going professional development using both blended learning and gamification approach as a delivery method. The authors found that participating in the PD positively influenced teachers' learning about research-based approaches to mathematics teaching as well as mathematics content knowledge. That chapter is followed by *Studying Infrastructures of Implementing Organizational Excellence of Model of EFQM at Education Department of Golestan Province: Studying Infrastructures of Implementing Organizational Excellence of Model of EFQM at Education*, Abdolshah, Norouzi, and Dorafshan. In that chapter, the authors describe the findings of a descriptive-survey research about a professional development model. Research findings show that infrastructures of implementing EFQM model at policy and strategy sector of education department is at maximum level and at partnership and resources section is at minimum level. In the next chapter, *Lessons Learned From Designing and Implementing a Three-Year Professional Development Program*, Jones and Arias highlight a process of creating, revising, and evaluating a professional development (PD) program for in-service upper elementary teachers (grades 3-6), titled the Central New Jersey Partner-

ship to Enhance Mathematics Achievement (CNJ PEMA). In particular, attention is focused on how the program sought to include teachers as partners in the creation and revision process as a way to provide them with a voice and choice in their own professional learning. The section closes with *Aligning effective professional development and online learning, A conceptual stance,* where Morewood, Ankrum, and Dagen synthesize research-based practices and the Community of Inquiry (CoI) framework. Beyond the alignment of these two conceptual frameworks, practical examples of online tools are discussed for both synchronous and asynchronous online learning contexts within this chapter.

Section Five focuses on pedagogies and strategies used to facilitate professional development. The section begins with *Project-Based Learning Integration with Teachers Immersed in a Professional Development Initiative*, in which McCormack focuses on the effectiveness of a professional development initiative on the planning, designing, and implementing project-based learning in mathematics, science, and special education classrooms. The results indicated valuable suggestions about the effectiveness of professional development for active engagement in project-based learning through networking, differentiating instructional strategies, creating new assessment tools, and gaining content knowledge and pedagogical skills. In the next chapter, *Middle School Teachers' Sensemaking of Job-Embedded Learning*,

Wade discusses a multi-case study on how middle school teachers constructed understandings of their job-embedded learning experiences. The aim of the study was to explore how teachers made sense of and gave meaning to their learning experiences that occurred during the school day as they engaged in the work of being a teacher. Following that chapter in *What Can I Do?: Using Critical Literacy and Multimodal Text Types to Enhance Students Meaning Making and Talk*, Allen offers preservice candidates and inservice teachers a portrait into a classroom context where one teacher identified the experiences and backgrounds of 20 culturally and linguistically diverse students, used critical literacy as a theory to purposefully select literature grounded in the lives and experiences of her culturally and linguistically diverse third graders, and then used critical literacy and multimodal text types to enhance students meaning making and talk. In the next chapter, *Innovative Instructional Strategies for An Online Community of Learners: Transforming Teachers' Knowledge*, Niess and Gillow-Wiles share the findings of a qualitative, design-based research study focused on examining teacher professional development that support an online community of learners in transforming their technological pedagogical content knowledge (TPACK) for teaching mathematics. The chapter describes an online learning trajectory and instructional strategies supporting the tools and processes in steering the content development in a social metacognitive constructivist instructional framework. Next in *Patterns of practice and teacher identity: Insights from the QTEL professional development program*, Husbye presents insights from a university-run professional development program for pre- and in-service teachers closely examining the ways one participant engaged in a variety of practice-based identities within her classroom as a result of her participation in the professional development program. Section Five continues with

Mathematics Teachers' Perspectives on *Professional Development Around Implementing High Cognitive Demand Tasks*, where Candela provides readers with an overview of a professional development created and enacted to support teachers' implementation of high cognitive demand tasks (Smith & Stein, 2011). This multiple case study seeks to give voice to the three seventh grade mathematics teachers who participated in the professional development as they share their perspectives on what factors affected their implementation of high cognitive demand tasks.

Next, in a chapter from Buchheister, Jackson, and Taylor with *Defining Effective Learning Tasks for All*. In the chapter, Buchheister, Jackson, and Taylor describe background information regarding the

preparation of practicing and prospective teachers when implementing research-based practices in the inclusive classroom. Following that is a chapter from Seals, Horton, berzina-Pitcher, and Mishra write *A New Understanding of our Confusion: Insights from a year-long STEM fellowship program*. This chapter discusses the philosophies and practices that drive the MSUrbanSTEM Leadership & Teaching Fellowship Program. This multi-year project offers a professional development program to a selected cohort of K-12 STEM educators from Chicago Public Schools, one of the largest urban districts in the U.S. This chapter provides a holistic view of the program, shares the fellow selection process, and focuses on the strategically developed curriculum and the theoretical bases for the chosen pedagogy. The next chapter, *Understanding and Teaching Emergent Bilingual Students*, by Rodriguez, shares findings from a study conducted with emergent bilingual students in a kindergarten writing workshop. It also focuses on how teachers should adopt an additive approach to language that expands children's linguistic, social, and cultural resources while supporting learning a new language as well and literacy development.

Next, in *Evaluation of Master's Programs in English Language Teaching (ELT) A Turkish Case of Professional Development: Evaluation of an ELT Master's Program in a Turkish University*, Ozturk and Mede, evaluate the English Language Teaching (ELT) master program offered by the Graduate School of Educational Sciences at a university. The findings revealed that the master program was effective regarding the content of the program as well as the role of instructors which contributed to the professional development. This section closes with *Professional Development to Enhance Teachers' Assessment Practices in Mathematics* by Polly. Through an inductive analysis of open-ended surveys the professional development increased teachers' awareness and use of cognitively-demanding mathematical tasks that align to their standards. However, many teachers reported their beliefs that assessments should be multiple choice and reflect the format of their high-stakes statewide end-of-year assessment.

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Section 1

Programmatic Efforts and Strategies

Chapter 1
The Evolution of Clinical Practice:
Moving from Traditional Student Teaching to Co-Teaching

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ABSTRACT

In this chapter, the authors examine the implementation of the co-teaching model within the clinical experience of a post-baccalaureate teacher credential program, examining the different levels of understanding and buy-in to the co-teaching model. Implementing mixed methodologies, the authors look specifically at the co-teaching experiences of three science co-teaching pairs. Although pairs highlighted within this case study predominantly aligned more with a traditional model of student teaching, each pair had at least one moment of co-teaching, which either provided a better learning environment for the secondary students and/or professional development for both the pre-service and in-service teacher. In the discussion and implications section of the chapter, the authors explore why co-teaching occurred in these specific contexts and how a teacher education program might better support its co-teaching pairs in their understanding and implementation of co-teaching.

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INTRODUCTION

Reflecting on their experience of learning to teach, pre-service teachers often refer to their field experience as one of the most influential factors shaping their development as a beginning teacher, with policymakers and practitioners also echoing this belief (Cochran-Smith & Zeichner, 2005; Guyton & McIntyre, 1990; National Council for Accreditation of Teacher Education, 2010). Research has identified the influential nature of field experience as well as challenges associated with this experience (Borko & Mayfield, 1995; Darling-Hammond, Pacheco, Michelli, LePage, & Hammerness, 2005; Goodnough, Osmond, Dibbon, Glassman, & Stevens, 2009), with a current movement to reform and improve field experiences (Fraser & Watson, 2014; NCATE, 2010; Zeichner, 2002).

Traditional student teaching – a common approach to fieldwork during a credential program – typically involves a master teacher who gradually releases responsibility of classroom instruction to the student teacher, often with an extended period of "take-over" where the student teacher has full responsibility of the classroom with minimal master teacher involvement. This model is sometimes associated with a "sink or swim" method for learning to teach. Fraser and Watson (2014) in their article entitled "Why Clinical Experience and Mentoring Are Replacing Student Teaching on the Best Campuses" explain that traditional student teaching dates back 200 years – often serving as a culminating experience to a credential program "under the watchful eyes" of a master teacher and university supervisor (p. 2). Challenges associated with traditional student teaching include little training of the master teacher in the mentoring of a student teacher, often leading to the master teacher having the student teacher observe his/her teaching on a few occasions before handing over the classroom to the student teacher for solo-time (Hamman, Fives, & Olivarez, 2007; Heck & Bacharach, 2015). In addition, Heck and Bacharach (2015) posit that an additional drawback to traditional student teaching is that planning is often done in isolation and a clear power dynamic between novice and veteran teacher exists, reducing opportunities for the student teacher to learn from and with the master teacher. Recognizing that being an effective master teacher involves "active mentoring" more than just providing a student teacher with access to a classroom (Zeichner, 2002, p. 59), teacher educators and researchers recommend moving away from the "familiar routines of traditional student teaching," and re-imagining how field experience can be an enriching learning experience for both teachers (Fraser & Watson, 2014, p. 11).

Co-teaching is one such reform effort that allows a pre-service teacher to co-teach alongside a cooperating teacher – collaborating in planning, instructing, and assessing. Although the clinical experience often focuses on the development of the pre-service teacher, co-teaching has the potential to positively impact the growth of cooperating teachers as they are faced with numerous educational reforms (e.g., Next Generation Science Standards, Common Core State Standards) and innovative instructional practices (e.g., project based learning). Drawing on the work of Badialia and Titus (2010) and Bacharach, Heck, and Dahlberg (2010), the authors of this study define co-teaching as the following:

Both cooperating teacher and pre-service teacher are engaged in student learning at all times through daily co-planning, co-instructing, and co-assessing.

The qualitative research study described in this chapter occurred during the 2014/2015 school year of a yearlong post baccalaureate credential program. Pre-service teachers who enrolled in the credential program simultaneously completed three quarters of coursework and a yearlong clinical experience that gradually increased from a practicum experience (consisting mainly of observing, assisting, and tutoring in a secondary classroom) to a co-teaching placement (teaching side-by-side with a cooperating teacher, first part-time – half days – and then full-time – full days). For the research study, participants included

all single subject pre-service teachers for the 2014/2015 school year, and qualitative data was collected on eight of the 42 participants (four science and four English co-teaching pairs). For this chapter, the authors focus on a subset of the eight co-teaching pairs, presenting an in-depth case study of three science co-teaching pairs who encountered challenges when implementing co-teaching.

This chapter begins with a review of research on co-teaching and teacher change followed by a theoretical framework for learning and teaching that guided the experiences of the co-teaching pairs described in this chapter. A description of the context of the research study and the mixed methodologies employed in order to triangulate the data is also included. Through the analysis of the findings, the authors posit that although the three co-teaching pairs appeared to align more with a traditional model of student teaching, each pair had at least one moment of co-teaching, which either provided a better learning environment for the secondary students and/or professional development for both the pre-service and cooperating teacher. The discussion and implications section of the chapter includes an explanation of why co-teaching occurred in these specific contexts, identification of barriers to implementing co-teaching, and suggestions on how a teacher education program might better support its co-teaching pairs in their understanding and implementation of the co-teaching model.

The research study was guided by the following questions:

1. How did the three co-teaching pairs implement co-teaching (co-planning, co-instructing, co-assessing)?
2. What barriers existed that prevented the implementation of co-teaching?
3. When co-teaching did occur, what factors encouraged the implementation of co-teaching?

LITERATURE REVIEW

Research on Co-Teaching in the Clinical Experience

Although co-teaching has its origins in the field of special education with pioneers such as Friend and Cook, in the 1980s teacher education programs began to appropriate the practice of co-teaching as a model for the clinical experience (Darragh, Picanco, Tully, & Henning, 2011). Since its implementation in the 1980s, numerous research studies have been conducted on what co-teaching is, what it looks like in clinical practice, the impact that it has on learning – the learning of K-12 students as well as the learning of pre-service teachers – and challenges associated with the co-teaching model.

Co-Teaching and the Impact on Students and Student Learning

In the four-year research study by Bacharach et al. (2010), the authors explored the differences in math and reading achievement of K-6 students in co-taught and non-co-taught settings. Using mixed methodologies, the authors concluded that co-teaching had a positive impact on learners in the classroom, using gains on high-stakes exams as one measure to show this positive impact. Similarly, Hang and Rabren (2009) analyzed the differences in reading and math scores for students with disabilities. Comparing their scores on the SAT National Curve Equivalents (NCEs) from the 2003/2004 school year when the class was not co-taught to the 2004/2005 school year when the class was co-taught, statistically significant differences in achievement were identified.

Additional benefits to students in co-taught classrooms include "enhanced instruction, rather than just a second set of hands" (Beninghof, 2015, p. 13). By drawing on the expertise of each member of the co-teaching pair and strategically using this expertise when planning, instructing, and assessing, co-teachers can better support struggling students, implement a variety of scaffolds, and differentiate instruction (Beninghof, 2015; Friend, 2015; Hartnett, McCoy, Weed, & Nickens, 2014; Heckert, Strieker, & Shaheen, 2013; Mandel & Eiserman, 2015; Murdock, Finneran, & Theve, 2015; Tomlinson, 2015). Additional benefits to student learning include a lower student-to-teacher ratio (Hartnett et al., 2014).

Co-Teaching and the Impact on Teacher Learning

Additional research on co-teaching has moved beyond the gains for students and has focused on the affordances and challenges for the development of the co-teachers. Research in this vein has focused on the notion of co-generative dialogue and how co-teaching pairs engage in reflective dialogue throughout their co-teaching experience. Scantlebury, Gallo-Fox, and Wassell (2008) define co-generative dialogue as "...when co-teachers discuss the issues that impact teaching and learning and collectively generate solutions to any problems" (p. 971). Research studies on co-teaching have found value in co-generative dialogue because this dialogue provides an opportunity to reflect on a shared experience (Badiali & Titus, 2010; Beers, 2008) and "examine their schema and practices in the presence of the other stakeholders in the classroom" (Beers, 2008, p. 447). Researchers also posit that co-teaching can help facilitate the development of reflection skills through "expanded opportunities for transformative action in learning and development through shared contribution, collective responsibility, expanded agency and the active promotion of each other's agency and co-development" (Murphy & Carlisle, 2008, p. 505). Through this "co-development," co-teachers engage "in the habit of seeking feedback and ideas from colleagues" (Haring & Kelner, 2015, p. 71), possibly fostering a teacher's collaboration skills and willingness to take risks (Mandel & Eiserman, 2015).

Co-teaching may also serve as the catalyst for breaking the power differential associated with traditional student teaching. Honigsfeld and Dove (2015) in their article entitled "Co-Teaching ELLs: Riding a Tandem Bike" explain that trust between co-teachers is an important part of a successful co-teaching pairing. In order to create this trust, the power differential needs to be eliminated for the co-teachers to have "shared goal setting, shared decision making, joint risk taking, having high expectations of each other, relying on each other, and overcoming one's fear of vulnerability" (p. 58). Heckeret et al. (2013) similarly argue that co-teaching can lead to a shift in the power dynamic between the pre-service and cooperating teacher.

Challenges of Co-Teaching During the Clinical Experience

Although research on co-teaching in the clinical experience has shown favorable results in terms of increasing student test scores (Bacharach et al., 2010; Hang & Raben, 2009) and providing opportunities for pre-service teachers to engage in reflective dialogue and develop collaboration skills (Badiali & Titus, 2010; Beers, 2008; Darragh et al., 2011; Scantlebury et al., 2008), the research has also captured a few downsides to co-teaching.

For example, the pre-service teachers surveyed by Darragh et al. (2011) wondered whether it was realistic to have two teachers in the room when hired as an in-service teacher and whether solo time was

needed in order to prepare pre-service teachers for their future career. Research has also shown the challenge of achieving cooperating teacher buy-in to the co-teaching model and ensuring that both teachers have a clear understanding of co-teaching and their role in the classroom (Heckert et al., 2013). Recommendations for addressing these concerns include longer placements in order to build a positive relationship, requiring cooperating teachers and pre-service teachers to attend co-teaching trainings together, and providing clear expectations of the clinical experience and how co-teaching progresses in order to allow "solo" time or more leadership responsibility as the placement progresses (Darragh et al., 2011).

RESEARCH ON TEACHER CHANGE

When implementing co-teaching as the model for the clinical experience, one challenge can be that this model may be different from the model the cooperating teacher experienced when he/she was completing his/her teacher education program. This can make it potentially difficult for the cooperating teacher to mentor a pre-service teacher in a way that is different from his/her own training (Dunne, Nave, & Lewis 2000; Hollingsworth, 1989; Knapp & Peterson, 1995). Seeking to address this potential challenge and support cooperating teachers to adopt a new model for teacher training, research on teacher change might prove helpful.

Although the body of research on teacher change predominately focuses on changing an in-service teacher's practice to align with reform initiatives and "best practices," this body of research can also provide insight into teacher resistance to change – whether the resistance to change is related to an in-service teacher changing his/her own practice or changing his/her approach to mentoring a pre-service teacher. Numerous research studies on teacher change have concluded that not only do some teachers change more than others (Fennema et al., 1996; Franke, Carpenter, Levi, & Fennema, 2001; Knapp & Peterson, 1995), some elements of teachers' knowledge and practice are more easily changed than others (Franke et al., 2001; Franke & Kazemi, 2001). For example, Kegan (1994) posits that the challenge of teacher change is "not merely asking them [teachers] to take on new skills…[but] asking them to change the whole way they understand themselves, their world, and the relationship between the two" (as cited in Blanchard, Southerland, & Granger, 2008, p. 325). Furthermore, teacher change takes time with studies showing "that teacher mastery of a new skill takes, on average, 20 separate instances of practice and that number may increase if the skill is exceptionally complex" (Joyce & Showers, 2002, p.12).

Professional development is also believed to be a catalyst for teacher change; however, studies have concluded that a lot of time and money is invested in teachers' professional development, yet this professional development has little impact on teacher quality (Goodwin, 2015; The New Teacher Project, 2015). Professional development typically offered by districts are not geared toward the needs of the individual teachers – creating a disconnect between the professional development and individual teacher's goals – and are often short-term and do not include follow-up after the professional development workshop (Goodwin, 2015; Joyce & Showers, 2002; The New Teacher Project, 2015). Spillane (2000) provides additional insight into why professional development may be ineffective at supporting teacher change and posits that the theories about teacher learning and change that the teacher leaders adopt influence the professional development implemented. Examining nine school districts in Michigan over the course of five years, Spillane (2000) interviewed teacher leaders and identified that the majority of leaders aligned

themselves with behaviorist views of teacher change while two viewed teacher change as situated and one held a cognitive perspective on teacher learning and change. Spillane (2000) posits that in order for professional development to be effective, there needs to be a balance among the three perspectives of teacher learning and change, moving beyond only a behaviorist view.

Although research has shown the challenges associated with teacher change, this research has also isolated three primary attributes that overcome teacher resistance and lead to change: school culture, collaboration, and a focus on student thinking, learning, and success. If a teacher teaches within a professional community that is a productive place for teacher learning, that in-service teacher will be more prone to adopting and executing varying pedagogies within their own practice over a sustained amount of time (Clarke & Hollingsworth, 2002; Fennema et al., 1996; Franke et al., 2001; Knapp & Peterson, 1995; Sparks, 1988). Knapp & Peterson (1995) highlight that interacting with other teachers experiencing the same thing is vital to teacher growth. Therefore, it is shown that the cues to change actually come from the organizational environment of the school culture itself (Richardson, 1990).

In addition, opportunities for collaboration can help to foster teacher change. Franke et al. (2001) state, "Just as classrooms promote student learning by becoming communities of learners where students collaborate to investigate topics in-depth, engage in collective reflection, and challenge each others' thinking, schools foster teacher learning when they become communities where teachers engage in challenging one another's thinking" (p. 654-655). Sparks (1998) argues, "If we can help teachers believe in the importance of using research based practices, and if we can provide a support group for initial change and experimentation [through collaborative groups], teachers will likely grow and become more reflective" (p. 117). Furthermore, Penlington (2008) explains that through collaborative dialogue, teacher change is likely to occur.

The third crucial contributor to teacher change is having a teacher shift his/her practice from teacher-focused to student-focused. This change has been found to increase communication between student and teacher and requires teachers to analyze their students' ways of thinking (Dunne et al., 2000; Fennema et al., 1996; Franke et al., 2001; Knapp & Peterson, 1995). Gaining a deeper understanding through reflection and analysis on the way a student is processing information also allows the instructor to more effectively assist students both on an individual and collective level (Fennema et al., 1996). Furthermore, teachers begin to change their beliefs about how to teach something only after they see success with their students (Guskey, 1985; Guskey, 2002).

Given this body of research on teacher change, supporting co-teaching pairs to implement a co-teaching model of clinical experience can be challenging, especially if the school culture is not supportive of this approach to training teachers. However, the co-teaching model naturally lends itself to collaboration and a focus on student learning, two important contributors to promoting teacher change. Therefore, to successfully support the implementation of co-teaching and potentially a change in the cooperating teacher's approach to mentoring a pre-service teacher, "Rather than training teachers to implement given practices, the interest is in having teachers come to see themselves as ongoing learners, seeking classroom practices that are responsive to the needs of the students and continually evaluating and adapting classroom practice" (Franke et al., 2001, p. 658).

THEORETICAL FRAMEWORK

A Social Constructivist View of Learning

Social constructivism and situated learning influenced this research and the pre-service teachers' clinical experience and co-teaching trainings. Drawing on the work of Lev Vygotsky, this study aligns with social constructivist theory and emphasizes the interaction between learners and others – in the case of co-teaching, between the co-teaching pair. Furthermore, valued is placed on the importance of language and dialogue in the construction of understanding and co-teaching is viewed as the opportunity to engage in dialogue with a knowledgeable other.

Coupled with social constructivism, this research draws on situated learning (Lave & Wenger, 1991). The authors believe in the need for beginning teachers to be situated in the social and cultural setting of a school for an extended period of time. Referring to one's engagement in a social practice that results in learning as "legitimate peripheral participation" (p. 29), Lave and Wenger (1991) posited that learners participate in communities of practice and gradually transition from being a newcomer in that community to a full participant. Participants in a community of practice have a common goal in regard to what the community of practice is about, how it functions, and what it is capable of producing (Wenger, 1998). This theory of learning "claims that learning, thinking, and knowing are relations among people in activity in, with, and arising from the socially and culturally structured world" (Lave & Wenger, 1991, p. 51). The authors believe that a co-teaching, yearlong clinical experience provides an opportunity for pre-service teachers to learn about teaching through active participation in this community of learners.

Related to the work on communities of practice by Lave and Wenger (1991), this research also draws on the work of Barab and Duffy (2012) in the conceptualization of communities of practice. In their book chapter entitled "From Practice Fields to Communities of Practice," Barab and Duffy (2012) delineate four features of a community of practice:

1. The community has a shared history;
2. The community has shared beliefs, goals, and practices;
3. A member of the community is a member of the collective whole, and
4. The community is constantly evolving and being re-defined by its participants.

Barab and Duffy (2012) view communities of practice and the notion of "collaborative resonance" as an approach to preparing pre-service teachers, immersing pre-service teachers in a community focused on teaching and learning. Similarly, the authors believe that a community of practice is established throughout the co-teaching, yearlong clinical experience, and pre-service teachers become a more involved member of that community as the clinical experience progresses.

METHOD

Context of the Investigation

This research study occurred during the 2014/2015 school year of a yearlong post baccalaureate credential program at Kennedy University[1]. Teacher candidates enrolled in the credential program simultaneously completed three quarters of coursework and a yearlong clinical experience that gradually increased from a practicum experience to a part- and full-time co-teaching experience. Three co-teaching trainings were provided to all co-teaching pairs (August, December, & March). The three trainings explored a variety of co-teaching topics, such as fostering the co-teaching relationship; defining and exploring co-planning, co-instructing, and co-assessing; planning a gradual release model of leadership while still emphasizing collaboration; and discussing co-teaching successes and challenges. Co-instructional strategies[2] (e.g., team teaching) were also modeled at the three trainings.

Case Study Participants

This research study examined the implementation of co-teaching for eight co-teaching pairs (four English and four science pairs). Findings from this study revealed that the eight co-teaching pairs displayed different levels of understanding and buy-in to the co-teaching model, resulting in a continuum of implementation. On one end of the continuum were co-teaching pairs who aligned more with traditional student teaching, while the other end of the continuum showcased pairs who implemented co-planning, co-instructing, and co-assessing in an intentional, collaborative manner with both teachers' voices being valued.

For the purpose of this chapter, the authors chose to focus on the three pairs who appeared to align more with a traditional approach to student teaching in order to explore what barriers prevented the successful implementation of co-teaching. The data revealed that these three co-teaching pairs did have at least one instance where co-teaching occurred, and the authors wanted to determine what factors facilitated this implementation in hopes of determining ways to change teacher practice and support the adoption of the co-teaching model. A description of each co-teaching pair is provided in the findings section of this chapter.

Data

Data for this research study consisted of:

1. Weekly reflections written by the pre-service teacher,
2. Bi-monthly university supervisor observations and observation materials (e.g., lesson plan), and
3. Three individual semi-structured interviews with the pre-service teacher, cooperating teacher, and university supervisor.

Weekly Reflections

Written reflections were electronically submitted by each pre-service teacher for each week of part- and full-time co-teaching, totaling approximately 20 reflections. The weekly reflection had three open-ended prompts (e.g., Please provide a specific example of how co-teaching was implemented in your classroom

this past week. If co-teaching did not occur, what do you see as the barriers?). In addition to open-ended questions, if the pre-service teacher responded that he/she had co-taught that week, he/she would respond to a series of close-ended questions that asked for more details about the implementation of co-teaching. See Appendix 1 for the weekly reflection prompts.

Bi-Monthly University Supervisor Observations

Each co-teaching pair was assigned to a university supervisor who had the responsibility of observing his/her pair approximately ten times over the course of the 20 weeks. For each lesson observed, the university supervisor submitted an observation report, which included quantitative data (e.g., the ranking of the lesson plan quality, classroom management) as well as qualitative data (e.g., what worked and recommendations for improvement). In addition, specific co-teaching questions were included in this observation report, which asked the university supervisor to describe the implementation of co-teaching (e.g., the extent to which co-instructional strategies were delineated on the lesson plan, the extent to which the space seemed like a shared space between two co-teachers, etc.).

Semi-Structured Interviews

Each member of the co-teaching pair was interviewed individually by a member of the research team on three occasions during the yearlong placement: a month before the transition from practicum to part-time co-teaching, a month before the transition from part-time to full-time co-teaching, and at the conclusion of the clinical experience. Each interview was guided by an interview protocol and was digitally recorded and transcribed. Member checking occurred during interviews two and three based on the coding of the previous interview, which guided the creation of a few participant-specific interview questions (Athanases & Heath, 1995; Carspecken, 1996; Emerson, Fretz, & Shaw, 1995; Spradley, 1979). The main goal of these interviews was to obtain a more nuanced understanding of the implementation of co-teaching for each co-teaching pair – highlighting both successes and challenges related to co-teaching. See Appendix 2 for the non-participant-specific interview protocols that were used for interviews one, two, and three. Appendix 3 includes an interview protocol for the university supervisor, which was implemented at the conclusion of the clinical experience.

Coding and Interpretation

As in most interpretive and qualitative research, the analysis for this research study was ongoing and reiterative. First, the researchers separated the data into episodes – "a series of turns that all relate to the same topic or theme" (Lewis & Ketter, 2004, p. 123). Once these episodes were demarcated, open coding occurred to explore ideas and themes related to co-teaching (Emerson et al., 1995). A core set of codes were established based on this open coding, with focused coding occurring in order to identify patterns and sub-themes related to co-teaching (Emerson et al., 1995). For example, an episode from an interview was first coded for a broad theme of *co-planning*, *co-instructing*, or *co-assessing* to identify what aspect of co-teaching was being discussed in the interview. After coding this interview episode as *co-instructing*, a sub-code was identified for the type of co-instructional strategy that was being described (e.g., *one teach/one observe*). When coded as *one teach/one observe*, additional sub-codes were applied that identified *how* one teach/one observe was implemented (i.e., which co-teacher was observing, what

was the focus of the observation). Finally, this episode was also coded for additional themes related to teaching and co-teaching (e.g., *student engagement, rapport with students*).

All data was double coded and inter-rater reliability was found to be at 85% or above. The agreed-upon codes for the data set were then put into NVivo for additional analysis.

FINDINGS

In the sections that follow, the authors present a case study for each of the three co-teaching pairs, providing reflection and interview data in order to describe how the co-teaching pair aligned with a traditional approach to student teaching and what the implementation of co-teaching looked like when it did occur.

Background on Elliot, Sarah, and School Site

Prior to attending the single subject credential program in 2014, Elliot completed his undergraduate degree in biology in 2013 at Kennedy University. As an undergraduate, Elliot completed 45 hours of observation (a prerequisite to the program) at the same school site in which he would complete his yearlong clinical experience.

Sarah, Elliot's co-teacher, was in her 25th year of teaching at the time of this study. Although Sarah was currently teaching middle school science, her initial training was in a multiple subject program and she later added her single subject credential. Elliot was the seventh pre-service teacher Sarah had hosted; however, all previous experience hosting occurred as a one-quarter clinical experience (ten weeks) and was prior to Kennedy University's utilization of co-teaching.

Lakemont Middle School, the school site in which Elliot completed his yearlong placement, is a public middle school that serves grades seven and eight and consists of 678 students and 57 faculty members. At Lakemont, Elliot and Sarah taught two periods of college prep biology and two periods of life science, one section being an English Language Learning class.

Elliot and Sarah's Implementation of Co-Teaching

Elliot and Sarah's Approach to Co-Planning

For planning, Elliot always began with a lesson that Sarah had created and implemented during a previous school year, but he had an opportunity to ask questions about the lesson or make modifications to it. Elliot never created a lesson by himself, and there was only one week of the 21-week placement in which Elliot reported in his weekly reflection developing a lesson plan collaboratively with Sarah. In an interview with Elliot, he clarified that the selection of developing a lesson plan collaboratively with Sarah was an error, and he meant to select a different co-planning choice. See Table 1 for the quantitative data from Elliot's weekly reflections – which were completed during part- and full-time co-teaching – regarding his approach to co-planning with Sarah.

The interview data from Elliot and Sarah confirmed this approach to planning, with Sarah taking the lead and collaborative planning rarely occurring. During Interview One, Elliot described their approach to planning: "She [Sarah] has these lesson plans that she's done for twenty-five years or so….We don't really deviate too much from those, but every so often…she'll ask me if there is something that I want

Table 1. Elliot and Sarah's planning practices

Planning Practices	Number of Weeks	% of Time
You were given lesson(s) or page(s) to teach without discussion	2/21	10%
You were given lesson(s) to teach with discussion and/or clarifying questions asked and answered	21/21	100%
You were given lesson(s) and jointly modified with your cooperating teacher	17/21	81%
You were given lesson(s) and you modified on your own	6/21	29%
Beginning with a standard/objective, you and your cooperating teacher jointly developed a new lesson	1/21	5%
Beginning with a standard/objective, you developed your own lesson	0/21	0%
Beginning with a standard/objective, you provided your cooperating teacher with a lesson for him/her to teach	0/21	0%

to take on or something that maybe I can improve on, so that's really how we co-plan." Sarah confirmed Elliot's description of their approach to planning and provided an explanation as to why she decided to approach planning in this way: "We actually have some really good units, so why reinvent the wheel at this point" (Interview 2). Sarah's years of teaching experience seemed to influence her decision to implement the lessons that were "tried and true" rather than start from scratch or let Elliot take the lead in planning. In addition, Sarah's decision to take the lead on planning stemmed from a concern she had about preparing her middle school students for a high-stakes exam, and once the exams had concluded, Sarah provided an opportunity for Elliot to take more of a lead in planning, but still began with her plans:

So at least this last unit- it's after testing so he [Elliot] had a little more….This is what we have. You can pick this and come up with something new. So he kind of had a little bit of that opportunity. I wish it could have been more. Also when you've been doing it for so long, it's what we have and it works. (Sarah, Interview 3)

Elliot and Sarah's Approach to Co-Instruction

Instruction also resembled a traditional student teaching placement in that Elliot and Sarah primarily implemented one teach/one observe and one teach/one assist. These two co-instructional strategies can be less collaborative in nature since one teacher is in a clear leadership role. More collaborative strategies – such as team teaching – were never used throughout the 21-week placement. Elliot and Sarah did have one instance of parallel teaching – providing an example of co-teaching – which will be explored in more detail in a different section of this chapter. See Table 2 for the quantitative data from Elliot's weekly reflections regarding the implementation of the six co-instructional strategies.

Table 2. Co-instructional strategies implemented by Elliot and Sarah

One Teach/One Observe	One Teach/One Assist	Team Teaching	Station Teaching	Parallel Teaching	Differentiated Teaching
21/21 weeks 100%	14/21 weeks 67%	0/21 weeks 0%	0/21 weeks 0%	1/21weeks 5%	0/21 weeks 5%

Reflecting on the yearlong experience during Interview Three, Sarah explained how they primarily implemented one teach/one observe and one teach/one assist as a means of keeping things "consistent" for her middle school students since Elliot was not involved in all class periods until full-time student teaching – the last two and half months of his clinical experience.

In the beginning, he's only here two days a week [during practicum], so this is what you're going to do. Observe and then you teach it in the afternoon. Then as it moved on in the winter when he was here part-time, I'm still teaching in the mornings. So I'm going to do it my way. I told him you can change it if you want, but we need to do this lab this day because we have to keep consistent. He didn't tend to want to change things much. (Sarah, Interview 3)

During Interview Two, Elliot provided his own thoughts on why Sarah was reluctant to implement more of the co-instructional strategies. Elliot explained, "She [Sarah] doesn't like it because her first two periods would have a different experience. If we did the co-teaching, her first two periods would be different than the ones I teach. So she doesn't like that it's not consistent across all classes" (Elliot, Interview 2).

Elliot and Sarah's Approach to Co-Assessing

For co-assessing, the self-reported reflection data from Elliot made it seem like this one aspect of co-teaching was more collaborative, with all three types of co-assessing occurring throughout the experience. For example, during Interview Two, Elliot commented that "We're really big on reflection, so we always do that afterwards….we always talk about how it went, what could have gone better." Although reflection on teaching was a daily occurrence, interviews with Elliot revealed that these informal reflections on teaching were used as opportunities for Sarah to provide feedback on Elliot's teaching and not necessarily an opportunity for co-generative dialogue (Scantlebury et al., 2008) in terms of an equal exchange of information and reflection on *their* teaching. During Interview Three, Elliot explained, "I mean sometimes, it's a little much, but there's a lot of feedback. If something didn't go well, she's gonna tell you about it." Elliot elaborated and said, "The majority of time spent was her talking at me instead of with me." See Table 3 for Elliot's quantitative data from his weekly reflections regarding his approach to co-assessing.

Table 3. Elliot and Sarah's co-assessing practices

Co-Assessing Practices	Number of Weeks	Percentage of Time
Informal: You and your cooperating teacher collaboratively reflected on lesson(s), student learning, and engagement	19/21	90%
Informal: You and your cooperating teacher discussed possible changes that could have improved the lesson(s), student learning, and engagement	19/21	90%
Informal: You and your cooperating teacher discussed modifications to future lessons based on observations & post-lesson reflections	14/21	67%

Meeting the Needs of Diverse Learners Encourages Co-Instructing

When examining the instances of co-teaching – one teach/one observe, one teach/one assist, and parallel instruction – most instances involved the teaching of diverse learners, specifically, a class that Sarah taught to English Language Learners that included a paraprofessional. During interviews, Sarah expressed the value she saw in implementing co-instructional strategies in this class as a means of lowering the student-to-teacher ratio and supporting students who had a variety of learning needs.

With my EL class, it was really nice having the extra body….We have about 14 [students] at that point, and I have an aid and him [Elliot], so there's [sic] three adults….It was wonderful because we could basically each take a small group. One time my aid took the low-end kids and was working on reading and pulling out information….One of us had the high-end and someone had the middle so that we could ability group the kids and that was wonderful to have the extra body to do that. (Sarah, Interview 1)

In the above interview excerpt, Sarah seems to see the value in co-teaching and how it can provide better learning opportunities for secondary students.

During Interview Three, a member of the research team probed Elliot for more details as to why parallel instruction was used since this was an anomaly from one teach/one observe and one teach/one assist.

Elliot: *Oh, it was because she teaches one class period a day where it's an all EL class. Since we had three teachers that day and it was a single section, we each paired up – because it was only like 12 students in the class. So we each paired up with four kids, and we went over the dissection with my group, she went over it with her group, and the aid went over it with her group. That was how that worked.*

Interviewer: *And what was that like? Did that feel different?*

Elliot: *Yeah. Honestly, any time I got to do the co-teaching, I saw what the model was about, and I understood why it's so cool.*

Similar to Sarah, Elliot expressed the value he saw in implementing co-instructional strategies with the EL class. Elliot also reflected on the parallel instruction lesson in his weekly reflection and explained, "It [co-teaching] was a welcome change from the previous flow of the classes…It showed me the intent of the [Kennedy University] program and how co-teaching, when done right, aides both parties" (Elliot, Reflection, Week 18).

BACKGROUND ON GRACE, IGNACIO, AND SCHOOL SITE

Grace comes from a family of teachers and discovered her natural ability to teach by way of tutoring peers at Kennedy University. She enrolled in the credential program in 2014 after completing an undergraduate degree in biology at the same university.

Ignacio, Grace's co-teacher, had been teaching biology and environmental science for 19 years, with the last 14 of those years teaching at Lewis High School. Prior to hosting Grace, Ignacio had hosted six pre-service teachers; however, this was the first year that Ignacio was hosting a Kennedy University

pre-service teacher. Ignacio wore many hats at the high school including serving as department chair and coaching track and field, cross country, and basketball.

Lewis High School, the school site of Grace's clinical experience, is a public high school that houses grades nine through twelve. The school consists of 216 faculty and approximately 2,750 students. 85% of the population is Hispanic with 48% of the population being English Language Learners. At the time of this study, Grace and Ignacio were teaching four periods of environmental science (one section specifically an English Language Learner course and another section containing six students in special education) as well as two additional AP biology class sections.

Grace and Ignacio's Implementation of Co-Teaching

Grace and Ignacio's Approach to Co-Planning

Grace and Ignacio also appeared to implement more of a traditional model of student teaching than co-teaching; however, they did implement more co-instructional strategies than Elliot and Sarah. For planning, the weekly reflection data from Grace shows that planning primarily included beginning with what Ignacio had previously developed and then moving into Grace developing her own plans. Although Grace did have an opportunity to develop her own plans – providing her with freedom in the planning process – there were few instances of planning in which Grace and Ignacio sat down to develop a lesson from scratch collaboratively. See Table 4 for the planning practices that Grace implemented throughout the 21 weeks.

During Interview One, Grace described what her planning process with Ignacio looked like early in the clinical experience: "Most of it's just his plans and he'll tell me what he wants to do and I'll get to look at it, and if I don't really like something, I can change it and he's totally good with that. But mostly we've just been using his plans." As the clinical experience progressed, Ignacio envisioned having Grace take on more planning responsibilities, which he described in Interview One:

When she takes over all the classes – and we've already had this conversation – now she's going to do the planning for the next unit after spring break. Cause after spring break she takes over all four bio classes – the two regular ones and the two remedial ones – and I'm just gonna teach the AP classes,

Table 4. Grace and Ignacio's planning practices

Planning Practices	Number of Weeks	% of Time
You were given lesson(s) or page(s) to teach without discussion	2/21	10%
You were given lesson(s) to teach with discussion and/or clarifying questions asked and answered	12/21	57%
You were given lesson(s) and jointly modified with your cooperating teacher	8/21	38%
You were given lesson(s) and you modified on your own	7/21	33%
Beginning with a standard/objective, you and your cooperating teacher jointly developed a new lesson	5/21	24%
Beginning with a standard/objective, you developed your own lesson	3/21	14%
Beginning with a standard/objective, you provided your cooperating teacher with a lesson for him/her to teach	1/21	5%

just to get the kids prepared for the exam. Now she's going to make her own deal and I already told her, you're doing it. You can give me a copy so I can see what it looks like.

Using language such as "takes over all the classes" and "make her own deal" communicate that planning was not collaborative but that Grace was in a lead planning role once this transition occurred. In addition, Grace and Ignacio appeared to divide up the classes (Grace taking four and Ignacio taking two) rather than co-teaching all six classes. This approach aligned itself more with a traditional model of student teaching. Grace attributed an inability to fully engage in authentic co-teaching on a daily basis due to inadequate time for planning. Grace and Ignacio only had one hour to plan each day. As a result, they relied heavily on pre-existing lesson plans already developed by Ignacio, and infrequently engaged in collaborative planning.

Grace and Ignacio's Approach to Co-Instructing

Similar to the approach to planning, co-instructing also followed the model of one co-teacher being the lead in instruction while the other co-teacher served as an assistant. In the 21 weeks of reflections from Grace, one teach/one assist was the primary co-instructional strategy utilized with team teaching and one teach/one observe falling close behind. Team teaching – while potentially more collaborative in nature – was revealed in Interview Two with Grace to be representative of "we take turns" with one co-teacher taking the lead in a portion of the lesson while the other assists, and then switching roles for a different portion of the lesson. In addition, Grace and Ignacio attempted the other three co-instructional strategies (station, parallel, and differentiated), but these attempts were usually on one or two occasions (with the exception of differentiated teaching). See Table 5 for more information about the implementation of co-instructional strategies.

This pair aligned with the traditional student teaching model in terms of instruction with Grace observing for the first class period and then "mimicking" Ignacio's model for the remaining time: "Ignacio usually teaches that one [second period], and I watch him and observe, just kind of figure out what questions he asks the students and what little stories he adds in and where. And then I'll take over third and normally do third by myself. If I forget anything, Ignacio is always in the back doing some stuff and he'll jump in" (Grace, Interview 2). This model was established based on Ignacio's belief that this traditional method would give Grace the opportunity to "figure out what it was like to teach by [herself] within the classroom" (Grace, Interview 2). Ignacio confirmed this approach to co-instructing and stated in Interview Three: "I'm definitely a back-seat driver. I do very little. I do throw some things out here and there, but it's her classroom, which is what it should be, because otherwise, I believe she would not be ready." This quote from Ignacio reveals that his approach to mentoring Grace aligned with the traditional model to student teaching, stressing the importance that Grace was alone in the classroom in

Table 5. Co-instructional strategies implemented by Grace and Ignacio

One Teach/One Observe	One Teach/One Assist	Team Teaching	Station Teaching	Parallel Teaching	Differentiated Teaching
10/21 weeks 48%	13/21 weeks 62%	12/21 weeks 57%	2/21 weeks 10%	2/21weeks 10%	7/21 weeks 33%

order to prepare for next year when she would be an employed teacher instead of viewing the opportunity to co-teach as a way to help both co-teachers grow.

Grace and Ignacio's Approach to Co-Assessing

In contrast to Elliot and Sarah, Grace reported in her weekly reflections limited opportunities to reflect on teaching with Ignacio. Table 6 reveals that over the course of the 21-week part-/full-time placement, co-assessing occurred less than 50% of the time. Although co-assessing occurred infrequently, when it did, co-assessing was less collaborative and consisted of Ignacio providing feedback on Grace's teaching after observing. During Interview One, Grace reflected on the implementation of one teach/one observe (where Ignacio was observing her teach) and commented on what would happen after the lesson: "And when we're done, he [Ignacio] always sits and tells me what he thinks and what I need to do next time." See Table 6 for more information about Grace and Ignacio's co-assessing practices.

New Standards Require New Plans

When co-planning did occur for Grace and Ignacio, it was around the need to create new lessons that aligned with the Next Generation Science Standards. It was not until the lessons stepped outside of Ignacio's expertise and experience that co-planning occurred. For example, with recent changes to the ecology standards, the new standards required new plans that Ignacio had not previously developed or successfully executed. Pushing Ignacio into an area where he was not completely established opened the opportunity for Grace to contribute her own ideas. Grace explained how this required co-planning: "We then went through Ignacio's lessons to determine which ones should stay, be modified, or be skipped. For two of the standards we had no lessons that would cover that material. From there, we brainstormed ideas for topics that would work well for that standard. Next week, we will begin to organize and detail some of these future lessons" (Grace, Reflection, Week 6). Teaching to new standards created an authentic opportunity for collaboration. Furthermore, these new standards disrupted the power dynamic of master teacher and beginning teacher and created a space for Grace to work side-by-side with Ignacio, developing something new.

Meeting the Needs of Diverse Learners Encourages Co-Instruction

Another instance in which co-teaching occurred was when teaching the class sections with a high population of English Language Learners. Although both co-teachers spoke some Spanish, Ignacio was

Table 6. Grace and Ignacio's co-assessing practices

Co-Assessing Practices	Number of Weeks	Percentage of Time
Informal: You and your cooperating teacher collaboratively reflected on lesson(s), student learning, and engagement	6/21	29%
Informal: You and your cooperating teacher discussed possible changes that could have improved the lesson(s), student learning, and engagement	9/21	43%
Informal: You and your cooperating discussed modifications to future lessons based on observations & post-lesson reflections	5/21	24%

more confident. Grace explained, "He tries to do their lab in Spanish with them, which is hard because he doesn't know that much, but he knows way more than I do. He'll help them in Spanish, and I help everyone else" (Interview 1). With a desire to meet the needs of their diverse learners, in classes that held a greater dynamic of English Language Learners, the co-teachers became active participants within the classroom and diminished the power differential that one instructor was "in-charge" while the other took more of a subordinate role.

BACKGROUND ON STACEY, REBECCA, AND SCHOOL SITE

Stacey, originally a pre-med biology major, switched her focus to biology in education and earned her undergraduate degree at Kennedy University in 2014. Stacey completed 45 hours of observation at a middle and high school prior to beginning the credential program in 2014.

At the time of this study, Rebecca had been teaching science for approximately 32 years with 30 of those years at Patrick High School. Rebecca had previous experience mentoring pre-service teachers, hosting between 10-15 pre-service teachers. However, this was the first time that Rebecca was hosting a pre-service teacher from Kennedy University under the co-teaching model.

Patrick High School – the school site for Stacey's clinical experience – is a public high school, housing grades nine through twelve. This school site is home to 2,442 students and 227 faculty members. Stacey and Rebecca's teaching schedule consisted of teaching three different courses: biology (three sections), marine science, and forensic science.

Stacey and Rebecca's Implementation of Co-Teaching

Stacey and Rebecca's Approach to Co-Planning

Table 7 provides Stacey's weekly reflection data in which she identified the co-planning practices that were in place for her 20-week placement. While Stacey did exhibit a traditional approach to planning, with 16 out of 20 weeks consisting of Stacey developing a lesson on her own and nine out of 20 weeks

Table 7. Stacey and Rebecca's planning practices

Planning Practices	Number of Weeks	% of Time
You were given lesson(s) or page(s) to teach without discussion	0/20	0%
You were given lesson(s) to teach with discussion and/or clarifying questions asked and answered	9/20	45%
You were given lesson(s) and jointly modified with your cooperating teacher	9/20	45%
You were given lesson(s) and you modified on your own	2/20	10%
Beginning with a standard/objective, you and your cooperating teacher jointly developed a new lesson	6/20	30%
Beginning with a standard/objective, you developed your own lesson	16/20	80%
Beginning with a standard/objective, you provided your cooperating teacher with a lesson for him/her to teach	0/20	0%

being given a lesson to teach, she also experienced more collaborative planning with six instances of developing a lesson with her co-teacher.

Planning resembled traditional student teaching in that at the beginning of the placement, Rebecca took the lead and gradually the leadership in planning shifted to Stacey as the clinical experience progressed:

January to February, I would say that she [Rebecca] would present the activities that she would do and the course development that she would do, and then I would add in anything that I want to try….But for the most part, I think she presented her ideas and what she's done but then was totally open to comments or questions or things I wanted to do. But now we're getting to the course where I'm planning almost all of it, so it's fun. (Stacey, Interview 2)

As the clinical experience progressed, Stacey and Rebecca divided the planning between her three different preps, and Stacey "solely took over the biology course" (Stacey, Interview 3). Stacey explained, "I am 100 percent on my own planning that course [biology], but then the other two, marine science and forensics, we kind of plan together. But she definitely takes a leading role in those classes because I'm not as familiar with these courses" (Interview 3). Based on the interview data, the number of different classes that Stacey and Rebecca were teaching and the content focus of those classes perhaps encouraged Stacey and Rebecca to implement more of a traditional approach to planning, dividing up the planning responsibilities rather than collaboratively planning.

Stacey and Rebecca's Approach to Co-Instruction

Stacey's instruction aligned primarily with a traditional approach to student teaching with one teach/one observe and one teach/one assist being used almost every week of the clinical experience. Stacey and Rebecca did experiment with team teaching, but based on the interview data, this team teaching was similar to Grace and Ignacio's approach in that it consisted of dividing up portions of the lesson to teach rather than joint team teaching, revealing a lower level of collaboration during the lesson and approaching this team teaching in a more prescribed way. In addition, there were one or two weeks where Stacey and Rebecca attempted a more collaborative co-instructional strategy (e.g., differentiated teaching); however, these were not the typical co-instructional strategies implemented.

During the interviews, Stacey described her approach to co-instruction: "Co-instructing for the two classes that she [Rebecca] is involved with, she leads, and then I assist, so I'm in the classroom circulating and helping, but she is the main instructor in those two. But then when it comes to my class, biology, I'm the main instructor, and then we kind of reverse roles – she'll help assist if there's [*sic*] any labs" (Interview 3). When deviating from one teach/one assist and implementing team teaching, Stacey and Rebecca often divided the lesson into different segments. Stacey described this approach in her weekly reflection: "We both had a particular part of the lesson that we were responsible for and transitioned from

Table 8. Co-instructional strategies implemented by Stacey and Rebecca

One Teach/One Observe	One Teach/One Assist	Team Teaching	Station Teaching	Parallel Teaching	Differentiated Teaching
20/20 weeks 100%	19/20 weeks 95%	8/20 weeks 40%	1/20 weeks 5%	1/20weeks 5%	2/20 weeks 10%

one to the other. For example, Rebecca would open the class with reminders and collect homework. Then I would present the whiteboard activity. We would both circulate the room assisting students" (Stacey, Reflection, Week 5). Although Stacey identified this as team teaching, it seemed less collaborative in nature – dividing up the lesson rather than teaching the lesson together – and in some ways, resembled one teach/one assist.

Stacey and Rebecca's Approach to Co-Assessing

One area in which Stacey and Rebecca implemented co-assessing was reflecting collaboratively after each lesson. Table 9 reveals that these informal conversations occurred 100% of the time, with 90% of the time these discussions resulting in changes to future lessons.

Teaching Outside of the Content Area Encourages Co-Planning

Although the quantitative weekly reflection data showed primarily one teacher in the lead for planning (either Stacey or Rebecca depending on the class being taught), the qualitative reflection and interview data revealed what appeared to be a more collaborative approach to planning, one that was prompted perhaps by the number of different courses and Stacey's limited knowledge in marine biology and forensics. In Stacey's weekly reflections, she described their approach to co-planning a protein identification lab in which they were beginning with what Rebecca had previously done and "determined what modifications were necessary and what materials we need to gather" (Reflection, Week 11). Stacey also described how they "bounced ideas off each other and came to a consensus" when planning for the marine sciences final (Reflection, Week 22) and how she "had an idea" and Rebecca "gave input on how to evolve that idea" (Reflection, Week 17).

During Interview Two, Rebecca commented on how the highlight of co-teaching was the ability to collaboratively plan:

It's validating when she [Stacey] takes one of my ideas, and she says, 'Oh, I really like that!' But then it's also nice where I say, 'Oh, I'm stealing that!' It's kind of this synergy. The feeling of it really takes two adults to do a good job in the classroom, and I know I'm not gonna have one forever, so I'm gonna take advantage of this. But I feel just having another adult to talk to, to bounce ideas off of [was the best part co-teaching]. (Interview 2)

Table 9. Stacey and Rebecca's co-assessing practices

Co-Assessing Practices	Number of Weeks	Percentage of Time
Informal: You and your cooperating teacher collaboratively reflected on lesson(s), student learning, and engagement	20/20	100%
Informal: You and your cooperating teacher discussed possible changes that could have improved the lesson(s), student learning, and engagement	19/20	95%
Informal: You and your cooperating teacher discussed modifications to future lessons based on observations & post-lesson reflections	18/20	90%

Rebecca found value in the ability to co-plan, and this perceived value would be one place to start if trying to encourage this pair to implement additional co-teaching. Rebecca further aligned herself with the intent of the co-teaching model when in Interview Two she described how she did not want Stacey to feel isolated and that she did not have the opportunity to collaborate with someone else. Even when transitioning to Stacey taking more of the lead in planning for the biology class, Rebecca described how she wanted Stacey to view her as a resource: "I think I'll always be a resource where she throws ideas at me" (Interview 2).

Supporting Student Participation in Labs Through Co-Instructing

When Stacey and Rebecca did co-instruct, it typically was used in order to facilitate labs in class. Team and differentiated teaching were particularly useful when guiding students through an oil-eating bacteria lab. Stacey described how they implemented co-instruction during this lab: "One at a time, I led a group of students through the lab while Rebecca oversaw the rest of the students and led them through the other portion of the lab. We were able to get twice as much accomplished with two instructors! It was great!" (Reflection, Week 16).

Similarly, Stacey and Rebecca implemented differentiated teaching when some of the students were not prepared to complete the lab on the day when it was implemented. During Interview Two, Stacey explained that they had a portion of the class not complete the pre-lab for homework. Therefore, these students were not able to participate in the lab. Rather than not implementing the lab for the entire class, Stacey and Rebecca decided to differentiate their instruction by capitalizing on the two teachers in the classroom:

Half the class was doing the lab and half the class was doing the pre-lab, and so she [Rebecca] helped lead the lab and I went and helped all the kids do the prior work that they should have done. And it was interesting because it turned out to be the kids that didn't do it were more the struggling students and so they needed a lot more scaffolding, a lot more help and so…it ended up being pretty good. I mean, ultimately we would like for everyone to be on the same page and for them all to do the lab and everything, but it was neat to have two people in there where there was two sets of different students that needed certain learning strategies, so it was pretty cool. (Interview 2)

DISCUSSION AND IMPLICATIONS

Co-teaching, a different approach to training teachers than the three cooperating teachers had experienced, can be challenging to understand and implement. Because of the learning curve associated with this new model of teacher training, it makes sense that a co-teaching pair might align with a traditional approach to student teaching. Although the three science pairs typically aligned with a more traditional approach to student teaching, there was evidence of the implementation of co-teaching, perhaps suggesting that with the proper training and support, more instances of co-teaching could occur. In the sections that follow, the authors identify common barriers to implementation as well as key factors that enabled co-teaching to be implemented. The authors also provide recommendations for teacher education programs on how to better support the understanding and implementation of the co-teaching model, grounding these recommendations in the research on teacher change.

Barriers to Implementation

For all three pairs, one barrier to implementation appears to be a cooperating teacher's longevity in the profession combined with prior experiences exclusively with the traditional model of student teaching. The teaching experience of the three cooperating teachers in this study ranged from 19 – 32 years and each had hosted at least six previous candidates utilizing a traditional model of student teaching. Based on this data, the study suggests more explicit conversations and trainings may need to occur with such veteran cooperating teachers to ensure there is a clear understanding as to how co-teaching differs from what these cooperating teachers have experienced over the life of their career. For example, within co-teaching trainings, teacher education programs could provide breakout sessions to address implementation issues for various constituents (e.g., first time cooperating teachers, veteran cooperating teachers with past experience hosting under the traditional student teaching model, experienced implementers of co-teaching).

Another common barrier for the three co-teaching pairs was a lack of reflection on *their* teaching. Interviews indicated that even when reflection occurred, it typically focused on the pre-service teacher and sometimes felt more like an evaluation of the pre-service teacher rather than a reflection. A possible unintended side effect of this was reinforcement of a power differential where the pre-service teacher was viewed as "less experienced" and in need of advice from a "superior." To alleviate this barrier, teacher education programs can provide better structures around reflection. One way to encourage collaborative reflection could be to provide guiding questions for reflection (e.g., How could we have better utilized having two teachers in the classroom to meet the needs of all learners? Reflect by yourself first, then share with your co-teacher your self-identified strengths and areas for growth). Another way to address this barrier is by asking cooperating teachers to model self-reflection after they have taught all or part of a lesson. This emphasizes the concept of lifelong learning and lowers the potential for anxiety or defensiveness on the part of the pre-service when receiving feedback.

A final common barrier for the three co-teaching pairs was an apparent lack of clarity regarding each of the co-instructional strategies, including misunderstanding of the possible benefits of using the various co-instructional strategies. This was seen when two of the three co-teaching pairs implemented team teaching in a manner that was more closely aligned with one teach/one assist. This interpretation of team teaching does not take full advantage of having two teachers equally and actively engaged with student learning throughout a lesson. Another example of the misunderstanding of the benefits of the co-instructional strategies was apparent through accidental successes. One co-teaching pair benefitted from differentiated instruction only because students came to class unprepared. Later they reflected that those students were in fact struggling and required more scaffolding than the rest of the class. In order for teacher education programs to better support its co-teaching pairs to understand and strategically implement the co-instructional strategies, trainings could include think alouds of co-teaching pairs sharing how they came to determine which co-instructional strategy would produce the best results for students. Models of lesson plans, video clips of the co-instructional strategies in action, and the reflections of co-teachers could also help to clarify not only how each co-instructional strategy could be utilized but also the collaborative reflection of co-teachers.

Key Factors that Enabled Co-Teaching

Teaching Diverse Learners

For all three co-teaching pairs, the diverse learning needs of their students encouraged the implementation of co-teaching. In the case of Elliot and Sarah and Grace and Ignacio, teaching English Language Learners created an opportunity for the implementation of parallel and differentiated instruction. Lowering the student-to-teacher ratio was an important first step in meeting the needs of these diverse learners. In addition, strategically grouping students by ability level (in the case of Elliot and Sarah) was another way to meet the needs of diverse students. Stacey and Rebecca implemented co-teaching not necessarily because their students were English Language Learners but because there were different levels of preparedness (e.g., when implementing a lab), so the learning needs of the students required a differentiated approach to instruction.

Drawing on the teacher change research, all three co-teaching pairs found student success when implementing co-teaching to meet the needs of their diverse learners, perhaps serving as a pivotal opportunity to change the cooperating teachers' beliefs about co-teaching since they saw success with their students (Guskey, 1985; Guskey, 2002). Capitalizing on this opportunity, teacher education programs could help support co-teachings pairs to collect data on student learning in order to provide evidence that the implementation of co-instructional strategies did, in fact, increase student learning. By collecting and analyzing this data, if positive learning gains were evident, cooperating teachers might be more likely to see the value in implementing co-teaching when teaching diverse learners and extend these co-teaching practices to support all learners.

Teaching New Content

For Grace and Ignacio and Stacey and Rebecca, new science standards or content where one of the co-teachers was less confident created authentic opportunities for collaborative planning. It makes sense that more collaborative planning would occur when developing a new lesson, for the power differential was disrupted with the cooperating teacher no longer having a wealth of experience and archive of lessons but instead, both co-teachers were positioned as learners. In the case of Stacey and Rebecca, Stacey's limited knowledge of forensics and marine biology – two courses that she was teaching with Rebecca – provided an opportunity for Rebecca to position herself as a mentor, engaging in discussions about the content and providing insight into how she approached planning for these classes. For Elliot and Sarah, the opportunity for collaborative planning never occurred because they relied on the lesson plans that Sarah had implemented over the course of her teaching career.

In order to encourage collaborative planning opportunities, teacher education programs could provide professional development for the co-teaching pairs around the Next Generation Science Standards and innovative instructional practices. For example, a multi-day professional development on project-based learning could be provided for co-teaching pairs. The co-teaching pairs would attend this professional development together, receiving foundational information on project-based learning and being tasked to design a project to be implemented at their school site. Since this project would be new curriculum, both co-teachers would be on an equal playing field and would be designing a unit of instruction together. Then, continued support would be provided to the pair throughout the clinical experience, providing guidance on developing and implementing the project, offering this support at the school site. Providing

professional development that was focused and sustained would create an authentic reason for collaborative planning. By providing "a support group for initial change and experimentation," the co-teaching pair might be more likely to "grow and become more reflective" (Sparks, 1998, p. 117), engaging in co-generative dialogue (Scantlebury et al., 2008).

Discipline-Specific Content

The data also revealed that the content of the discipline itself might provide natural opportunities for the implementation of co-teaching. For example, Stacey and Rebecca frequently used co-instructional strategies when implementing labs, showing how the content of a lab encourages co-teaching. Having two teachers in the classroom to set up the lab, circulate to provide one-on-one instruction during the lab, and assist with cleanup aided the implementation of a lab and ultimately created a more student-centered learning environment. Researchers on teacher change argue that some elements of teacher change and practice are more easily changed than others (Franke et al., 2001; Franke & Kazemi, 2001), and in the case of Stacey and Rebecca, changing the approach to implementing labs through the use of co-instructional strategies seemed like a natural and easy change in practice.

CONCLUSION

The results of this study confirm the challenges associated with implementing a new model for the clinical experience. In order to enact a change in the practice of a cooperating teacher when supporting the development of a pre-service teacher, the cooperating teacher must be properly supported to understand the model of co-teaching. In addition, opportunities to employ co-planning, co-instructing, and co-assessing and find success when implementing these aspects of co-teaching are important contributors to moving along the continuum of co-teaching and disrupting the master/beginning teacher power dynamic that often can inhibit collaboration. Positioning both co-teachers as learners and focusing on increasing the learning of their students can be an important first step in seeing value in the co-teaching model.

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KEY TERMS AND DEFINITIONS

Clinical Experience: Clinical experience is the fieldwork portion of a teacher credentialing program where a pre-service teacher is paired with a cooperating teacher. This has often been referred to as student teaching.

Co-Assessing: Co-assessing occurs when the co-teachers collaboratively evaluate, grade and reflect upon the results of assessments. Co-assessing also includes reflecting informally on how a lesson went. Assessments might be formative (e.g., quick writes, homework, exit slips) or summative (e.g., lab reports, tests, essays). In either case, co-assessing conversations should focus on what students have learned, where there is room for growth, and next steps for instruction.

Co-Instructing/Co-Instructional Strategies: Co-instructing occurs when the co-teachers have intentional, active, and specific roles within a lesson. Options for co-instructing include the following strategies: one teach/one observe, one teach/one assist, team teaching, station teaching, parallel teaching, and differentiated teaching.

Co-Planning: Co-planning occurs when the co-teachers discuss and develop lessons and/or assessments collaboratively. Both teachers are actively involved in the planning process by sharing ideas, developing drafts for feedback, sharing resources, etc. Co-planning may occur in person or virtually (e.g., through the use of Google Docs).

Co-Teaching: A model of student teaching where both the cooperating teacher and pre-service teacher are engaged in student learning at all times through daily co-planning, co-instructing, and co-assessing. Through intentional reflective dialogue and collaboration, there is potential for professional development and growth for both co-teachers.

Cooperating Teacher: A cooperating teacher is a certificated teacher of record working within a school system who hosts a pre-service teacher during the clinical experience.

Pre-Service Teacher: A pre-service teacher is a post-baccalaureate student who is studying to earn a teaching credential and enter the teaching profession.

Traditional Student Teaching: Traditional student teaching typically involves a master teacher who gradually releases responsibility of classroom instruction to their student teacher. The final phase of traditional student teaching is often an extended period of 'take-over' where the student teacher has full responsibility of the classroom with minimal active participation from the master teacher. This model is sometimes associated with a "sink or swim" method for learning to teach.

ENDNOTES

[1] Pseudonyms are used throughout the chapter for all names and schools.

[2] For more information on the different co-instructional strategies, see Bacharach et al. (2010).

APPENDIX 1: WEEKLY REFLECTION SURVEY

Table 10. Weekly reflection survey

Last Name:
First Name:
Current Program:
Cooperating Teacher:
School:
Date:
What was your most memorable moment this week?
What was your biggest challenge this week?
Did you and your cooperating teacher co-teach this week?
If yes, please provide a specific example of how co-teaching (co-planning, co-instructing, or co-assessing) was implemented in your classroom this past week. If co-teaching did not occur, what do you see as the barriers?
Approximately how much time was spent co-planning this past week?
How often did you take the lead role during co-planning?
Which of the options below most accurately reflect your planning experiences this past week? (1) You were given lesson(s) or page(s) to teach without discussion, (2) You were given lesson(s) to teach with discussion and/or clarifying questions asked and answered, (3) You were given lesson(s) and jointly modified with your cooperating teacher, (4) You were given lesson(s) and you modified on your own, (5) Beginning with a standard/objective, you and your cooperating teacher jointly developed a new lesson, (6) Beginning with a standard/objective, you developed your own lesson, (7) Beginning with a standard/objective, you provided your cooperating teacher with a lesson for them to teach, (8) Other
How often did co-instructing occur this week?
How often did you take the lead role in co-instructing?
Which of the strategies below did you utilize when co-instructing this past week? (1) Station teaching, (2) Team teaching, (3) Parallel teaching, (4) Differentiated teaching, (5) None of the above, (6) Other
How often did co-assessing occur this week?
How often did you take the lead role in co-assessing?
Which of the following options below most accurately reflect your assessing experiences this past week? Formal Assessment: (1) Your cooperating teacher evaluated/graded assessments and discussed results with you, (2) You evaluated/graded assessments and discussed results with your cooperating teacher, (3) You and your cooperating teacher evaluated/graded assessments collaboratively; Informal Assessment: (1) You and your cooperating teacher collaboratively reflected on lesson(s), student learning, and engagement; (2) You and your cooperating teacher discussed possible changes that could have improved the lesson(s), student learning, and/or engagement; (3) You and your cooperating teacher discussed modifications to future lessons based on observations and post-lesson reflection; (4) Other
Do you feel your students view you as an additional teacher in the classroom?
Do you feel both you and your cooperating teacher are engaged in furthering student learning throughout the school day?

APPENDIX 2: INTERVIEW PROTOCOLS FOR CO-TEACHING PAIRS

Interview 1

1. Tell me a little bit about your teaching career.
2. Describe your relationship with your co-teacher. What are the strengths and challenges of this relationship?
3. Have you already established that you are co-teachers in the classroom? If so, how? If not, in what ways have you not established that you are co-teachers?
   3a. Have you co-planned during practicum? If yes, describe what co-planning looked like?
   Possible Probes:
      i. How much time did you co-plan per week?
      ii. Who took the lead in co-planning?
      iii. What was your role in co-planning?
      iv. What were the benefits of co-planning?
      v. What challenges did you encounter when co-planning?
   3b. Have you co-instructed during practicum? If yes, what did co-instructing look like?
   Possible Probes:
      i. If yes, what co-instructional strategies did you implement?
      ii. What worked about the co-instructional strategy?
      iii. What was challenging about the co-instructional strategy?
   3c. Have you co-assessed during practicum? If yes, what did co-assessing look like?
   Possible Probes:
      i. Did you design, grade, and/or analyze assessments together?
      ii. Who took the lead when co-assessing?
      iii. What benefits did you see to co-assessing?
      iv. What challenges did you encounter when co-assessing?
4. What do you look forward to about co-teaching in January?
5. What challenges do you anticipate encountering as you implement co-teaching in January? What would help you to overcome these anticipated challenges?

Interview 2

For this interview, I would like you to think about your experience during part-time co-teaching as you respond to these questions. Part-time co-teaching occurred in January (after winter break) and will conclude at the end of March/beginning of April.

1. Describe to me a day in the life of co-teaching. What would I see and hear? How do you spend your time together?
2. Describe your planning process as a cooperating teacher/teacher candidate within the part-time clinical experience.
   Possible Probes:
   a. What does co-planning look like? Provide a specific example of how you co-planned a recent lesson.

   b. Who takes the lead in planning?
   c. How much time do you spend co-planning?
   d. In what ways are you implementing co-planning?
   e. In what ways are you not implementing co-planning?
3. Describe your assessment practices with your teacher candidate/cooperating teacher within the part-time clinical experience.
   Possible Probes:
   a. Provide an example of how you have co-assessed this quarter.
   b. If you haven't co-assessed this quarter, what has been a challenge/barrier to co-assessing?
4. In the previous two questions, we discussed planning and assessing. Now, describe what instruction looks like with your teacher candidate/cooperating teacher during the part-time clinical experience.
   Possible Probes:
   a. Provide an example of a lesson that you co-taught. What did it look like?
   b. What co-instructional strategies have you used this quarter?
   c. Which co-instructional strategies do you use most frequently?
   d. Are there any co-instructional strategies that you haven't tried?
      i. Why haven't you tried this co-instructional strategy?
5. Tell me about the sharing of *leadership* in co-teaching – sharing *planning*, *instructing*, and *assessing* responsibilities.
   Possible Probes:
   a. How did edTPA impact the transition of leadership in co-planning, co-instructing, and/or co-assessing?
6. Describe a *co-teaching experience* that you have had during *part-time co-teaching* that went *well*. In what ways did it go well?

Note: This question may not need to be posed if the previous questions have elicited a response to this question.

7. Describe a *challenging co-teaching* experience that you have had during *part-time* co-teaching.
   Possible Probes:
   a. What challenges did you face?
   b. What was the cause of these challenges?
   c. How are you working to resolve this or how have you resolved this challenge?
8. What is *one goal* that you have for *co-teaching* during the *full-time* clinical experience?
9. What do you think *contributes the most* to whether co-teaching is successful or not?

Interview 3

Kennedy University defines the components of co-teaching as co-planning, co-instructing and co-assessing. For each of these areas, we'd like you to reflect on how they played out during full-time co-teaching and how they evolved through out the clinical experience. Although these first few questions may seem redundant, we want you to focus on each particular aspect of co-teaching.

1. What has co-planning looked like for you and your co-teacher during full-time co-teaching? How has co-planning evolved throughout the clinical experience?
2. What has co-instructing looked like for you and your co-teacher during full-time co-teaching? How has co-instructing evolved throughout the clinical experience?
3. What has co-assessing looked like for you and your co-teacher during full-time co-teaching? How has co-assessing evolved throughout the clinical experience?
4. Share and reflect on quantitative data.
5. Reflecting on the clinical experience, what has been the highlight of the co-teaching experience?
6. Reflecting on the clinical experience, what has been the greatest challenge of the co-teaching experience?
7. Has the co-teaching experience shaped how you think about reflection? If so, how so?
8. Has the co-teaching experience shaped how you think about collaboration? If so, how so?
9. Describe the role the university supervisor played in supporting the implementation of co-teaching.
10. What advice would you provide to a co-teaching pair beginning the clinical experience?

APPENDIX 3: UNIVERSITY SUPERVISOR INTERVIEW PROTOCOL

1. Tell me a little bit about your career in education and your role as a university supervisor.
2. What is co-teaching? How would you describe it to someone who is unfamiliar with this method of teaching?
   Possible Probes:
   What do you think are the benefits and drawbacks of co-teaching?
3. Describe the relationship between your co-teaching pair. What are the strengths and challenges of this relationship in respect to implementing co-teaching?
4. Over the course of the clinical experience, how did your co-teaching pair establish that they were co-teachers in the classroom?
5. Over the course of the clinical experience, what barriers prevented your co-teaching pair from establishing that they were co-teachers in the classroom?
6. Did you observe or hear of any strengths AND/OR challenges from your co-teaching pair regarding co-planning? If there were challenges, did you provide any support/solutions?
7. Did you observe or hear of any strengths AND/OR challenges regarding co-instructing? If there were challenges, did you provide any support/solutions?
8. Did you observe or hear of any strengths AND/OR challenges from your co-teaching pair regarding co-assessing? If there were challenges, did you provide any support/solutions?
9. How did Kennedy University's program help to support you to understand the co-teaching model?
10. What was most helpful to you when supporting your co-teaching pair to implement co-teaching?
11. What would have helped you to better support your co-teaching pair to implement co-teaching?

Chapter 2
Learning to Theorize from Practice:
The Power of Embedded Field Experiences

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ABSTRACT

Too often, university methods courses privilege theory and expect teacher candidates to imagine what it means for classroom practice. This chapter illustrates the power of innovative methods courses with embedded field experiences because they are designed to offer intentional and systematic opportunities for teacher candidates to theorize from practice each and every class period. Using as an example Brett, a former teacher candidate and now early career 2nd grade teacher, we illustrate Brett's meaning-making of classroom based experiences both within the teacher education program and into her own classroom as we describe the design of English-language arts and mathematics methods courses for preservice teachers that leverage embedded field experiences.

INTRODUCTION

"Miss Brett, will you come sit with me?" - my small teacher, Kameron, asks as we circle up on the carpet for math workshop. Kameron is one of those students who will greet you every morning with a huge smile on his face and a rib crushing hug. He is a student who will teach you how to become a better listener, a student who will teach you that constant curiosity and a vivid imagination are two of the most prized possessions a learner can ever have, a student who will teach you about taking risks, as he raises his hand to give it a shot before the teacher has even finished asking the question. He is a student who will

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shape your heart and mind about teaching and learning, if you are lucky enough to be invited to sit with him on the carpet- and thankfully I was.

Brett, now an early career second grade teacher, experienced as a teacher candidate (TC) in the Master of Arts in Teaching (MAT) program in Elementary Education at a flagship institution in the Southeastern United States what all language arts and mathematics methods MAT teacher candidates experience – the ability to move in and out of mentor and apprentice roles as they learn how to teach readers, writers and mathematicians. While Kameron likely saw Brett as someone there to help guide his thinking, Brett saw Kameron, her assigned small teacher during her language arts methods course, as someone to teach her how to make careful observations of student thinking that can be leveraged to make sound, theory-driven instructional decisions.

Too often university methods courses privilege theory and expect TCs to imagine what it means for classroom practice. The MAT program, on the other hand, is well known and respected for its innovative methods courses because they are designed to offer intentional and systematic opportunities for TCs to theorize from practice each and every class period (Hodges & Mills, 2014). This unique university-public school collaboration requires all participants (university faculty, classroom teachers, TCs and elementary students) to position themselves as learners in ways that promote the professional development of teachers, teacher candidates and university faculty, and ultimately student growth. In short, the methods courses are designed to promote professional inquiry while simultaneously fostering inquiry into literacy and mathematics with elementary students.

THEORIZING FROM CLASSROOM TEACHING AND LEARNING EXPERIENCES

The design of the methods courses align with what Oonk, Verloop, and Gravemeijer (2015) refer to as *theory-enriched practical knowledge*. By engaging in carefully crafted teaching and learning experiences and subsequent reflection on those experiences, teacher candidates learn to make meaning of theories originating in classroom practice and develop theories of their own. In this way, teacher candidates construct practical knowledge alongside theoretical concepts. By teaching the mathematics and language arts methods courses onsite in elementary schools and collaboratively planning embedded field experiences with exemplary coaching teachers, TCs are offered the chance to witness, reflect upon and implement exemplary teaching demonstrations that are directly related to the beliefs and practices they are learning in their methods courses.

Theorizing from Teacher Moves and Student Thinking in Mathematics Classrooms

The site-based mathematics methods course is predicated on the notion that effective mathematics instruction recognizes students' intuitive ways of solving mathematics tasks as legitimate forms of mathematical reasoning, while leveraging those intuitions to design subsequent learning opportunities (cf. Carpenter, Fennema, Franke, Levi, & Empson, 2015). During each university class session, TCs take part in classroom teaching demonstrations, learning to name teacher moves aligned with reform recommendations in mathematics education (National Council of Teachers of Mathematics, 2014). TCs observe the classroom teacher's selection of cognitively demanding tasks, identification of students' strategies

and representational choices, and the selection and sequencing of student work to make public during debriefing sessions (cf. Stein, Engle, Smith, & Hughes, 2008). In the midst of these observations, TCs work with an assigned elementary student/small teacher as s/he engages in mathematics tasks designed collaboratively between the classroom teacher and the methods course instructor.

Prior to entering the classroom, the methods instructor sets up the classroom engagement by highlighting important learning progressions, promising representations and models, and examples of exemplary tasks where TCs can develop their own understanding of the mathematics while simultaneously building a repertoire of practices that help to construct students' understanding of mathematical ideas. After the classroom interaction, TCs debrief with one another, their methods instructor, and the classroom teacher to making meaning from the data collected during the lesson. These debriefing sessions reflect a shared commitment to collaborative growth for everyone involved. That is, the teacher candidates, methods instructor, classroom teacher, and elementary students all move in and out of mentor/mentee roles within each class session.

As university faculty charged with the design and delivery of methods courses, we seek to model the same sorts of observations and responsive teaching we hope to see in our TCs. That is, we are intentional about observing what the TCs attend to in their observations and interactions, alongside how they make meaning of those observations as they form beliefs about teaching readers, writers, and mathematicians. Over time, our observations of TCs have generated several themes in their work with children. In the following sections, we describe those themes using Brett's illustrations of her decision-making within her 2nd grade classroom.

Theme 1: Site-Based Methods Courses Legitimize Practices by Observing Them Work with Real Children in Real Classrooms

Learning about teaching in university settings, then imagining how mathematical practices, tasks, models, and representations might "play out" inside a real classroom is a genuine challenge for TCs. Site-based methods courses offer candidates the opportunity to observe instructional practices and try out strategies under the guidance of the classroom teacher and university instructor. Reflections on these experiences become the basis for developing beliefs about effective mathematics teaching and learning. As Brett illustrates,

As a student teacher, you are humbled as you sit alongside Kameron and Mr. O, and learn what teaching and learning actually looks like in a responsive classroom. Mr. O'Keefe's unit on graphing modeled for me that you will always have a plan, but a child's natural curiosity is the best and most authentic track to take, and when their track leads you away from your original one- it's not terrifying, but an incredible journey where all are poised as learners. Kameron's enthusiasm and connection to new material showed me what happens when a question is given the freedom to be explored. After that, I never looked back, only forward - envisioning how I may put them into practice in my own classroom one day.

As TCs begin to unpack the complexity of teacher moves, they are offered observational frameworks as a way of making finer-grained observations of classroom practice. For example, candidates observe the extent to which lessons take up research-based practices for conducting high-yield, classroom-level mathematics discussions (Stein, Engle, Smith, & Hughes, 2008). As students reflect upon these obser-

vations, they are able to theorize from the data they collect to solidify productive instructional routines. As one teacher candidate stated,

I feel like I have the knowledge that there are ways of supporting students' talk after they've solved a task. By focusing on student's thinking (both correct and incorrect strategies) to develop different representations and help make connections between strategies and representations, I can see the kind of instruction that is essential in scaffolding mathematics discussion. This discussion is important in supporting students in taking risks and asking questions to further their own understanding.

Lastly, as TCs are introduced to certain pedagogical structures and certain ways of reasoning mathematically, they may be reluctant to take up what they are learning without concrete classroom experiences that serve to legitimize those structures and ways of reasoning. As one TC said as he reflected on his experiences,

In my case, if I'm skeptical of something, I get to see it actually work. It multiplies the teaching value by 100. [My instructor] will explain something, and I'll think "I don't know about that," but then I see it work.

Theme 2: Site-Based Methods Courses Frame Issues around Children's Mathematical Thinking and Understanding

A wealth of research in mathematics teacher learning notes the importance of maintaining a focus on students' thinking (e.g. Kazemi & Franke, 2004; Little, 2004; Carpenter, et al 2015) to support instructional change. We have found that it is generally common practice to share samples of student work as cases of certain kinds of mathematical thinking. Perhaps no area of mathematics research has been more impactful to the field than Cognitively Guided Instruction, which is founded upon the idea that children are inherently mathematical, can develop quite sophisticated ways of reasoning through mathematics tasks without direction instruction on how to do so, and that this thinking can be leveraged in the design, selection and sequencing of learning tasks.

While we too use these mechanisms within mathematics methods coursework, we also note that *professional noticing of children's mathematics thinking* – the in-the-moment decision making that teachers must do based upon the things children say or do as they engage in mathematical thinking - is quite difficult to develop outside of live interactions with children. Jacob, Lamb, and Philipp (2010) describe these competencies as three inter-related components:

1. Attending to the strategies that students use as they solve problems;
2. Interpreting students' mathematical understandings based upon their demonstrated thinking; and
3. Making decisions about how to respond based upon what students said and did while solving a mathematics task.

In our view, the key aspect of this professional noticing is that it takes place "in-the-moment" and that both interpreting and responding to students' thinking take place "in-the-moment" as well. Our response to developing these competencies in TCs is to engage them in "Kidwatching" as a way of launching responsive teaching (Souto-Manning, Mills, & O'keefe, 2010).

As an example, the mathematics methods course foregrounds the critical role representations play in:

1. Deepening mathematical understanding; and
2. Making connections among representational tools (Hodges & Johnson, forthcoming).

Further, as TCs learn about representations, they also gain knowledge about the purposeful selection of models of mathematical situations (c.f. area/region, set and length models for fractions [Behr & Post, 1992]). TCs then move into classroom-based Kidwatching experiences, observing the extent to which students make use of certain fraction models and are able to move fluently between mathematical representations as they reason about fraction concepts. As TCs work with students, they are encouraged to probe students' thinking and respond to what they see and hear through scaffolded questions. When students debrief on their experiences they are encouraged to interpret student work with one another. One TC wrote,

All of the students I interviewed seemed to have a clear understanding of moving from symbol to picture. They all knew how to shade in an area model. One pattern I noticed was that all three students had difficulty moving from picture to symbol. This made me think they were better at partitioning than unitizing fractions.

Theme 3: Site-Based Methods Courses Simultaneously Position Teacher Candidates as Mathematics Teachers and Learners

Site-based methods course afford TCs opportunities to develop personal identities as doers and teachers of mathematics in relation to the normative identities established in school contexts (Hodges & Hodge, 2015; Gresalfi & Cobb, 2011). The normative identity, or collective view of what counts as effective mathematics teaching and learning, is carefully crafted by the methods instructor and participating coaching teachers. That is, through ongoing collaborations, the methods instructor and coaching teachers are able to have ongoing reflective conversations about the kinds of mathematics teaching and learning they wish to privilege and legitimize. TCs then have opportunities to take up personal identities as teachers of mathematics in relation to these experiences. One TC described the difference in positioning the following way,

We are here [in the program] to teach. Everything we are doing is for us to teach. It's a mindset difference about whether you want to be a student or a teacher. At the site-based courses I feel like a teacher, on campus I feel like a student.

Brett's statement at the beginning of this chapter also illustrated how being positioned as a teacher, charged with working alongside Kameron, afforded her opportunities to learn from his thinking. Furthermore, the simultaneous development of knowledge of children's thinking alongside knowledge of how to respond to that thinking, illustrated in theme #2, provides opportunities to learn to use what they know about students' work to inform instructional decisions. As Ball and Cohen (1999) note,

Teaching occurs in particulars – particular students interacting with particular teachers over particular ideas in particular circumstances … [therefore,] much of what [TCs] have to learn must be learned in and from practice rather than in preparing to practice. (p.10)

Our goal is to unite learning from practice with the experiences of preparing to practice through the design of the site-based methods courses.

Theorizing from Teacher Moves and Student Thinking in Reading and Writing Workshops

Generally, the structure of the site-based English Language Arts (ELA) methods course is congruent with math methods in content and form. The ELA course is designed to help TCs develop a solid understanding of the beliefs and practices that represent current research in literacy education (Glover & Keene, 2015). The embedded field component positions them to notice, name and practice beliefs as they encounter them in their methods course. This design fosters ongoing reflection so TCs learn to deliberately teach in ways that reflect their beliefs. For instance,

If we believe learning is a social process, we offer students ongoing opportunities to teach and learn from one another across the day. If we believe children need to learn to read like writers, we design mini-lessons and writing workshop engagements intended to teach them to do so. If we believe it is important for children to see themselves in books, we deliberately create classroom libraries with high-quality multicultural books. (Mills, 2014, 38)

The ELA course is built on the notion that effective literacy instruction grows out of intentional and systematic kidwatching grounded in foundational understandings of reading and writing as complementary, sociocultural, transactive processes (Goodman, 1996; Halliday, 1975; Ladsdon-Billings, 1995; Luke, A. & Freebody, 1997; Nieto, 2010; Pearson, 2002, Rosenblatt, 1995; Stephens, 2013; Vygotsky, 1986). The course is designed to teach TCs how to make theoretically sound and practically relevant instructional decisions from formal and informal assessment data (Author 2, 2004, IRA-NCTE, 2010). To make responsive teaching a habit, the TCs complete Responsive Teaching Cycle forms during and immediately following each engagement with their small teachers.

They learn to take kidwatching notes by documenting observations (what the child says or does) when "in the midst" of their work with their small teachers. Upon returning to the ELA methods classroom, they spend focused time reflecting on and interpreting their observations. They interpret their observations by articulating the meaning of the children's words or actions based on their growing theoretical expertise. Finally, they devise new plans that grow out of their careful observations and interpretations. Each class session is carefully orchestrated to offer TCs the chance to grow new beliefs and understandings about teaching and assessing readers and writers then immediately implement them as practice. Over time the TCs internalize the Responsive Teaching Cycle process. It becomes second nature for them to observe, interpret and respond to young readers and writers "in the midst" and "after the fact."

Every week the ELA methods instructor plans with the coaching teacher to carefully scaffold the tall (TCs) and small teachers (elementary students) in concert. They design demonstrations and engagements

Figure 1. Responsive teaching cycle data collection
(Inspired by Whitin, Mills and O'Keefe, 1990)

that clearly show the TCs how to make practical connections to the theory featured in the methods course that day, while simultaneously offering the small teachers truly differentiated instruction.

Theme 1: Site-Based Methods Courses Legitimize Practices by Observing Them Work with Real Children in Real Classrooms

Across the semester the TCs inquire into beliefs and practices for teaching readers by gathering information from reading interviews, holding reading conferences, collaborating on cloze passages and conducting formal assessments such as Running Records (Clay, 2000) and Miscue Analysis (Owocki & Goodman, 2002). Each engagement or tool offers TCs first-hand investigations into foundational understandings in literacy education such as the cue systems in language, strategies proficient readers use, differentiating between high and low quality miscues, matching students with "just-right" books, how to teach reader-to-reader and so on (Johnston, 2012; Serravallo, 2014). The opportunity to learn about a practice in the ELA methods course then try it out immediately makes all the difference in the world. One TC commented,

The demonstrations and engagements in this class helped me make solid connections to course concepts. For example, learning about Miscue Analysis then having the opportunity to perform a Miscue Analysis with my small teacher helped solidify my understanding of the reading process.

Another wrote,

The opportunity to work with our small teachers was amazing. It really helped that what we did in class went along so well with what they were doing. Also being able to actually perform a miscue analysis was beyond helpful in understanding the process.

The TCs learn how to support young authors by carefully coaching their small teachers as they compose and publish a memoir and a nonfiction piece. In fact, the TCs and their small teachers write and publish memoirs in concert. In the morning, the TCs learn how to teach young writers to envision, draft,

revise, edit and publish. In the afternoon, they grow as teacher writers by living and reflecting on each phase of the process when working on their own memoirs with colleagues. This engagement is designed to help the TCs learn to write well, to truly understand and get in touch with the writing process from the inside-out (Calkins, 2012; Fletcher, 2013). In so doing, they learn to talk to and teach their students writer-to-writer (Ray, 1999).

One TC commented,

I appreciate how we were scaffolded into our projects. I especially liked how we did memoirs at the same time as the students so we were living the process with them.

Brett's reflection reveals lessons she learned by writing her own memoir while simultaneously coaching Kameron through his piece:

- *I've learned where and when editing is most helpful. It's clear that Tim's kids wouldn't be the amazing writers they are without attention to craft and content first.*
- *I've learned importance of asking genuine questions from a reader's perspective rather than simply telling kids what to change is the most helpful kind of feedback.*
- *I've learned the value of inspiring kids to take feedback about content or craft and/or editorial advice to heart.*
- *I've learned why we need to teach out of patterns in children's thinking, work and understanding. The more you get to know your students and document their patterns in kidwatching notes, the easier it will be to identify patterns within kids and across your class.*
- *I've learned to inspire not force kids to make changes.*

Theme 2: Site-Based Methods Courses Frame Issues around Supporting Children's Growth and Understanding as Readers and Writers

The embedded field experience is the cornerstone in the ELA methods course. Each and every class session is devoted to issues around supporting children's growth and understanding as readers and writers. The TCs recognize the significance of literacy learning theory when wondering how to respond to a child who miscues when reading or how to offer helpful guidance when editing for spelling and language conventions. They learn how to teach in ways that are theoretically sound and practically relevant through responsive teaching. A TC captured the essence of the model succinctly,

Having the opportunity to practice responsive teaching, observation, and assessment practices with my small teacher was very meaningful. Being able to learn through practice brought theories to life and deepened understanding.

The TCs complete a comprehensive kidwatching project as the culminating course experience. The projects reflect the small teachers' growth and change as readers and writers as well as the TCs capacity to theorize from the range of instruction and assessment strategies they implement each week. It's a rigorous yet meaningful assignment. After collecting literacy data on their small teachers across the semester, they write their way into understanding and internalizing the significance of the methods course content as illustrated by the TCs reflections,

- *Composing the kidwatching project provided me with an opportunity to truly reflect on my understanding of the course content, experiences and theory-practice connections.*
- *The kidwatching project made me think deeply about individual students' progress and learn how to make instructional decisions based on that progress. It made me seek to understand and teach each child as a reader and writer.*
- *The opportunity to work with small teachers taught us about kidwatching, and responsive teaching. It was great to hear about a topic, and then go to work with a child immediately focusing on that topic.*

Theme 3: Site-Based Methods Courses Simultaneously Position Teacher Candidates as Literacy Teachers and Learners

The embedded field experience component of the ELA course is carefully crafted to create a symbiotic relationship between all participants. Each learning engagement is designed to position everyone as learners (Volk, 2014). Tim, the ELA coaching teacher, puts it this way,

When I invite TCs into my classroom each week, they learn how to teach from my students while my kids have the benefit of ongoing literacy experiences with another caring, thoughtful adult who is interested in nurturing them as readers, writers and people. And I continue growing as a teacher because the presence of TCs in my classroom causes me to carefully reflect on everything I say and do.

It only takes couple of weeks for the TCs to recognize the value of learning with and from their students. By looking closely and listening carefully to teach into and out of individual children's strengths, needs and interests, the TCs become teacher researchers (Shagoury and Power, 2012). One TC put it this way,

I learned how to truly connect with students and just how much you can learn from students if you're willing to listen.

Brett learned how to learn from students during her first written conversation with Kameron. Her notes reveal the fact that she is doing so much more than simply teaching writing. Brett is accessing Kameron to learn how to teach writers. Her notes also illuminate how she is learning to theorize from practice as she weaves quotes from professional literature into her reflection.

One of the first classroom experiences I got to enjoy with Kameron was a written conversation; and wow, did I see how valuable these can be! Yes, I got a sneak peek into who Kameron is as a writer, but I also got to see who Kameron is as a person. I found this written conversation with Kameron to be incredibly worthwhile, as it embodied the true meaning of kidwatching, the process of "getting to know each child in as many different contexts as possible - to know each child as a person unique in all the world" (O'Keefe, 1996, p.65). Within this conversation, Kameron as a writer and Kameron as an individual were not two separate entities. I learned that Kameron has two sisters while I also learned that he was continuing to work on spacing between his words as he writes. I learned that he likes to watch and play sports (even imaginary football), as I learned to interpret his invented spelling. He wrote what he wanted to communicate and didn't restrict his responses to words he could spell accurately. Kameron was placing value on content or convention, helpful knowledge to possess for both his writer and individual identities. I

learned that when he is bored he likes to watch TV or play video games, at the same time learning that he puts a lot of effort into making sure he uses capitals and end punctuation correctly. I learned. I saw that if teachers allow students to engage in strategy lessons, such as written conversation like this one, then those students "are provided with genuine opportunities to learn language, learn about language, and learn through language" (Halliday, 1975).

NEW BEGINNINGS: TRACKING THE IMPACT OF THE MAT PROGRAM

Brett continued growing and changing by positioning herself as a learner across the MAT Program. As an early career teacher, she recognizes the impact the embedded field experiences in her methods courses had on the beliefs and practices she enacts in her second grade classroom today.

As a student teacher, you are humbled as you sit alongside Kameron and Mr. O, and learn what teaching and learning actually looks like in a responsive classroom. My time in the MAT Program allowed for all different learning experiences, but none more powerful than having the opportunity to sit with Kameron on the carpet. He reminded me what life is like for an 8 year old living in a third grade classroom, and taught me how to sit back and listen as his wonderings took his imagination and passion to a new level. He showed me how strong a student can connect with the content, when given the opportunity to claim ownership to how the curriculum evolves. He gave me a chance as and was instrumental in shaping my beliefs of teaching and learning. After that, I never looked back at my old beliefs, only forward - envisioning how I may put them into practice in my own classroom one day.

Now that day has come, only this time the students calling me to sit with them on the carpet are my very own second graders at Dutch Fork Elementary.

Brett constructed a solid vision of beliefs and practices to guide her teaching of readers, writers and mathematicians in the MAT program. Consequently, she was hired as a second grade teacher at Dutch Fork Elementary. The interview team enthusiastically embraced Brett because she could both articulate and implement her model of mathematics and literacy instruction with integrity. She is thriving in her new professional home with the support of the leadership team. The Principal and Literacy Coach have co-constructed a culture of professional inquiry that is congruent with the MAT Program. Julius Scott, explains foundational features of the school culture he has been cultivating for the past three years as principal of a new Environmental Science Magnet program. His explanation illuminates why he found Brett such a promising teacher candidate:

We recognized that embracing an inquiry based stance on teaching and learning would serve as the foundation upon which our school would be known for. The paradigm shift that resonated the most for us included examining the relationships between beliefs and teaching practices. Collectively our school had never used this process as a framework but we knew this framework was paramount to our work ahead.

[T]eachers became very interested in recruiting [new hires] that not only embraced our stance on inquiry-based teaching and learning but that would also add value to our school community. This included listening attentively to the language and belief systems candidates espoused during our annual

district teacher recruitment fair. This shift in our thinking led to three out of four teaching vacancies being filled by MAT graduates, Brett being one of them.

Brett continues growing in the company of her students and colleagues. Sally Somerall, the Literacy Coach, strives to create invitations that position teachers as learners with their students and one another. She and Julius craft professional development experiences that mirror the kind of thinking and work they want for their elementary students. Sally's description captures the ways they are helping teachers theorize from their own personal learning experiences.

Before the first day of school, we invited everyone to bring a sample of anything he or she read over the summer. People could bring a magazine article, a manual, or a book they read for a book club. In groups of eight, people shared what they read and had discussions around those readings. One person at each table took notes to record the kinds of talk going on in each group.

After 45 minutes of engaging conversations, the note-takers were asked to share with the group the kinds of talk and comments they heard during the discussions. Without having a formal protocol to follow in the book discussions, people laughed, nodded, and enthusiastically discussed their texts. Readers questioned and evaluated characters' decisions. They asked each other about the authors, the topics, the series, and decisions about what to read next. People scribbled new titles and topics into their notebooks. They inquired into reading habits of each other, and made comments such as, "Oh, I didn't know you liked reading about that" or "Wow. I'm going to have to read more about that—I had no idea!" The conversations were lively and rich with information about the readers themselves and the texts they read.

And, during the sharing after this time together, people realized that listening and responding to other readers did not require a set of 'reading conference' questions. Their talk with each other mirrored that of friends at dinner—casual, authentic conversations between people learning about each other and learning about books. What kept the conversations going, were the responses from the listeners--a genuine question or comment to spur the conversation on further. We felt it was possible to create a culture of readers in our school that reflected the kinds of reading and engagement that we experienced together in that cafeteria. We knew we needed to be the kind of readers for children that we were for each other.

Together, Brett, Julius and Sally are showing what is possible rather than what is typical in elementary classrooms and, in so doing, they illuminate the lasting impact of embedded field experiences. We know that our collaborations, when united by a shared vision of high-quality instruction, provide meaning to investigations into students' thinking, purpose to theoretical underpinnings and practical knowledge needed to grow readers, writers and mathematicians. Brett illustrates this unification of experience, beliefs and practice well when she says,

As our unit progressed, our readers and writers were not simply reading and writing, but making personal connections to their new learning and becoming poised to inform others about real-world events. We were staying true to our beliefs, yet still able to allow our interests and curiosities be explored as a means to uncover our standards.

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Chapter 3
Teaching and Learning Simultaneously:
Collaboration between Teacher Education and a University ESL Program

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ABSTRACT

The purpose of this chapter is to describe a collaboration process between a teacher education program and a university ESL program that attempts to increase teacher candidates' exposure to ELLs with "third space" as a theoretical framework. In third spaces, boundaries of teacher and student get blurred, and new ways of thinking about teaching and learning emerge. In the collaboration project that this chapter describes, the two teacher candidates regularly volunteered in the university ESL classes and taught mini-lessons to the ELLs while taking a class about ELL teaching. The qualitative analysis of the participants indicates that in the collaboration project, a university-based class and a field-based class were in sync by providing the participants with opportunities to immediately implement what they learned in a traditional class with the ELLs. In this boundary blurriness, the ELLs became from abstract to concrete in the participants' mind, and the participants became reflective practitioners.

INTRODUCTION

English language learners (ELLs) represent the fastest growing segment of the school age population in the United States (García, Jensen, & Scribner, 2009). Projections indicate that ELLs will comprise 40 percent of public school students by 2030 (U.S. Department of Education & National Institute of Child Health and Human Development, 2003). Although ELLs could master conversational English fairly easily, within 2-3 years (Cummins, 1980), the majority of them struggle to succeed in school, particu-

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larly on content area achievement measures (Short & Boyson, 2012). On the National Assessment for Educational Progress Grade 8 exams for reading and mathematics, ELLs performed poorly: 74% and 72% performed below basic in reading and math respectively, compared with only 22% and 25% of non-ELLs respectively (National Center for Educational Statistics, 2009).

Because ELLs are held to the same accountability standards as native English speakers (Short & Boyson, 2004), providing them with effective content instructions and opportunities to acquire academic language along with opportunities to develop the English language proficiency becomes crucial for their school success. That is why ELL education becomes relevant not only to ELL specialists but also to mainstream teachers. T*he population of teachers, however, will likely remain predominantly white native speakers of English.* In 2011, white native speakers consisted of 84 percent of full-time teachers (Feistritzer, 2011). To be responsive to the academic needs of ELLs, these monolingual teachers need to develop "sufficient breadth and depth of knowledge and range of skills" (Samson & Collins, 2012, p. 4) to be able to meet the unique needs this population effectively.

To produce teacher candidates who possess knowledge, skills, and dispositions that will lead to ELLs' academic success, all teacher candidates in our university's teacher education program are required to take a class, EDBL 401: *Principles and Practices for Educating English Language Learners*. This class covers the history of education for ELLs, basic second language acquisition theories, and scaffolding techniques to help ELLs develop their academic language proficiency. However, many teacher candidates have had minimum experiences of working with ELLs before the class. Since extended contact with people who speak languages other than English has a positive impact on teachers' attitudes towards ELLs (Lucas & Grinberg, 2008) and the lack of exposure undermines their understanding of ELLs' needs, our teacher candidates' lack of experiences with ELLs may hinder them from acquiring knowledge, skills, and dispositions appropriate for ELL teaching.

The purpose of this chapter is to describe a collaboration process between a teacher education program and a university ESL program in which teacher candidates were required to interact with university ELLs. The chapter delineates how the interactions affected teacher candidates' understanding of ELL teaching and their development of knowledge, skills, and dispositions for the ELL population.

LITERATURE REVIEW: PREPARING TEACHER CANDIDATES FOR THE ELL POPULATION

Considering the increased population of ELLs at public school, all teacher candidates should be prepared to effectively work with ELLs by acquiring appropriate knowledge, skills, and dispositions for the ELL population during teacher preparation. However, they have little access to preservice education focused on what to teach and how to teach this underserved population (Ballantyne, Sanderman, & Levy, 2008; Hollins & Guzman, 2005). According to National Center for Education Statistics (2002), 41% of teachers have ELLs in their classes, but only 12.5% of those teachers had had 8 or more hours of training in the previous 3 years on how to assist them. As of 2008, only four states (Arizona, New York, California, and Florida) required specific coursework or certification requirements with regard to ELLs for all teachers (Ballantyne, Sanderman, & Levy, 2008). These realities support the claims that most teachers are not prepared to work with ELLs (Janzen, 2008) and unlikely to help them successfully learn academic content and skills through English while developing proficiency in English (Lucas, Villegas, & Freedson-Gonzalez, 2008).

Possibly, due to this lack of state requirements and trainings, scholars have vigorously suggested the need to transform the teacher education curriculum so that it becomes more relevant to improving the quality of ELL teaching. Waxman, Téllez, and Walberg (2006) propose a curriculum where teacher candidates develop "understanding of first and second language acquisition, strong content mastery, cross-cultural understanding, acknowledgement of differences, and collaborative skills" (p. 192). According to Major and Brock (2003), essential knowledge, skills, and dispositions teacher candidates should demonstrate in order for them to effectively work with ELLs are "knowledge of second-language-acquisition theory and pedagogy, use of culturally-relevant curricula, the propensity to validate the students' home language and culture, engagement in reflectivity and professional growth, a clear sense of their own ethnicity, and a commitment to student advocacy" (p. 8).

According to Hollins and Guzman (2005), the most effective way to acquire the aforementioned knowledge, skills, and dispositions is to provide teacher candidates with field experiences because from direct experiences, they could bolster their capacity to understand, relate to, and work with ELLs. The emphasis of field experiences is a result of a growing consensus that much of what teachers need to learn must be learned in and from practice rather than in preparing for practice (Hammerness, Darling-Hammond, & Bransford, 2005). For largely white monolingual teacher candidates, the exposure not only to the sociocultural characteristics of the ELL population but also the preparation to enact effective instructional practices for ELL learning becomes critical for their development of appropriate knowledge, skills, and dispositions for the ELL population. Lucas, Villegas, & Freedson-Gonzalez (2008) urge teacher education programs to require teacher candidates to spend time in schools and classrooms where they will have contact with ELLs during field-based courses because the direct contact will provide teacher candidates with opportunities to "apply what they are learning about linguistically responsive teaching" (p. 370) in traditional courses.

Advantages of field experiences are many. Field experiences will increase teacher candidates' opportunities to directly engage with ELLs. Lucas, Villegas and Feedson-Gonzalez (2008) argue that direct contact with ELLs allows teacher candidates to see ELLs as individuals instead of abstract beings and away from prevalent media stereotypes of immigrants. Direct contact with those who are culturally and linguistically different will also challenge teacher candidates' beliefs and values about teaching and learning and may lead to disrupting their own biases (Coffey, 2010). These benefits will eventually transform teacher candidates into those who have empathy and positive dispositions towards ELLs. Further, field experiences provide teacher candidates with much needed opportunities to practice. For example, McGraner and Saenz (2009) found that teacher preparation programs that included field experiences with diverse student populations, not only helped teacher candidates to understand, relate to, and gain confidence when working with ELLs, but also prepared them to create more effective instructional practices for ELLs. In this line of research, studies revealed that teacher candidates' practices with ELLs were greatly enhanced when collaborated with and given feedback from the mentor teachers and university supervisors (Athanases & de Oliveira, 2010; Sakash & Rodriguez-Brown, 2010). Moreover, experiences with ELLs directly correlate to positive attitudes towards them. Lee and Oxelson (2006) reported that teachers who did not receive training as language educators expressed more negative or indifferent attitudes toward ELLs compared to those who had personal experiences with ELLs. Li (2005) also found that increased exposure to observing and working with ELLs resulted in teacher candidates identifying and embracing their role in teaching ELLs. Finally, field experiences provide teacher candidates with opportunities to gather information about the bilingual and ESL programs (Sakash & Rodriguez-Brown, 2010).

Contact alone, however, does not guarantee a positive impact. It may work to reinforce, rather than to break down, any negative stereotypes that teacher candidates may bring to the contact (Ballantyne, Sanderman, & Levy, 2008). Lucas (2005), for example, reported that some teacher candidates interpreted their experiences in ways that perpetuated stereotypes. Marx (2006) also revealed that white teacher candidates interacted with ELLs as if they had been superior. Without skillful guided reflection on their own experiences, teacher candidates may fail to produce a positive outcome from field experiences. Because of this potential danger, developing structured reflection into field experiences becomes crucial. As McGraner and Saenz (2009) recommend, structured observation and reflection are imperative for teacher candidates' understanding of teaching ELLs. Through reflections, teacher candidates can see their own growth, learn from mistakes, obtain valuable feedback from instructors, and look critically at their experiences. The advantages of these structured observation and reflection were detailed in Abbate-Vaughn's (2008) study where teacher candidates did a year-long urban field experiences with culturally and linguistically diverse students and used process writing to reflect on changes in their attitudes and dispositions working with ELLs. At the end of the practicum year, most teacher candidates had shifted their focus away from a deficit perception to more clearly seeing assets that ELLs brought to the classroom and embracing their own responsibility in reaching out across cultures.

In summary, studies all agree that due to the increasing number of ELLs in mainstream classes, teacher education programs need to provide their teacher candidates with an education full of opportunities to prepare them for a linguistically diverse classroom. Carefully structured field experiences that increase teacher candidates' direct contact with ELLs and that facilitate their self-reflections seem to be critical.

THEORETICAL FRAMEWORK: THIRD SPACES

Zeichner (2010) argues that disconnect between university-based and field-based classes has been one of the central problems that has plagued traditional college and university-based preservice teacher education for many years. In the historically dominant "application of theory" model, teacher candidates are supposed to learn theories at the university and then go to schools to practice or apply what they learned on campus (Korthagen & Kessels, 1999). Although most university-based teacher education programs now include multiple field experiences, the disconnect between what students are taught in campus courses and their opportunities for learning to enact these practices in their school placements is often very great (Bullough, et al. 1999; Zeichner, 2007).

To remedy the disconnect, Zeichner (2010) proposes the concept of "third spaces" that derives from hybridity theory which recognizes that individuals draw on multiple discourses to make sense of the world (Bhabba, 1990). Third spaces involve a rejection of binaries such as practitioner and academic knowledge, and theory and practice, and involve the integration of what are often seen as competing discourses in new ways. Eventually an either/or perspective is transformed into a both/also point of view. Gutiérrez (2008) argues that a third space is "a transformative space where the potential for an expanded form of learning and the development of new knowledge are heightened." (p. 152). In third spaces, boundaries of teacher and student get blurred, and new ways of thinking about teaching and learning emerge.

Zeichner (2010) lists several boundary crossings that create third spaces in teacher education. Bringing P-12 teachers to teach sections or portions of required courses in preservice teacher education and incorporating the writing and research of P-12 teachers (e.g., Gallas, 2004; Goldstone, 2003; Hanson, 2008) into the campus-based curriculum create third spaces where teacher candidates examine both aca-

demic and practitioner generated knowledge related to particular aspects of teaching. Flessner's (2008), for instance, constructed representations of his

teaching math to elementary children and then used these representations (video clips, examples of student work) in his campus math methods course at the University of Wisconsin-Madison.

Alternatively, university instructors can hold method classes, for example, at elementary schools, in an attempt to deliberately and strategically connect academic and practitioner knowledge in support of teacher candidates' learning of how to enact specific teaching practices advocated in methods courses. Campbell (2008), for example, reports that at the University of Washington, Seattle where interns participated in mediated instruction in their math certification program, they developed a deeper understanding of the promoted teaching practices and were more successful in enacting the practices in diverse urban secondary schools.

Third spaces have more to do with the emergence of new ways of thinking about teaching and learning rather than with the changes of class locations and class instructional modes. Because the boundary between teaching and learning, and academics and practitioners becomes blurred in a third space, teacher candidates are able to see things from different perspectives. Zeichner (2010) summarizes that creating third spaces in teacher education involves an equal and more dialectical relationship between academic and practitioner knowledge in support of teacher candidates' learning and that teacher candidates can enhance their learning in new ways. Gorodetsky and Barak (2008) contend that these hybrid spaces encourage a more egalitarian status for its participants than traditional models of college and university teacher education.

CREATING THIRD SPACE FOR TEACHER CANDIDATES

History of the Collaboration Project

The AUAP (Asia University America Program), currently in its 28th year, has brought over 3,500 students to Central Washington University (CWU) from Asia University in Tokyo, Japan. The AUAP is an innovative five month study abroad program for sophomore students at Asia University and is ongoing at two other universities in Washington as well. The AUAP classes are mostly homogeneously Japanese. There are a few other ethnicities such as Koreans and Chinese represented but mainly Japanese students from the same host university.

The collaboration project began in 2009 as a way to connect CWU students in the communication department (COM) to non-native English speakers by exposing them to different forms of communication. Through a variety of activities and discussions, the COM students were able to practice communication strategies and learn about their own abilities to effectively communicate with ELLs. Additionally, the AUAP students who are usually taught English in a classroom with other Japanese students, had an opportunity to observe, practice, and model their language after native English speakers. The initial class meeting was a success on many levels and opened the door to more joint ventures.

In 2010, the AUAP expanded its connections and began working with the education department, specifically literacy minors. Through this collaboration, the class meetings became more intentional in nature. Specific activities were designed so that teacher candidates could practice concepts or theories that they were learning about in class. A fifty minute class period was divided into two parts; half of the class dedicated to the CWU students teaching, the other half dedicated to the needs of the AUAP students.

Having the two groups of students working and learning together created an exciting environment where both sets of students had energy and passion for learning. When working with the CWU students in the combined classes, instructors noticed a more energetic classroom environment. Additionally, feedback from the AUAP students indicated that they found it easier to speak English with native speakers, as it was less intimidating and more meaningful.

Due to the success of the combined class style, bringing together the CWU students and the AUAP students, the AUAP created a "classroom volunteer" program in 2011 where the CWU students could volunteer in the AUAP classes. By bringing native or near native speakers into the AUAP classroom, the AUAP students were able to work closely with native speakers on a more regular basis. Creating opportunities for teacher candidates to observe and participate in the ESL classroom has given them a chance to learn first-hand about ELLs' challenges in the classroom, observe and work with ESL professionals in a controlled environment, and to improve their own cross-cultural communication skills. The Classroom Volunteer program has grown significantly since its inception in 2011, with a current enrollment of 95 volunteers, many of whom volunteer on an average of three to four hours a week.

Classroom Volunteers are asked to serve in many capacities in the classroom ranging from leading small group discussions, to working one on one with an ESL student. In some cases, volunteers must teach or help reinforce grammar concepts, and in other situations, participate in role-plays or other pronunciation or fluency based activities. Classroom Volunteers are exposed to all aspects of classroom factors, from classroom management to evaluation. For many participants in the Classroom Volunteer program, this is the first experience to not only work with, but even talk to someone whose native language is not English. Oftentimes, new volunteers are shy, scared, and hesitant to interact or take the lead when asked. One AUAP teacher notes as below:

I noticed that when students first started volunteering in the classroom, they were very careful to get a lot of directions. They asked many questions to make sure they were doing the activity right and checked in with me more. They were less confident about their ability to direct the activity and watched me carefully. As they grew more comfortable, they needed to check in with me less. They grew more confident in their skills to fill in the extra time between activities, sometimes by drawing out the activity, sometimes by starting conversations. They also became better at drawing out the students who are shy or don't know how to answer.

Collaboration Project

Ideally, the exposure to ELLs should be conducted at a K-12 setting because teacher candidates are going to be certified at this level. However, within the structure of the teacher education program in our university and within the community where our university is located, it is difficult to achieve this goal. In order to remedy this situation, the EDBL 401 class, one of the authors regularly teaches, began a process of collaboration with the AUAP.

Upon collaborating, we carefully followed the description of the most powerful teacher education program model delineated by Darling-Hammond (2006):

Require students to spend extensive time in the field throughout the entire program, examining and applying concepts and strategies they are simultaneously learning about in their courses alongside teachers who can show them how to teach in ways that are responsive to learners. (p. 8) (emphasis added)

In our collaboration project, while learning theories, concepts, and strategies in the EDBL 401 class, teacher candidates volunteer in the AUAP classes five times a quarter for one hour each time. The teacher candidates directly assist the AUAP students under the AUAP teachers' guidance in a small group setting. They may explain vocabulary terms and the teacher's instructions, explain and practice grammatical structures, do oral activities together, discuss research topics for the AUAP students' final project, proofread their writings and conduct writing conferences.

According to Darling-Hammond (2006), the most productive use of these field experiences is to use the subject matters teacher candidates are going to teach. Therefore, we also require the teacher candidates teach a mini-lesson (15 minutes) based on their content areas to the AUAP students three times a quarter. They create worksheets/handouts or interactive activities that help the AUAP students' comprehension and teach a lesson using a variety of scaffolding techniques covered in class. Systematic reflection on learning in relation to teaching and detailed feedback are especially educative (Darling-Hammond, 2006). Thus, after each mini-lesson, the AUAP students evaluate the teacher candidates' teaching effectiveness. In addition, the teacher candidates receive feedback in relation to their teaching with the AUAP students from the AUAP instructors and the EDBL 401 instructor.

Research Study

In what follows, two teacher candidates' new learning process will be described in detail. Both teacher candidates were all white monolingual English speakers, and had had almost no interactions with ELLs before the EDBL 401 class. John was a post-bach student in his mid 20s who majored in elementary education, while Tim was an undergraduate student in his early 20s who majored in PE and health. Their names are pseudonyms.

Both authors observed both teacher candidates when they interacted with the AUAP students in class and when they taught mini-lessons, and took field notes. Observations were also made by the AUAP instructors. Each time they had interactions with the AUAP students, both teacher candidates wrote reflection papers based on the guided reflective questions provided by the first author. These reflective questions were based on the observations made by both authors. After analyzing these reflection papers, the first author met with each candidate to discuss what they had written for further reflections and clarifications. The comments made by them during the EDBL 401 class were recorded immediately after the class. Finally, a formal interview with each candidate was conducted. The interviews were tape-recorded and transcribed.

These multiple data sources were qualitatively analyzed. Both authors coded the teacher candidates' interviews for words and phrases that stood out related to the study's research questions. Observational field notes and their written reflections were analyzed at this time. Then, these codes were compared with each teacher candidate and sorted into common groupings. The common groupings of each teacher were subsequently compared and contrasted against each other to create larger categories.

TEACHER CANDIDATES IN THIRD SPACE

Since both teacher candidates had not had meaningful interactions with the ELLs before the collaboration project began, both of them stated that they did not know what to expect. This section elaborates

how each candidate attempted to connect what he learned in the EDBL 401 class upon interacting with the AUAP students, what he discovered during the interactions, and how his new learning took place.

John's Case

Having experienced working with special education students as a para-educator before, John, at the beginning, had an optimistic viewpoint about teaching ELLs, another group of students who need specialized instruction. However, John soon altered his viewpoint. He commented, "I thought that working with ELLs would be similar to working with special education students. But, they are very different."

At the beginning, John found it difficult to adjust himself to ELLs' speech. He repeatedly asked the AUAP students to repeat themselves and "tried to decipher what they were saying by listening to the context." During this "repeat and listen" process, John noticed that "oftentimes the students would try to explain things by first providing a 'big picture,' then 'zeroing in' on the details." In other words, John discovered that the AUAP students tended to use a topic-comment structure rather than a subject-predicate structure because the former requires no grammatical marking in stating what the topic is and then giving some information about it.

John took advantage of this new discovery because it allowed him to "identify the scaffolding of the meaning." For example, when an AUAP student said, "My problem is different sleeping time," John immediately replied, "Can you say, 'My problem is that I have different sleeping time'?" Apparently, the AUAP students' tendency to use a topic-comment structure gave John sufficient time to think about how to fix the sentence grammatically.

John was indeed good at correcting the AUAP students' utterances grammatically. By doing so, John was also critical about the fellow teacher candidates' use of broken English, such as "She pick book." It seems that John's criticism derived from his attempt to put the theoretical construct – comprehensible output – into practice. Swain (1995) claimed that language production forces learners to move from comprehension (semantic use of language) to syntactic use of language and emphasized the importance of comprehensible output.

In the EDBL 401 class, John learned that asking ELLs such questions as "Do you understand?" or "Does anyone have a question?" was not an effective comprehension check strategy because no students would answer such questions by "Yes." While interacting, John observed that this was true. John found that the AUAP students would "say 'Okay,' but still did not understand" and hid the fact that they did not understand. John displayed some frustration whenever the AUAP students did this because it "made the process of explaining difficult at first because I had no gauge of how well I was being understood." In addition, John found that the AUAP students' tendency to ask their peers in Japanese disruptive to other AUAP students and him as a teacher. John wrote: "I could have asked a question and called on a student to answer *after* the question had been asked, rather than *before* the question was asked." This reflection suggests that John began to see a value of asking specific questions rather than vague questions, such as "Do you have any questions?"

Simultaneously, John attempted to understand where ELLs were coming from and this became more and more analytical as the quarter passed by. For example, in his attempt to understand why many AUAP students did not utter many sentences in English, John wrote:

I feel that the language barrier was made more impenetrable by the student's lack of confidence in speaking. My student's writing was proficient, but he was hesitant to answer verbally at times; ELL

students may have difficulty pronouncing the words in their mind and therefore may communicate that they do not know the answer.

In the above, John analyzed that the AUAP students may have difficulty pronouncing each word and concomitantly not producing many sentences and concluded that this made them look like they did not understand. The analysis of the reason behind the AUAP students' silence lead John to proactively and frequently check their comprehension.

Admitting his natural tendency to speak in abstract language, John had the most difficult time explaining CALP vocabulary using BICS vocabulary. BICS (basic interpersonal conversation skills) and CALP (cognitive academic language proficiency) are theoretical constructs proposed by Cummins (1980). BICS refers to language skills needed in social situations, such as on the playground, in the lunch room, at parties, playing sports, and talking on the telephone. These social interactions take place in a meaningful social context, and are cognitively less demanding than academic subjects. CALP, on the other hand, refers to formal academic learning. This includes listening, speaking, reading, and writing about subject area content material. This level of language learning is essential for students to succeed in school. According to Cummins (1980), BICS could be acquired relatively rapidly, while CALP takes much longer, 5-7 years.

Although having learned the difference between BICS and CALP in the EDBL 401 class and clearly understood the difficulties with which most ELLs have with CALP, John still struggled to practically apply these two constructs to his teaching and interactions with the AUAP students. One time, an AUAP student named Naoki asked for the meaning of the word "immediately." John used a pencil as "a prop in demonstrating the meaning of the word," and with a pencil, tried to locate each point of time, such as before and after, but it only confused Naoki. Naoki finally understood the meaning in his native language, Japanese, and said, "Oh, 'soon'!." A similar difficulty was observed when Naoki did not understand the meaning of the word "community." Despite John's lengthy explanations with gestures and examples, Naoki did not comprehend what "community" meant at all.

The realization that even gestures and demonstrations failed to convey the meanings and that he should have just explained it with a more conversational word such as "soon" was a humbling experience for John. He remarked: "I realized that using BICS words maximized my chance of being understood by the AUAP students. I am naturally a CALP speaker, especially when explaining things, so this was a challenge for me." This remark suggests John's clear understanding of another construct he learned in the EDBL 401 class – comprehensible input.

Krashen (1981) purports that second language learners must understand the message that is conveyed in order for them to acquire the language. Abstract information needs to be presented with visuals and easier vocabulary words so that it becomes concrete, thus comprehensible.

Gradually, John began to show a progress with regard to his vocabulary usage. When he first taught a mini-lesson about the American Revolutionary War to one AUAP student named Satoshi, John found himself still not using conversational vocabulary in his attempt to explain academic vocabulary words that were unknown to the student. During the whole 15 minute lesson, Satoshi looked confused and not comprehending the lesson, which escalated John's frustration. He said, "I believe that more was misunderstood than understood." When he taught a second mini-lesson, however, an AUAP student named Masaru evaluated his teaching: "He used easy vocabulary words and grammar, and spoke slowly, which gave me good comprehension." Masaru's comment indicates that John had reflected upon the mistakes

he made in his first teaching and attempted to incorporate what he learned from his mistakes when he taught the second time, in particular focusing on using more comprehensible words and grammar.

When he taught the third time, John was able to explain the terms "rebel" and "siege" in a way an AUAP student he was teaching, Takashi, comprehended. For example, John explained the term "rebel" as "If you are to rebel Dr. Amos, you're going to rebel against her," and the term "siege" as "taking something in a war." When Takashi did not comprehend what "form" meant in a sentence John uttered, "How do you think America was formed?", John immediately rephrased: "How do you think America became a country?" Takashi consequently showed his comprehension by nodding.

It was apparent that John made an effort to give the AUAP students comprehensible input and that he began to use more BICS words when explaining CALP words. However, he had a mix feeling about the use of visuals. The importance and effectiveness of visual aids for ELLs' comprehension was emphasized throughout the EDBL 401 class and supported by the research studies since 1970s. For example, Omaggio (1979) proved that the advantages of having illustrations in the second language accrued from the fact that the pictures served as advance organizers of a general nature.

At the beginning of the quarter, John stated, "Some sort of visual aid is necessary in order to reinforce oral information." When he taught the first mini-lesson about the American Revolutionary War to Satoshi, he used plenty of pictures and photos related to the topic. Nevertheless, these visuals did not provide Satoshi with comprehension simply because Satoshi had no background knowledge about the American Revolutionary War. This experience taught John that "Visuals are good, but I can't rely on them. It's important to check students' background. Satoshi didn't know anything about the Revolutionary War." Although making good activities to check students' background in the EDBL 401 class and feeling successful presenting them to the EDBL 401 classmates who were all native speakers of English, it was not until he actually taught a real ESL student that John realized quantitative and qualitative differences in background knowledge among those students who are culturally different. This realization seems to have provided him with a solid understanding of what comprehensible input really means – input second language learners receive needs to be built off their prior knowledge for easier and full comprehension.

Realizing that ELLs are different not only linguistically but also culturally, John began to reflect and analyze why the AUAP students did not comprehend certain words and topics from the cultural lens. In his attempt to analyze why Naoki did not understand the meaning of "immediately," John compared and contrasted between the U.S. culture to the Japanese culture. John wrote as below:

After some reflection and brief Internet research, I believe that Naoki had trouble understanding the word "immediately" because telling one's roommate to do the dishes "immediately" may not be acceptable or common in the Japanese culture. Also, it doesn't look like Japanese people use analogy as often as we Americans do.

For the analysis of "community," John wrote: "This may be because there is less separation from community in schools in the Japanese culture than there is in the American culture, and it does not need its own separate term." About the first mini-lesson to Satoshi, John reflected:

Satoshi didn't know anything about the topic. I could have used the same theme, "war," for example, to build off his background knowledge. He may not know the American Revolutionary War, but he should know what a war means. Themes can be applied to everyone.

In John's reflections above, the AUAP students were transformed from just students who did not speak English well enough to those whose knowledge was vastly different from John's and *culturally* different. It seems that John began to realize that in order to teach ELLs effectively, paying attention to the students' cultures was as imperative as using scaffolding strategies and techniques because cultural differences may explain why ELLs misunderstand and do not comprehend.

John's realization that ELLs are not only linguistically different but also culturally different is significant. It displays his understanding that language is only one aspect of cultural differences ELLs bring to the classroom and that ELLs are not necessarily deficient but rather different from the dominant U.S. linguistic and cultural norms. At the end of the quarter, John stated with a smile, "I think I made progress, but a lot more to learn."

Tim's Case

Naturally easygoing, Tim enjoyed interacting with the AUAP students. In a casual conversation setting, he was motivated to make the AUAP students speak more in English. In order to do so, he intentionally chose topics that the AUAP students would like, such as food, clothing, and sports. Tim wrote: "Speaking about food in any language can bring joy to anyone because food connects us as humans," and "Two big sports that I've talked about are baseball and soccer. Both of these sports are extremely popular in Japan and many of the students grew up playing either one or both." This type of interactions using topics relevant to the AUAP students' life resulted in them speaking more in English.

Determined that interactions were key to the improvement of English skills, Tim was critical about one AUAP instructor's lesson where the instructor showed Charlie Chaplin's *Modern Times* that was released in 1936. Tim observed that the AUAP students were not able to identify with the movie itself because it was simply old, so foreign, and silent, thus not able to be engaged with the questions given to them, either. This experience seems to have assured Tim that just showing a movie or video clip, although visual, would not improve ELLs' language skills because there is no interaction.

In addition, Tim realized that having appropriate background knowledge help ELLs comprehend the academic topic. He said:

The first question in the worksheet was, "What did Charlie Chaplin compare the American workforce to?". I got it. Herding sheep. All the workers are going to work at one time. But, the AUAP students were confused. They couldn't even have any reference to the movie. Nothing was going on. So, I started to talk about sheep, and people are being herd like that.

Despite his effort to build off from what the AUAP students knew, a lack of background knowledge about the U.S. society in the movie's era prevented them from comprehending the movie's theme.

In his effort to increase interactions with the AUAP students, Tim had difficulty incorporating two theoretical constructs covered in the EDBL 401 class – interaction hypothesis and comprehensible output into his own interactions and teaching. According to Long (1981), both comprehensible input and L2 development stem from conversational modification that occurs when native speakers and ELLs work to resolve a communication difficulty. When an AUAP student described a sunset as "Power stone?" and "Red rock? Sun mountain red," Tim had no idea what he meant. This AUAP student drew pictures of a scene where the sun was setting in. However, Tim still did not understand and kept saying, "I don't understand." Then, the AUAP student took out his iPhone, searched for the images of a sunset on the

Internet, and showed them to Tim. This still did not make Tim understood. In this short interaction, neither Tim nor the AUAP student understood each other, and they both looked puzzled. Although understanding how the interaction hypothesis works in his mind, putting the theory into practice was a challenge for Tim. In this interaction, Tim clearly lacked effective interactional adjustment in the attempt to negotiate for meaning. Rather he waited for the AUAP student to come up with alternative ways to explain the sunset, which was unsuccessful due to the student's limited English language skills.

Another theoretical construct Tim had a mix result of success and failure was comprehensible output. In the same interaction above, the AUAP student spoke most of the utterances ungrammatically, such as "Dictionary ok?" "Last question no easy," and "Partner important." Compared to John who showed an effort to correct the AUAP students' ungrammatical utterances by recasting and repeating them grammatically, Tim did not correct the AUAP students' utterances, which resulted in them not producing grammatically correct sentences. Tim was aware of this when he commented: "The only obstacle that I faced with these students was getting the proper structure of both questions and sentences."

However, Tim explained his stance as "I will start to build up at their level. As they progress, I will become stricter about proper grammar." He explained that when ELLs' English language level is low, he will focus more on meanings than forms and that when their level gets a little higher, he will begin asking them to pay attention to grammatical correctness. As he interacted with the AUAP students whose English level varied, it seems that he realized that demanding too much grammatical correctness to beginners was not worthwhile. Tim's stance on grammatical correctness highlights his judicial judgement as a teacher rather than incorporating the theories he learned in the EDBL 401 class without thinking about how they apply to real teaching.

Although successful in a casual conversation setting, Tim struggled with making himself understood by the AUAP students, in other words, giving comprehensible input, in academics. Evaluating the AUAP students' English language skills, Tim wrote: "When attempting to communicate with CALP many of the AUAP students have been lost with my experience. Even with breaking words down and simplifying them in the most basic terms in BICS, the students still struggle." Throughout the quarter, Tim was persistent in using more BICS words. However, when it came to academic tasks, he realized how daunting the tasks were. For example, upon explaining what "adoption," "foster parents," and "step family" were, Tim tried hard to make his explanations more context embedded. He drew a family structure, acted out possible scenarios, and used simple sentences, such as "If I adopt you, I'll be your foster parent." Despite his effort for contextualization and visualization, not all the AUAP students he worked with comprehended the meanings. Reflecting on this failure, Tim wrote:

When I was explaining a word to the students and they just simply didn't get it. It was frustrating, but I made sure to use resources that were available and not to get upset. I could have gotten upset multiple times, but that would have just taken away from the experience with the students. I think I speak way too fast.

A repeated failure of the AUAP students with comprehending Tim seems to have been very upsetting, particularly because Tim *did* make an effort. Simultaneously, Tim thought about the possibility that his incomprehensible speech could have added to the AUAP students' difficulty. Instead of blaming the AUAP students, Tim began to reflect upon what he *did not* provide.

Academic language acquisition goes beyond understanding of content area vocabulary. It includes skills such as comparing, classifying, synthesizing, evaluating, and inferring. Academic language tasks

are abstract and context reduced because information is read from a textbook or presented by the teacher, and is cognitively more demanding. Tim witnessed the difficulties with developing academic language beyond vocabulary while teaching a PE lesson to an AUAP student. Before the lesson, he was optimistic and remarked, "I luck out in my field for PE with ESL students because of the high level of psychomotor skills being performed." However, after teaching a mini-lesson for the first time, Tim was depressed:

Half of my directions left the student in a complete state of confusion. Even watering down the directions and attempting to use more BICS vocabulary than CALP, the confusion was still evident. It is extremely difficult to teach core classes to teach ESL students.

In the reflection above, his initial optimism changed into a deep reflection.

Tim continued to reflect on this failure and attempted to analyze why he failed:

Having pictures and short directions are good. Directions should be written with bullet points and each sentence should be short. You provide questions for students to think of, and then respond to. In a setting like that, ELLs will struggle because they have to hear it, process it, and give an answer, which will be very difficult.

These reflections illustrate that Tim went through thoughtful and careful reporting and analysis of his own teaching practices and that he attempted to understand why certain activities or practices were productive or nonproductive. In other words, Tim began to see himself as a "reflective practitioner" (McKernan, 2013; Schön, 1983).

Similar to John who began to see the AUAP students' cultures as critical for effective teaching, Tim also started to realize that the AUAP students' cultures could interfere with comprehension. While debriefing one of the volunteering experiences where he had difficulty making the AUAP students understood the terms "foster parents" and "step family" with one of the authors, Tim pondered, "Well, maybe in Japan, they don't have as many foster parents or step family as we do here in America. If they don't, of course, it's understandable that they didn't get it." Approximately three weeks later, Tim's hypothesis that ELL's cultures could interfere with comprehension was tested. In a role play activity at a restaurant setting, the AUAP students he worked with were very confused about what a tip was and how it worked in America. Tim reflected, "I never got this figured out, but I believe that it's greatly different in Japan." In reality, a tipping system does not exist in Japan, thus the AUAP students were not familiar with it at all.

On the other hand, Tim stated that it could be he who misunderstood or did not comprehend the AUAP students' utterances rather than the opposite. He described one incident in one of the volunteering session:

The AUAP students were talking about a "diet." In America, a "diet" is losing weight like that. I was completely confused because they were telling me about the Japanese political system. I had the AUAP students actually draw, but that wasn't clear at all. Then, the AUAP teacher explained to me what the "diet" meant. Completely the same word that applies to both meanings and I have never heard the other one before.

This experience was refreshing to Tim because it gave him a new perspective that if the AUAP students were culturally different to him, he was culturally different to the AUAP students. In this way of

thinking, the hierarchy between he as a teacher and the AUAP students as students was eliminated and they were positioned as both students and teachers.

Realizing that he and the AUAP students could be teaching and learning together, Tim declared as below:

If there is not like a serious need, I will move forward. But I will write it down as a reminder. I will look it up and bring it up the next day. I think words and phrases ELLs bring up are really important to acknowledge, even just saying, "I understand what you are saying." Games and activities vary so much across cultures. Being able to implement even just small variations shows the students that as a teacher I care about their culture and history, and I want other students to experience their culture as well.

It seems that Tim began to see the benefit of respecting and incorporating ELLs' cultures, not only for ELLs, but also for those students who are native speakers of English.

Tim's understanding of the AUAP students as cultural beings was further enhanced by witnessing the interactions between one of the authors and the AUAP students in Japanese. He was impressed:

It's really eye-opening. You speak Japanese and the AUAP students speak Japanese. When you communicate with them in Japanese, I can see, from the tone of their voice, they're fluent in Japanese. In English, I can see a lot of thinking and processing going on. It's kind of a reminder that students who are English language learners don't speak English fluently, but we've got to realize that they're learning, it's a slow process, and they are expected to learn all the core content areas. It's really tough. I was able to understand that.

Witnessing the AUAP students communicating fluently in Japanese, Tim was able to understand that they were fully functioning human beings in their native language, Japanese, but in a foreign language, English, they struggled. This contrast seems to have given Tim empathy towards ELLs who need to navigate two different linguistic/cultural worlds.

DISCUSSION

In the current study, the opportunities to directly work with the university ESL students seem to have created a third space where both teacher candidates were able to connect between a lecture class and a field-based class in their own ways. In this third space, both of them appear to have gone through a similar process of discovering new learnings while interacting with and teaching the AUAP students.

John and Tim were both optimistic about teaching ELLs at the beginning, and ELLs were abstract in their mind at that time. John thought that teaching ELLs would be similar to teaching special education students. Tim felt that teaching academic content areas to ELLs would be similarly easy after experiencing successful interactions in a casual setting. Their optimism obviously derived from their lack of experiences with ELLs. Not having any experiences learning a foreign language themselves seems to have added to their optimism. In this sense, a serious learning of a foreign language could alleviate beginning optimism among other teacher candidates.

Karabenick and Clemens Noda (2004)'s survey result shows that the majority of teachers are very confident in their ability to teach most students, but they are significantly less confident in teaching

ELLs. The fact that practicing teachers feel more challenged with regard to ELL teaching indicates that it is indeed more difficult than it looks. Both participants in the current study quickly learned this fact, and the ELLs began to be more and more concrete in their mind. Once interacting regularly, they noticed that they were having difficulty with understanding the AUAP students' speech. In addition, they found themselves struggling to give comprehensible input to the AUAP students, in other words theory into practice. While struggling, the participants were emotionally charged; they were frustrated, upset, shocked, dismayed, and depressed. These emotional disturbances, however, seem to have made them critically reflect and analyze their teaching/interaction practices. In other words, experiencing failures, struggles, and emotionally distressful moments could open up pathways to a third space for new perspectives among teacher candidates who are over-confident about themselves because it gives a valuable opportunity to experience the blurriness between teachers and students.

While reflecting, the participants became analytical in trying to understand why their interactions and teachings did not go well. John found that asking specific questions reduces ELLs' silence, while both candidates learned that there was indeed a difference between BICS and CALP. John further realized that giving examples will help ELLs' comprehension. At this stage, it was clear that the participants attempted to directly incorporate what they were learning in the EDBL 401 class into their interactions/ teachings, and to make sense of it.

Interestingly, an attempt for direct incorporations of theories/strategies into practice accidentally provided the participants with an opportunity to manipulate them and make a judicial judgement on their own, in other words, making learnings by themselves and for themselves. For example, regardless of the obvious advantages of having visual aids, John became skeptical about its effectiveness and decided not to rely thoroughly on them. Tim also made a decision when to correct and when not to correct the ELLs' grammatically incorrect utterances depending on their English language skills. Their manipulations and judicial judgements on what they had learned in the class illustrate that the participants proactively developed their own unique ELL teaching practices rather than simply copying the best practices presented in the class. In this sense, the participants became the owner of their own practitioner knowledge, rather than the borrower of the existing academic knowledge. And this was made possible because of the third space available to them.

The sense of ownership must have empowered the participants in a way they discovered something that was not explicitly focused in the EDBL 401 class – cultural differences. The class emphasized the importance of ELLs' background knowledge and how to build off their prior knowledge. Both participants realized that a lack of sufficient background knowledge interferes with comprehension by witnessing the AUAP students' struggles. Because they were all in the process of becoming a "reflective practitioner" (Schön, 1983) and they all had a sense of empowerment, the participants were able to discover the fact that the AUAP students were culturally different, and thus could process the information differently. Since this discovery was made all by themselves, beyond the class content, it seems that this knowledge solidified their learning.

In the AUAP collaboration project, the formal and informal, the official and unofficial spaces of the learning environment intersected, creating the potential for authentic interaction and a shift in the social organization of learning and what counts as knowledge (Gutiérrez et al., 1995). While interacting with the AUAP students, both teacher candidates transformed themselves from passive recipients of knowledge to proactive explorers of knowledge through a series of failures, trials, judgements, and discoveries. They needed to receive feedback from the AUAP students both directly and indirectly, and analyze their failures in their attempt to improve their teachings/interactions. By doing so, academic

and practitioner knowledge merged in new, less hierarchical ways, and both teacher candidates became reflective and analytical learners who were willing to learn from the students they taught and interacted with. Milner et al. (2003) state that "authentic reflection should lead to self-realization through reflections that focus on self, other human beings, and power structures" (p.69). In this sense, it seems that the collaboration project provided the participants with a third space where they were able to engage themselves in authentic reflection with the assistance of the ELL students.

Our attempt to create opportunities for the direct contact with ELLs was done with the university-level ELLs, not with the K-12-level ELLs. Compared to K-12 students, older learners, like the AUAP students, tend to be practical, purposeful, and self-directed (Florez & Burt, 2001), thus more motivated to learn a foreign language. Older learner's prior education and L1 literacy can also have both facilitating and complicating effects on their L2 learning (Harper & de Jong, 2004). Despite these age-related differences, the AUAP students were ELLs who went through linguistically similar processes in acquiring English to the K-12 level ELLs. Because of this, both teacher candidates, John and Tim, were able to apply the theoretical concepts and practice sheltering strategies they learned in the EDBL 401 class which was meant for teaching K-12 ELLs, with the AUAP students. Some studies also revealed that requiring college students to work with college-level international students and ELLs enhances the host students' inter-cultural understanding (Osmond & Roed, 2010; Wilson, 1993). We are confident that what both teacher candidates learned in the collaboration project will transfer when they teach K-12 ELLs in the near future and they will be able to demonstrate effective ELL teachings and deep cultural understandings.

RECOMMENDATIONS AND FUTURE RESEARCH

In the current study, the participants wrote reflection papers each time they interacted with and taught the AUAP students, most of the time followed by our observations. We noticed that the participants reflected and analyzed much more deeply when we intentionally gave specific reflective points based on our observations. This could be attributed to the fact that they were able to focus on specific incidents that occurred during the interactions which they themselves may not have noticed, thus able to concentrate more on their reflections. As much as possible, teacher candidates who directly work with ELLs in any setting should be given an opportunity to write a reflection paper with guided questions. This will increase their ability to analyze the situations they encounter and the struggles they experience.

In our university's teacher education program, we offer an online version of the EDBL 401 class and require teacher candidates to interact with the AUAP students via Skype. It is interesting to investigate whether or not a third space needs to be a physical space for it to produce advantages. We would like to explore whether or not those students who take an online EDBL 401 class and mainly interact with ELLs via Skype have similar experiences of a third space learning to those who take a traditional class.

Fundamentally, we must investigate whether or not the prior exposure to ELLs makes a difference in teachers' attitudes and pedagogy towards ELL teaching. The existing literature suggest that the majority of practicing teachers possess negative attitudes towards teaching content areas to ELLs (Walker, Shafer, & Liams, 2004; Youngs & Youngs, 2001). If these teachers have had some experiences of interacting with ELLs, for example, during pre-service teacher education, would they hold negative views towards ELL teaching? Furthermore, is it possible for teacher candidates to change their attitudes towards ELL teaching once they begin teaching? We would like to investigate a long-term effect of the exposure following the same two participants' career path.

CONCLUSION

The collaboration project seems to benefit the teacher candidates in various ways. First, it creates a "third space" where they become both teachers and students. This boundary blurriness seems to have the teacher candidates experience the students' viewpoints. Second, a university-based class and a field-based class seem to be in sync in the project by providing the teacher candidates with opportunities to immediately implement what they have learned in a traditional class with the ELLs. It is our intent to increase the opportunities for teacher candidates to learn in a third space in our university's teacher education program so that they can implement effective teaching for ELLs.

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Chapter 4
Alternative and Authentic:
A Close Look at a Successful, Nontraditional Teacher Certification Program

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ABSTRACT

In this piece, the author describes an alternative teacher certification program to achieve two objectives. The first is to counter an argument that current programs in this category do not fit the criteria of alternative certification pathways that were established in the 1980s. The author will use this established framework (Walsh & Jacobs, 2007) to demonstrate that such programs still frame these criteria. The second objective is to refute the seemingly wide-spread negative perception that alternative teacher certification programs often carry due to the generalization of these types of programs. This will be accomplished by describing SUNY Empire State College's Master of Arts in Teaching Program and demonstrating that it meets the high standards expected from any teacher preparation program. It is the author's hope that stakeholders with an investment in education and in teacher preparation, in particular, will not make unfounded assumptions of alternative preparations and instead understand that there are high quality programs that support the profession of teaching.

INTRODUCTION AND BACKGROUND

Part of the motivation to write this chapter includes the fact that alternative certification programs have been in existence for several years across the United States, and this author feels it should be included in an encyclopedia of teacher education and professional development. In part due to address teacher shortages, state boards beginning in the 1980s agreed to allow new pathways to certification that differed from the traditional route, called "alternative" pathways to teacher certification. The National Association for Alternative Certification (NAAC) describes alternative routes to certification as "any other than traditional undergraduate degree-granting programs." Retrieved from http://alternativecer-

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tification.org/. As this definition is rather broad, the New York State Department of Education further explains the pathway as those that "feature an accelerated introductory component, followed by paid employment, with extensive mentoring, coursework and other supports from the college and the school district." Retrieved from http://www.highered.nysed.gov/tcert/certificate/teachalt.html. The state also makes it clear that the college and the institution of higher education are in partnership to help develop the teacher in a clinically manner.

There are two key motivating factors in the creation of alternative pathways to teacher certification. The first is to address critical teacher shortages, often in high-needs areas. The second is to provide a more practical avenue to the profession for those who are not readily able to divorce themselves of income in order to pursue a traditional pathway that includes at least a semester of student teaching. Rosenberg and Sindelear (2005) add that alternative pathways have "opened doors to teaching for persons from other careers, from the military, from liberal arts colleges, former teachers who want to upgrade their credentials and get back into teaching and for people who trained to teach years ago but never did" (p.118).

Over the last few decades, many alternative certification programs have arisen, including Troops to Teachers, Teach for America, and the largest in the country, the New York City Teaching Fellows. This latter program was created in 2000 to address serious teacher shortages in New York City, obviously one of the most diverse and complicated districts in the country. The Fellow's strategy involves trying a different approach to teacher preparation and including people from all walks of life with whom New York City's diverse population have a better chance to connect. Today, Teaching Fellows comprise 12% of all New York City Teachers, 20% of all science teachers, 24% of all math teachers and 22% of all special education teachers in the city. Retrieved from: http://www.nycteachingfellows.org/purpose/mission.asp

Additional reasons for developing alternative certification programs include: "the shift of subject matter to science, technology, engineering, and mathematics; recognized differentiated needs of students of academic, linguistic, economic and cultural diversity; and specified geographically determined areas of need" (Kaplan, 2012, p. 37). These reasons contributed to SUNY Empire State College's (ESC) incentive to develop an alternative certification program.

As the title suggests, Walsh, et al (2007) argue in their work *Alternative Certification Isn't Alternative* that most programs that were created in the last few decades do not fill the model of what it truly means to be alternative. They lay out criteria that should be present in alternative certification programs and analyze many extant programs concluding (in their estimation) that they are not, in fact, alternative. In this chapter, the author looks at the criteria and demonstrate how one particular program meets and sustains expectations of alternative certification.

The second objective of this chapter is to respond to the seemingly automatic negative connotation associated with the term "alternative" when associated with teacher preparation. An explanation for this generalization is because there is an assumption that all alternative programs follow the same most recognized model of fast-tracking or "boot camps" without sufficient preparation. In the chapter that ensues, the author will demonstrate that not all programs are alike and some, in fact, serve their purpose, which is to attract high-quality candidates into the *profession* of teaching and support teacher retention.

MAIN FOCUS OF THE ARTICLE

As mentioned before, Walsh, et al (2007) lay out their criteria[1] in the article *Alternative Certification Isn't Alternative* and subsequent analysis of a variety of programs. These criteria include academic selectivity,

strong subject-matter knowledge, streamlined and practical sequence, and intensive new teacher support (p.19). Selectivity refers to a candidate's academic summary prior to entering a certification program, and subject-matter knowledge refers to the content area in which a candidate wishes to teach. The sequence refers to the notion that course loads should be reduced for new teachers so that there is time to focus on their in class pedagogy. Finally, the last criteria refers to the need for new teacher mentoring (p. 19). They conclude that most programs that were approved in the category of alternative certification stray from these core foundations.

In 2000, The New York State Board of Regents approved regulations permitting alternative certification programs. In response to this regulation and the then urgent need for teachers, the State University of New York (SUNY) Empire State College (ESC) implemented an alternative pathway for teacher preparation in 2003. Known for educating adult learners since 1971, SUNY Empire State College was well positioned to create a program that would serve nontraditional teacher candidates and career changers. The program's intention was not only to address the then teacher shortage in New York State but also to provide adult learners with a viable option of making the career transition into teaching that was manageable in many respects, including financial and school-life-work balance. Many adult learners cannot afford the financial and time requirements of a traditional program including the semester of student-teaching as they have other obligations such as having a family. This program would seek an innovative, non-traditional approach to teacher preparation and as a result, would utilize the Transitional B certificate as a component to the Master of Arts in Teaching (MAT) degree for adolescent content areas (English Language Arts, Languages other than English (LOTE), mathematics, the sciences, and social studies). Transitional B is a fully recognized certification in the State of New York that allows students to become teachers of record after a full year of clinical experience and course work to prepare them for the classroom setting.

After completing a rigorous 200 clock hour introductory component that includes at least 40 field hours and after passing two certification tests, candidates in Alternative Teacher Preparation (ATP) programs are eligible to be employed as full-time certified teachers of record in NYS public schools. While teaching, they receive mentoring support from hiring school districts, supervision from the ATP programs, and take additional college courses to complete their teacher certification requirements. Retrieved from: www.highered.nysed.gov/ocue/spr/AlternativeTeacherCertificationProgram.htm

Let's examine the SUNY Empire State College program aligning it with the Walsh and Jacobs (2007) framework sequentially to demonstrate how this program retains its alternative designation. With regards to academic selectivity, the ESC program goes beyond the "2.5 grade point average required of students entering most traditional education programs" (Walsh and Jacobs, p.19). In 2014, the SUNY Board of Regents implemented new mandates with respect to all certification programs; all incoming teacher candidates would now need a GPA of 3.0. Empire State College is no exception, so all of our candidates meet this criteria. Even before this regulation however, our incoming expectation was a GPA of 3.0, higher than the proposed 2.5 in other programs. Yet our selectivity is not exclusive to GPA. Program admissions requirements now include the taking of the Graduate Records Examination (GRE) or the Millers's Analogy Test (MAT) as well as our longstanding tradition of an in person interview with every teacher candidate with a protocol of questions that the program deems a better indicator of potential program and teaching success than a simple GPA. Questions include what drives their passion about

their content area and to teach it as well as what supports they have in place to help ensure their success in the program and in their new career.

With regards to strong subject matter knowledge, ESC teacher candidates come into the program with a minimum of 30 credit hours on their transcript in their designated content area. Additionally, they must take and pass New York State's Content Specialty Test in their field prior to our recommending them for certification; they cannot be a teacher of record without these qualifications. Additionally, oftentimes our population of adult learners includes career changers and come from a related field. For example, some of our science teachers were previously scientists at IBM or other companies obtaining content knowledge on the job. They, therefore, come into teaching with a wealth of experience and relatable real world knowledge and application of that knowledge. Many of our LOTE teachers are heritage speakers who have an inherent confidence in speaking the target language, which is a benefit of language instruction. It also adds to a diverse teacher candidate pool, which is a well-known goal of the K-12 setting. Finally, students in the first year of the program (prior to receiving the Transitional B certificate) take a methods course in their content area, which not only exposes them to pedagogy but to best practices in the content field as well. Within ESC's MAT program, students then also take an additional content methods course and a content area study beyond those thirty credits, reinforcing their mastery of subject matter.

Having a streamlined, practical sequence is a logical way to support a non-traditional teacher candidate. Walsh and Jacobs (2007) argue that new teachers should not be overwhelmed with coursework (total 18 hours) and that the content should focus only on that which will help make a new teacher competent. (p.19). ESC's program differs from others because it is a combined certification program with the Master's degree. So while our program totals 42 credits, students only need the first 12 credits to be recommended for the Transitional b certificate, and they attain this in two semesters' time. These credits include an introduction to middle childhood and adolescent development, a course in exceptionalities, which includes how to read and interpret individualized education plans (IEPs). They also include an initial methods course in the content area as well as a foundations of education course rich with community assets, teaching diverse learners and the understanding the Common Core State Standards, which New York State has adopted.

It is at this point ESC's candidates are eligible to become teachers of record in the classroom. Yet our support and development does not stop there. A strong benefit of our program is that it is longitudinal, which speaks to Walsh and Jacobs' (2007) final criteria, which is intensive new teacher support. As our candidates become teachers, they remain students in our program for an additional two or three years, depending on the pathway they take.[2] Thus, the faculty are active members of this intense support and induction. Faculty observe each candidate five times a semester and provide detailed feedback in the form of an adaptation of the Danielson (2011) rubric and a debriefing session with the student. While this is important, it is limited support and thus the program also ensures each new teacher has a school based mentor in their content area who agrees to serve as their school-based mentor for a period of two years. The first mentored teaching agreement, which all parties (student, school-based mentor, and program faculty) sign decrees the expectation that the teacher and mentor will meet on a regular, intense basis for the first 8 weeks of teaching. The second one states that they will continue to meet regularly for the next two years. In their article, *Research based alternative certification: An answer to teacher* attrition, Stanley and Martin (2009) write, "Recommendations for effective programs also included a structured, well-supervised indication period with close supervision and guidance by an experienced mentor for at

least one year" (p. 4) so our program goes well beyond these recommendations with an additional year. This support is essential as these teachers know the school structure, the building dynamics and most importantly, their students and provides them with a safe space for additional development. Research (Ingersoll and Strong, 2011) has shown that mentored support helps to increase teacher retention, which is why this longitudinal, mentoring protocol was established. Describing Empire State College's model using the Walsh and Jacobs (2007) framework demonstrates that the program is indeed an alternative certification program. The Appendix shows a table summarizing the framework and ESC's evidence of that framework.

While it is important, for the purposes of this essay, to authenticate this alternative teacher preparation program, it is more significant to demonstrate the quality of the program. As mentioned previously, alternative teacher certification programs have often been degraded pervasively in the media and even in the academy due to the erroneously homogenized grouping of such programs that include the often debated program Teach for America (TFA) which has become "the poster child for these new pathways." (Stern & Johnston, 2013, p.3). As Anderson (2007) explains, the Teach for America program includes a very fast track entree into teaching with only 30 hours of independent work, some teacher observations, and a mandatory 5 week training institute (p. 685), which many argue is insufficient. The target audience for TFA is mainly recent college graduates often from top tiered universities. Critics of the program argue that this audience is not idea for teacher retention as young professionals often wish to move on to more lucrative careers. Anderson tells us that "less than a quarter [of TFA members] remain in the school where they were initially placed for more than 3 years" (Anderson, 2007, p. 689).

Though there is also support for the program including positive results in outcomes, one of the biggest criticisms of the program is that it deprofessionalizes teaching. In their article *I want to* do *TFA, not* become *a teacher*, Stern and Johnston (2013) write that many corps members view TFA as a stepping stone in a larger career trajectory or a stop gap on their way to law school rather than a pursuit of a genuine profession. Though some members do remain as teachers, there is a need to eradicate the notion that the profession of teaching is something to be "done" rather than become. "Whereas we've described *doing* as uncritical automation, becoming, for us, means to develop or grow into a self-reflective knower and practitioner" (p.15). The latter is the goal for any caring teacher preparation program- to encourage teachers to become reflective practitioners and to continue as life-long learners in the profession. Yet with TFA being a "poster child" for alternative routes to teaching, it is important to negate the generalization that all programs are the same.

In their article *Teach For America in the media: A multimodal semiotic analysis*, Osborn and Sierk (2015) state, "When social actors are collectivized, they are homogenized, as group representation 'diminish[es] individual differences'" (p.4). They further explain that "knowledge of certain social and political realities is not formed from first-hand experience but rather on the basis of the texts to which we are exposed" (Hart in Osborn and Sierk, p.3). As a result, the masses are likely to form an uneducated opinion on a topic or, in this context, a program about which they know very little. Naturally then, when people are exposed to articles like *Teach for America and Symbolic Violence: A Bourdieuian analysis of education's next quick fix*, which obviously connotes a disparaging implication in its title, they are likely to adopt a negative view not only of TFA but also of other alternative pathways to teacher education. Teacher preparation should not be bifurcated into traditional pathways and boot-camp models; there are quality alternative programs that exist in between those two extreme including that of SUNY Empire State College. Alternative pathways certainly may include the non-traditional routes to teacher licensure[3] including some programs deemed "boot camps," which may not provide sufficient preparation

for nascent teachers going into the field including into challenging teaching environments. However, other alternative pathways to teacher education do, in fact, help prepare teachers for the field that are longitudinal, rich with clinical experience, and provide robust mentorship of pre and in service teachers while students complete the program.

Quality Matters

A report from the National Research Council (2010) identified the three critical aspects of teacher preparation that create positive outcomes for students as:

1. Candidate content knowledge,
2. Quality of teacher candidates, and
3. Field (or clinical) experience.

The National Research Council report contributed to the enhancement of the new Council for the Accreditation of Educator Preparation (CAEP) (2011) standards particularly Standard 2 which explicitly addresses Clinical Partnerships and Practice. 2.3 states that clinical experiences should be "of sufficient depth, breadth, diversity, coherence, and duration to ensure that candidates demonstrate their developing effectiveness and positive impact on all students' learning and development." Retrieved from: http://edsource.org/wp-content/uploads/commrpt.pdf.

Additionally, Darling-Hammond (2006) describes the need for continuous improvement of teacher preparation and that quality programs should include an inextricable link between course work and clinical work and supervision of that clinical work as well as strong partnerships with schools that have demonstrated success in teaching diverse learners. (p. 300).

I have already addressed the first two findings in the description of how and why this program is alternative and will now also describe the program to include a description of the clinical component as well as to differentiate it from better known, lesser respected models of nontraditional teacher certification preparation.

The MAT is a graduate level program based on a clinical model that enables adults to earn their initial certification while working as full time teachers in schools with the highest needs in the state. Both the faculty and the administration of the college embody the belief that early clinical experiences in high needs school contexts, extensive mentoring and continuous supervision, individualized instruction by adult and urban education specialists, cohort based instructional models, an integrated curriculum that supports systematic reflection, intensive collaboration with local school districts, financial support, and authentic assessment of outcomes are the differences that make the difference in recruiting, training and retaining high quality candidates. (Burbank & Kauchak, 2003).

The three-year, part-time program begins with a year of pre-service coursework including foundations, methods, differentiated instruction, and issues of diversity. Students also need to complete the required field observations associated with pre-service teaching. With this introduction, students are exposed to theory and practice, which informs their classroom presence throughout years two and three. During these latter two years, the students, who are by now teachers of record with classrooms of their own, remain in the program to fulfill degree and certification requirements. Students continue taking course work that aligns with the daily tasks and challenges of their classroom practice including lesson planning, management and assessment. Course work includes that of assessment, lesson and unit planning,

literacy in the content areas as well as four mentored teaching seminar where students come together with their faculty mentor to discuss the clinical component of their degree.

Darling-Hammond (2006) describes one of the most challenging aspects of teacher preparation, which is successfully integrating theory and practice. Empire State College's program allows for the balance to which Darling-Hammond refers to as elusive. Additionally, it provides a space for reflective practice, which Schon (1996) defines as "thoughtfully considering one's own experiences in applying knowledge to practice while being coached by professionals in the discipline" (p.4). Having students engaged in course work at the same time they are teaching in a clinical setting allows for this reflection to occur. The mentored teaching seminars in particular support this type of learning and continued development. This extended clinical model allows faculty to observe and interact with teachers of record in their classrooms for two years to better reinforce what they have learned and are learning in the program. In addition it also provides an opportunity to support teacher candidates and teachers of record through on-going mentoring and instructional assistance and collaboration as they continue their coursework. Having a longitudinal relationship with teacher candidates and teachers of record allows for continued support and development, which directly benefits these nascent teachers and their students as well.

Cohorts

Dinsmore and Wenger (2006) write that "nontraditional-age students place great value on participation in peer cohort groups to combat isolation" and that they "understand teaching as a developmental process and perceive themselves as needing practice" (p. 59).

ESC's MAT program was established on the framework of cohort models, as peer support was vital in helping students achieve success. As a result, this program developed a dual cohort model. SUNY Empire State College is geographically located all over the state of New York currently with 34 locations including a more expansive center in every major city. Thus the program faculty are in a unique situation to serve and support students all across the state in multiple content areas. How this is achieved is through a blended learning model. Herlo (2014) states, "Blended Learning (BL) works because it combines two things in a way that makes each one better than they are on their own: professors' talent and technology tools. BL allows professors to do what they do best work directly and closely with individual students and small groups by harnessing the adaptive power and precision of technology" (p.147). The blended learning program structure is a key component in enabling state-wide support for these students.

The program enrolls students in all content areas in 6 geographic regions: Western New York, Central, New York, the Capital Region, Hudson Valley and New York City and program faculty are located in all 6 regions with varying content backgrounds. Students enter the program and then become a part of two cohorts, their local, geographic cohort with whom they attend face to face courses throughout the program and also their content area cohort (English Language Arts, LOTE, mathematics, science, social studies) with whom they are in fully online courses[4]. This structure provides individual and group support to students with local and content area mentors, as well as essential peer support with local and content area colleagues across the state.

Residency Program

To address the previously cited statement from Darling-Hammond with regards to extensive clinical placements, ESC's MAT program introduced an additional track in 2011. While it is the program's belief that

the longer standing program provides sufficient clinical support to teacher candidates, we wanted to offer another option for students who did not feel ready to be a teacher of record after a year of preparation.

To that end, the program developed and implemented a clinically rich residency track option for the MAT. This track stems from teacher preparation best practices for residency models including the Boston Teacher Residency and the Academy for Urban School Leadership in Chicago with regards to their extended time in the classroom under the tutelage of a veteran teacher. (Berry, Montgomery, Cutis, Hernandez, Wurtzel, & Snyder, 2009). It was also informed by the National Board for Professional Teaching Standards, as there is a National Board Certified K-12 teacher on the program faculty. These standards include including: Teachers are committed to students and their learning, Teachers know the subjects they teach and how to teach those subjects to students, Teachers are responsible for managing and monitoring student learning, Teachers think systematically about their practice and learn from experience, and Teachers are members of learning communities (NBPTS, 2007).

Students in Empire State's residency model begin in the school with their critic teacher (cooperating teacher) from the beginning of the school year, including professional development days, and remain until the beginning of May. Critic teachers utilize the gradual release of responsibility methodology over the course of the year emphasizing co-teaching, culminating in an 8 week immersion period in which the resident assumes responsibility for all classes. This model allows for students to gain a full year teaching experience, which is invaluable in anticipating planning, addressing management, and garnering a sense of what an entire year of teaching entails.

This program also responds to Darling-Hammond's (2006) critical component of the need for "proactive relationships with schools" (p.300). Before a student is granted access to the residency, s/he must submit to an interview with the school's administration and potential critic teacher, thus increasing the investment on behalf of the K-12 school as well as the institution of higher education. This is where the partnership begins. If the personnel believe the student will make a good resident, they are granted access, and all parties then sign a memorandum of understanding outlining which institution is responsible for what. Included in that agreement is that each term (fall and spring), there will be a mid-term and final evaluation, conducted both in writing and in person, during which the student, the critic teacher and the faculty representative from ESC sit down, discuss the benchmarks and the resident's progress in terms of both strengths and weaknesses.

Each semester, the resident is observed by college faculty five times using an adapted version of the Marzano (2011) rubric. The critic teacher is also asked to fill out this rubric on a lesson the resident teaches over the course of the semester as well to see consistency in evaluation. In preparation for teach visit, the student fills out a pre-observation form (Danielson, 2011) and submits a lesson plan. After the lesson has occurred, the resident then fills out the post- observation form to ensure reflective practice. Like the Trans B program, throughout the year residents complete the required coursework for the MAT degree and New York State certification. Both pathways of Empire State College's MAT degree with certification provide innovative, alternative routes to certification that are based on quality course work and theory, significant mentoring support, and clinical practice.

It is important to note that alternative teacher certification programs are still bound by the regulations and expectations of accreditors, formally the National Council for Accreditation of Teacher Education (NCATE) or the Teacher Education Accreditation Council (TEAC), and now the Council for the Accreditation of Educator Preparation (CAEP). Empire State's MAT program went through the rigorous TEAC process, writing the required Inquiry Brief that addressed TEAC's "Quality Principles of Evidence of Candidate Learning, Evidence of faculty learning and inquiry and Evidence of institutional commit-

ment and program capacity for quality" (Murray, 2010, p. vii). This process culminated in a site visit and subsequent report in 2012 which stated the accreditation team was "very impressed with Empire State College's *Inquiry Brief* and the work they were doing both to track their outcomes and to adapt to changing state regulations." The letter continued, "It is clear that the faculty is involved in on-going programmatic self-study and improvement (TEAC decision letter, 2012) which should be a goal of any teacher preparation program. TEAC found our program to be meeting benchmarks and expectations "with no weaknesses or stipulations" demonstrating the program's strengths with regards to national accreditation standards.

CONCLUSION

This chapter included a detailed summary of a high quality alternative teacher preparation program and its two tracks. It also was intended to raise awareness and encourage countering negative assumptions of programs labeled "alternative" due to the perceived homogenization of the category. Those who specialize in teacher education care about and respect the profession. Teaching is challenging and contextual, which is why there is no one size fits all model for development. Empire State College implemented a program utilizing alternative routes to help adult learners transition into the teaching profession in a thoughtful, responsible manner that affords this population a career opportunity that might not otherwise be possible. While an objective of this piece was to highlight this particular program, it also serves to remind us to examine individual programs with a critical lens and not be persuaded to make generalized assumptions merely by the category in which a particular program sits based on media portrayal. Alternative pathways to teacher certification can be authentic, viable and of high quality, and there are, in fact, valid reasons for their existence. The general public, educators, and potential teacher candidates should not judge a program by its designation, rather they should look at each program specifically to determine its value.

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APPENDIX

Table 1. Framework criteria and program's corresponding elements

Walsh and Jacobs Criteria	SUNY Empire State's Corresponding Elements
Selectivity	3.0 Grade Point Average GRE/MAT score In person interview Background knowledge and skill set
Strong Subject Matter Knowledge	30 credits in their area of certification Passing score on the Content Specialty Test Content Methods course prior to certification Career changes from relevant fields
Streamlined and Practical Sequence	Program includes certification and a Master's degree 12 credits only are required for the transitional b certificate
Intensive New Teacher Support	2 years of mentoring after obtaining certification Faculty observations at least 10 times a year In school mentor via contract for 2 years.

[1] Note that the author does not necessarily agree with these criteria but is employing it as a recognized framework for alternative certification programs.

[2] ESC's transitional b MAT program can be achieved in two or three years depending on the student's pathway.

[3] Though to be clear, Teach for America does not grant licensure.

[4] Fully online includes regular synchronous webinar meetings and conference calls.

Chapter 5
edTPA is a Rock in My Shoe:
Alleviating the Pain of edTPA with the edPASR Strategy

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ABSTRACT

As more and more states adopt edTPA as a professional portfolio for teacher licensure, more and more teacher candidates face the challenge of completing edTPA often with little guidance or support. The purpose of this chapter is to describe a specific strategy, called the edPASR Strategy, for supporting teacher candidates through the edTPA process. The chapter shares how the edPASR Strategy emerged from the need to develop a heuristic method that would help teacher candidates successfully navigate and complete the edTPA Portfolio. The chapter examines edTPA related program data from a sample of 263 elementary education teacher candidates (n=263) from the University of North Carolina at Charlotte, which is located in the Southeast region of the United States. The chapter reports on the improvement over time in the participants' mean scores on the edTPA Tasks. One reason for the improvement is providing systematic guidance for the teacher candidates through the edPASR Strategy, which stands for: ed- Educate yourself; P- Practice, AS – Assess Self, and R – Review.

INTRODUCTION

For more than three decades the field of teacher education has been privy to the growing public demand for accountability and the professionalization of teacher practice. Such demand has its origins in the rise of the standardization movement that was heralded with the early 1980's *A Nation at Risk Report* (Gardner, 1983). The exigency for teacher professionalization, though, has not been met with the same kind of zeal for a rise in teacher salary so that teachers are paid like professionals (Carter Andrews, Bartell, & Richmond, 2016; Hanushek, 2016; Labaree, 2011). That is an important story that the chapter will

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revisit in the concluding remarks. The main story of this chapter, however, is about preparing teacher candidates for successfully completing their edTPA Portfolio. EdTPA is a performance-based portfolio assessment developed by the College of Education at Stanford University. The edTPA Portfolio provides evidence of a teacher candidate's developing professional teacher practices. It is a measure of teacher professionalization. The edTPA Portfolio requires teacher candidates to showcase artifacts related to their planning, instruction, assessment, integration of academic language, and analysis of teaching (Lynn, 2014). The portfolio is then independently evaluated based on a series of rubrics. More and more states in the United States are adopting edTPA as part of granting initial teaching licensure. Thus, the edTPA Portfolio has become a "high-stakes" performance assessment that demands a great investment in teacher candidates' time and mental activity.

EdTPA is an example of an authentic assessment of the skills and dispositions for the professional practice of teacher. But teacher candidates do not always perceive edTPA that way! Many teacher candidates perceive edTPA as busy work and a bother because of the comprehensiveness of the portfolio requirement. Other teacher candidates perceive it as a pain because of the amount of work involved. One teacher candidate put it like this "edTPA is a train wreck that I can't look away from because it is so much, all at one time and it is very painful to have to look at and deal with." In an informal survey, the chapters' authors asked a group of teacher candidates to complete the following sentence stems with a metaphor and explanation: *The edTPA Portfolio is a* _____ *because* _____. The majority of the teacher candidates shared metaphors describing something quite painful or challenging. Here are examples of what they wrote:

- The edTPA Portfolio is a black hole; it sucks you in painfully and won't let you out.
- The edTPA Portfolio is a marathon because it is a lot of ongoing work.
- The edTPA Portfolio is a wrecking ball because it makes me stress like crazy!
- The edTPA Portfolio is a Tsunami because it lurks on the coast and then proceeds to envelop everything around you.
- The edTPA Portfolio is a dental appointment because it may be good for your skills but is sometimes painful.
- The edTPA Portfolio is a rock in my shoes because it is annoying!

These are likely not the metaphors that Stanford's College of Education professors were thinking of when designing and testing the validity of edTPA. Nonetheless the metaphors represent real—and somewhat amusing—perceptions of edTPA. How do teacher educators' best prepare teacher candidates for success on edTPA? What are ways to make edTPA less of a "painful" experience? This chapter shares a systematic strategy, called the edPASR Strategy, for supporting teacher candidates through the edTPA process. The edPASR Strategy provides a heuristic method for alleviating the pain of edTPA, which for some is like the proverbial rock in one's shoe.

The chapter is organized in four sections. First, background information is provided as the chapter's authors review the literature about edTPA. Next, the chapter focuses on how edTPA is enacted at the University of North Carolina (UNC) and situates edTPA in the Performance-Based Assessment Cycle framework (Byker, 2016). Third, the chapter describes the methodology and shares findings from a study of edTPA related program data from a sample of 263 elementary education teacher candidates (n=263) at UNC Charlotte. Finally, the chapter discusses how the participants' mean score improvement could be related to the development of a systematic way, called the edPASR Strategy, of preparing the program's

teacher candidates for the edTPA Portfolio. The chapter further defines and explains the features of the edPASR Strategy.

BACKGROUND

The introductory acknowledgement statement found on most edTPA related documents explains how "edTPA stems from a twenty-five-year history of developing performance-based assessments of teaching quality and effectiveness" (SCALE, 2015, p. i). EdTPA also acknowledges education related groups that were pioneers in developing and using performance-based portfolio assessments for teacher quality evaluation (SCALE, 2015). The education groups that forged the way for edTPA include the National Board for Professional Teaching Standards (NBPTS), the Interstate Teacher Assessment and Support Consortium (InTASC), and the Performance Assessment for California Teachers (PACT). The lineage of edTPA illustrates how teacher performance assessments are not new. The National Board for Professional Teaching Standards was created in the 1990s. National Board Certification (NBC) is voluntary and consists of four components: 1) content knowledge, 2) differentiation in instruction, 3) teaching practice and learning environment, and 4) effective and reflective practitioner (NBPTS, 2014). National Board Certification is based on national standards, created to identify accomplished teachers, involving a rigorous, reflective portfolio beyond what is required for teacher licensure. National Board Certification is the highest certification a teacher can achieve. The process is offered to all areas of teaching after three years of experience and involves a rigorous reflective portfolio process for current teachers. From the National Board Certification process, a similar teacher performance assessment was created in 2002 in California called the called Performance Assessment for California Teachers (PACT). What was unique about PACT was how it was designed to be a performance assessment for teacher candidates (Reagan, Schram, McCurdy, Chang, & Evans, 2016; Meuwissen & Choppin, 2015). PACT laid the groundwork for the development of edTPA.

Many in the field of education foresee a time when the edTPA Portfolio replaces traditional teaching licensure exams (Darling-Hammond, Newton, & Wei, 2013; Mahoney, 2015; Ratner & Coleman, 2016; Sawchuk, 2013). Scholars argue the edTPA Portfolio is a more authentic and robust assessment of whether a candidate is ready to teach whereas licensure exams are decontextualized and not connected to practicing teaching (Darling-Hammond, Newton, & Wei, 2013; Sato, Wei, & Darling-Hammond, 2008; Sato, 2014). EdTPA is designed to assess candidates' teacher knowledge and skills while situated in actual practice: in the classroom. According to the American Association of Colleges for Teacher Education's (AACTE) edTPA website, 683 teacher education programs in 38 states and the District of Columbia have adopted edTPA as an assessment for their teacher candidates.

There is an emerging collection of descriptive studies and descriptions of support structures for teacher candidates' completion of edTPA. For example, Ratner and Kolman (2016) discuss a variety of levels of support faculty can take in response to teacher candidates' needs with edTPA. They examine teacher education programs where faculty participate in many edTPA-like activities with teacher candidates, such as workshops, and practice entries. There are also teacher education programs where faculty are taking a more "business as usual" approach and not really calling what they do "edTPA", even though they are facilitating the portfolio assessment. Because there is such variety, the Stanford Center for Assessment, Learning and Equity (SCALE) created a document that provided teacher educators with guidance about the level of support they can offer teacher candidates. The document is called "Guidelines for Accept-

able Candidate Support" (SCALE, 2014a) and outlines support restrictions for faculty, supervisors, and cooperating teachers. It is not clear if there is a level of accountability built in, to be sure all involved, follow these guidelines. Corliss (2016) developed a list of suggestions for the top ten aspects of support, related to ensuring teacher candidates' success with edTPA. Number 10 on the list is the importance of genuine support from the cooperating teacher the candidate is placed with. It is important the CT knows about edTPA and can help the teacher candidates with some decision-making. Also included on the list is mention of opportunities for the teacher candidate to have access to data, know the prompts, and video record as many lessons as possible. The list finishes with the number one way to ensure success on edTPA: give teacher candidates opportunities to make the best instructional choices possible based on the knowledge of their P-12 students. Corliss (2016) suggests edTPA is an opportunity for teacher candidates and institutions of higher education to think critically about what is currently done in teacher preparation and what can be done better.

Barron (2015) reports that the success of teacher candidates on edTPA was related, in part, to teacher education faculty taking the time to change curricula in order to support the candidates throughout the edTPA process. Burns, Henry, and Lindauer (2015) describe their approach to supporting teacher candidate through edTPA based on four main initiatives:

1. Strategic field placements,
2. School partnerships,
3. Continual practice, and
4. Practical support from the teacher education faculty.

In some institutions of higher education, teacher educators report "business as usual" for support (Meuwissen & Choppin, 2015) and edTPA is seen as an extra or "add-on" to an existing program. Researchers, though, have called for more faculty "buy-in" and ownership of edTPA so that teacher candidates can receive the support necessary to be successful (Ratner & Koman, 2016).

The literature shows how the edTPA process requires a high level of teacher educator faculty involvement (Ratner & Kolman, 2016). Darling-Hammond, Newton, and Wei (2013) report that teacher candidates who had learned skills from the portfolio assessment also felt well-supported by their university program faculty. The edTPA Handbook (SCALE, 2015) includes strict Guidelines for Candidate Support, including lists of acceptable and unacceptable means of support. For example, it is acceptable and encouraged to have conversations with the teacher candidate around effective teaching but it is unacceptable to edit the videos for the teacher candidate or offer feedback on the final product. In spite of the guidelines, there is a disparity and variation in the level and kind of support offered to teacher candidates (Ratner & Kolman, 2016). Not every teacher candidate can be placed with a cooperating teacher who is excellent at managing the learning environment and can manage the pressure of high-stakes tests, while allowing a student teacher to take up time in the classroom (Ratner & Kolman, 2016). Other variables may include the teacher candidate placed with university supervisors, faculty members, or teachers who have philosophical differences with the edTPA process, where the faculty member or university supervisor does not feel ownership or "buy-in" for the edTPA process. There are so many variables for every teacher candidate experience with student teaching, so a consistent support structure is foundational to the teacher candidates' potential success on edTPA.

MAIN FOCUS OF THE CHAPTER

As the literature shows, there is a need for teacher education faculty support of guiding teacher candidates through edTPA. The chapter's main focus is on the edTPA support process for elementary education teacher candidates in the College of Education at the University of North Carolina (UNC) at Charlotte. The implementation of edTPA happened in 2012 at UNC Charlotte. The teacher education programs began implementing edTPA during student teaching in the Fall, 2014 semester. During the Fall, 2013 and Spring, 2014 semesters teacher candidates in both the Elementary Education undergraduate and graduate certificate/MAT programs had completed each of the four tasks as practice experiences in various courses. The courses each include a practice task, candidates complete the project in the context of the classroom that they are placed for their clinical, classroom-based experiences. In some cases this is their student teaching classroom during their first semester as seniors. Meanwhile, candidates complete edTPA Task 4 in a classroom that they are placed in during one of the semesters of their junior year. Course instructors are charged with the process of providing detailed feedback to students on at least one draft of the practice task in the course. Many faculty members provide opportunities for peers to examine and look at each other's work in order to provide further feedback to one another. In the case of Tasks 1 and 4, recent studies have found that candidates' experiences of completing tasks in courses has resulted in successful products using a scaffolding approach of working on a task as a whole class, in groups, and then individually (Polly, 2016; Polly, under review). Table 1 shows an overview of the scope and sequence of edTPA practice tasks at UNC Charlotte.

During student teaching, candidates complete a full-time 15 week internship in elementary school classrooms. Candidates return to campus during the semester for workshops about the edTPA Portfolio. The four workshops are designed to allow teacher candidates to review the edTPA task requirements, to collectively analyze edTPA artifacts with their colleagues, and to work through each of the edTPA tasks. Lastly, candidates are given the option to come to a fifth workshop to have a peer review their work and to ask any last minute questions before submitting their portfolio. Each portfolio is submitted through the Pearson national scoring system and is scored by a nationally-trained evaluator. By submitting the project to Pearson, students have assurance that their score is credible and valid. Faculty members review the edTPA data from the previous semester during department meetings, and discuss ways to further support teach candidates during courses as well as in student teaching. To this point, these modifications have been minor adjustments to the way these practice tasks are implemented in courses (Polly, 2016).

Table 1. Courses that include edTPA practice tasks

Task	Focus	Undergraduate Program	Graduate Certificate/ MAT Program
1	Planning literacy	Integrating Curriculum for Elementary School Learners, Senior Year	Integrating Curriculum for Diverse Learners, Semester 2 of 4
2	Teaching literacy	Research and Analysis of Teaching, Senior Year	Social Studies Methods, Semester 2 or 3 of 4
3	Assessing literacy	Measuring and Evaluating Teaching, Senior Year	Teaching Reading in Grades 3-6, Semester 3 of 4
4	Planning, teaching, and assessing mathematics	Mathematics Pedagogies in Grades K-2, Junior year	Assessing and Differentiating Mathematics, Semester 3 of 4

Performance Based Assessment Cycle

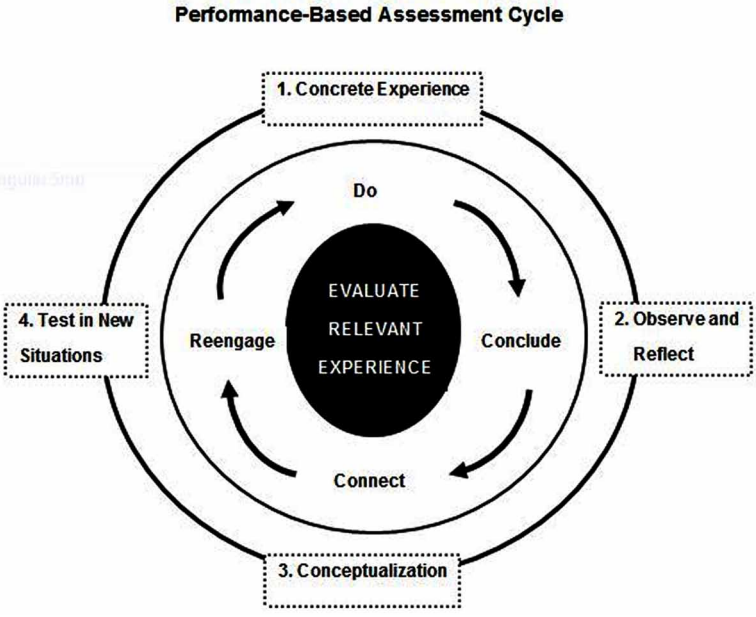
EdTPA is a performance-based assessment. The public demand for teacher professionalization requires more authentic ways of measuring a teacher candidate's likelihood of embracing professional teaching practices. The Performance-Based Assessment Cycle (Byker, 2016) provides a helpful framework for showing the process of performance-based assessment. The process can also help guide faculty support of the edTPA Portfolio along each component of the cycle. See Figure 1 for a graphic representation of the Performance-Based Assessment Cycle.

Figure 1 illustrates how the core of performance-based assessment is based in the evaluation of relevant experience. The relevancy of the edTPA Portfolio centers on planning, instruction, and assessment, which are authentic features of professional teaching practice. Starting on the first day of school, a teacher is expected to be able to plan, instruct, and assess students. The Performance-Based Assessment Cycle shows how learners move through a cyclical process of experiential learning based on the assessment. From the core of relevancy, the Performance-Based Assessment Cycle captures the cycle of experience moving from:

1. Doing,
2. Concluding,
3. Connecting, and
4. Reengaging.

As Figure 1 show, the cycle is connected and interrelated. Performance-based assessment is not just about a single, isolated event, but about a process.

Figure 1. A graphic representation of the Performance-Based Assessment Cycle



Related to supporting teacher candidates for edTPA, teacher educators can use the Performance-Based Assessment Cycle. Indeed, the chapter's authors used the cycle to systematize the edPASR Strategy. The strategy, which is explained in detail later in the chapter, starts with doing one of the edTPA tasks. Here doing means practicing. Before one can begin doing the person needs to know what is to be done. Thus, doing not only captures the initial engagement of experience, but includes preparing for the experience. Related to edTPA tasks, preparation means a thorough reading of the edTPA task directions. After doing or practicing an edTPA task the experience is not suddenly finished. Thus, the learning does not stop. It is important for teacher candidates to form conclusions of what they did. Concluding requires reflection so that learners can be ready to reengage with the task. Related to edTPA tasks, concluding is represented in the faculty feedback and the teacher candidates' self-assessment of their practice task artifacts.

Connecting is the third component of the Performance-Based Assessment Cycle. Connecting is the expansion of drawing conclusions about an experience. It is the shaping of conceptual knowledge gained from the initial task experience. Related to the edTPA tasks, teacher candidates connect when they have opportunity to review and discuss the edTPA Portfolio requirements in collaboration with other colleagues. Connecting has a social learning feature where teacher-candidates are learning through a discourse about the experience. After connecting with the concepts of an experience tasks, learners move to reengaging. Related to edTPA, reengaging is the stage where teacher candidates complete and submit the entire edTPA Portfolio. The Performance-Based Assessment Cycle's first three components prepare teacher candidates to reengage in the edTPA tasks. When the reengagement happens, the teacher candidates are thoroughly equipped and prepared to submit their official edTPA Portfolio.

Method

The Performance-Based Assessment Cycle informs how many faculty members in the College of Education at UNC Charlotte guide their teacher candidates through edTPA. The guidance, though, continues to develop and evolve each year. Yet, what is the impact of such guidance on teacher candidates' edTPA scores? The chapter's authors investigate this question through a research study. The study has two research questions:

1. What are teacher candidates' scores on the various tasks of edTPA over time?
2. What are the specific strategies that support teacher candidates for success with edTPA?

To investigate these questions, the study uses a quantitative research design. The study's quantitative data come from UNC Charlotte's edTPA related program data from a sample of 263 elementary education teacher candidates (n=263). These data are analyzed and reported using descriptive statistics.

Findings

The chapter organizes the findings of the study based on the research questions. First, the chapter's authors report on the participants' scores on the various tasks of edTPA over time. Table 2 shows the participants' mean scores by each of the edTPA tasks by semester over time.

As Table 2 shows, UNC Charlotte College of Education serves a large number of teacher candidates in the Undergraduate and Graduate Certificate programs. In general, the Graduate Certificate teacher candidates' mean scores on the different tasks are usually a little higher than the undergraduate teacher

Table 2. Means on edTPA project for elementary education programs

		Task 1	Task 2	Task 3	Task 4
Fall, 2014	54 UG	2.99	3.02	2.85	n/a
	22 GCT	3.00	3.03	2.73	n/a
Spring, 2015	102 UG	3.04	3.03	2.92	2.87
	29 GCT	3.24	3.20	2.96	3.33
Fall, 2015	42 UG	3.00	2.97	2.95	2.83
	14 GCT	3.15	3.19	2.99	3.08
Total	198 UG	3.02	3.02	2.90	2.85
	65 GCT	3.14	3.14	2.89	3.25

Note: UG stands for Undergraduate and GCT stands for Graduate Certificate program. The edTPA passing mean score across the four tasks is a 2.44.

candidates. Of course, one possible reason for this could be that many of the Graduate Certificate teacher candidates have experience in schools as teaching assistants. Thus, many Graduate Certificate teacher candidates have prior knowledge to draw upon for the different edTPA related tasks. Another reason could likely be the smaller sample size of the Graduate Certificate teacher candidates' participants. Over time on most tasks the undergraduates and graduate certificate participants either improved their mean scores or stayed relatively the same. For example, on Task 2 the Graduate Certificate teacher candidates improved their mean score from a 3.03 to a 3.20 over the Fall, 2014 to Spring, 2015. In Fall, 2015 the Graduate Certificate teacher candidates' mean score on Task 2 stayed relatively the same at 3.19 compared to the mean score in Spring, 2015. Over time, undergraduate teacher candidate participants had the greatest improvement in the mean scores on Tasks 1 and 3. From Fall, 2014 to Fall, 2015, the undergraduate teacher candidate participants' mean scores improved slightly from 2.99 to 3.00 on Task 1 and from a 2.85 to 2.95 on Task 3. As a collective, the teacher candidate participants' overall mean scores were above the passing rate of a 2.44.

The second research question examines the specific strategies that help to support the participants and prepare them for success with edTPA. Table 2 shows that a large majority of UNC Charlotte elementary education teacher candidates successfully pass edTPA. There are many correlations that could be possible reasons why including:

1. The quality of teacher candidates in the program,
2. UNC Charlotte's commitment to developing high-quality teacher candidates,
3. A strong work ethic disposition among the teacher candidates,
4. Quality of mentor teachers and field experiences, and
5. The robust scope and sequence of UNC Charlotte's teacher education program.

In this section, we specifically examine program related practices in guiding the elementary education teacher candidates through edTPA. To guide teacher candidates through edTPA, the UNC Charlotte Elementary Education program faculty has adopted many high-impact practices (Brownell & Swaner, 2009; Kuh, 2008). The practices include edTPA practice tasks, detailed review and feedback, the provision of collaborative learning communities, and the adoption of the edTPA Portfolio as a student teaching

capstone experience. To organize these practices, the chapter's authors developed the following edPASR Strategy which stands for:

- **ed:** Educate self
- **P:** Practice
- **AS:** Assess Self
- **R:** Review

In the next section, the chapter moves to a deeper discussion of each component of the edPASR Strategy.

DISCUSSION: edPASR STRATEGY

The first part of the edPASR Strategy is "ed" which stands for educate oneself about each edTPA task. EdTPA publishes quite detailed handbooks to explain what is required in the edTPA Portfolio. Reading the handbook is a critical part of edTPA success. The handbook should not be merely skimmed through, but, instead, thoroughly read. Video explanations and tutorials, many of which can be found on YouTube, are also helpful for teacher candidates to view. The chapter's authors use short reading quizzes that teacher candidates take to show that they know the edTPA task requirement. Additionally, teacher candidates complete a writing activity where they summarize the edTPA tasks and rubrics in their own words. Reading the edTPA handbook, viewing tutorial videos, completing a reading quiz, and summarizing edTPA tasks in their own words are all part of how teacher candidates prepare for edTPA by educating themselves about the requirements.

The "P" in the edPASR Strategy stands for practice. As explained earlier, the elementary education teacher candidates at UNC Charlotte practice completing all four edTPA tasks as part of the program coursework. There is value to practicing the entire edTPA task as opposed to doing only part of a task. The value is akin to the Malcolm Gladwell (2008) quote: "Practice isn't the thing you do once you're good; it is the thing that makes you good" (p. 42). First, practicing an entire edTPA task helps teacher candidates develop a realistic sense for the time investment required to complete the edTPA Portfolio. Second, practice helps teacher candidates work through the different challenges that may come up with the edTPA tasks. This is especially true for Task 2, which requires teacher candidates to provide video evidence of their teaching. The Task 2 practice round helps teacher candidates troubleshoot video camera issues like testing the volume and making sure there is enough power in the recording device. Third, practice allows faculty members to provide feedback to teacher candidates—through individual conferences and extensive comments—about their edTPA task artifacts.

The "AS" in the edPASR strategy means assess self. Faculty feedback to teacher candidates on their practice tasks is helpful. Yet, self-assessment is equally, if not more, helpful. The first step of self-assessment is to analyze the edTPA task rubrics and the edTPA *Understanding Rubric Level Progressions* document (SCALE, 2014b). Teacher candidates read through the rubrics and the rubric progression document to identify how edTPA evaluators will be evaluating their task artifacts. Then teacher candidates go back to their practice artifacts and assess it by scoring their task artifact based on the rubrics. In addition, to self-scoring the teacher candidates provide a short paragraph of justification for their score based on explanations provided in the *Understanding Rubric Level Progressions* document. Assess self also means teacher candidates develop the understanding that edTPA evaluators score the edTPA Portfolio

based on a "preponderance of evidence" (SCALE, 2014b, p. 3). A preponderance of evidence means that teacher candidates provide a strong pattern of evidence and examples throughout their narratives that they write about their edTPA task artifacts.

Finally, the "R" in the edPASR Strategy stands for review. The review time for the elementary education teacher candidates at UNC Charlotte happens early on in the student teaching semester. The review is organized into four Friday workshops that are like "edTPA boot camps" to go over the edTPA Portfolio requirements. During these boot camp review sessions, teacher candidates are reminded of the due date for submitting their portfolio later that semester. The teacher candidates also have time to collaborate and discuss artifact examples. An affordance of the collaborative experience of review is how it provides space for teacher candidates to raise questions of clarity about the edTPA tasks. The collective review experience is also a significant marker of how the teacher candidates are committed to the same goal of teacher professionalization. The review time is where teacher candidates conceptualize their edTPA Portfolio. It is an essential part of preparing to reengage the edTPA process in order to do "edTPA for real" during the student teaching semester.

As discussed earlier in the chapter, the edPASR Strategy aligns with the Performance-Based Assessment Cycle (see Figure 1) framework. The educate self and practice features of the strategy are connected to Doing in the Performance-Based Assessment Cycle. The self-assessment feature is aligned to Concluding as teacher candidates evaluate their own artifacts and draw conclusions about the practice experience. The review part of the edPASR Strategy is where teacher candidates are Connecting to the requirements of the edTPA Portfolio and gaining conceptual understanding of edTPA nuances. After connecting with the concepts of an experience tasks, the teacher candidates are ready to Reengage the process by completing their portfolios. A successful edTPA Portfolio means that the teacher candidates show great promise towards becoming a professional teacher.

FUTURE RESEARCH DIRECTIONS

The edPASR Strategy emerged from a need to organize the edTPA support practices among the UNC Charlotte's Elementary Education faculty. A unifying strategy is helpful in large departments where there is some turnover in who teaches courses as well as a lot of adjunct professors. The edPASR Strategy can assist with faculty "buy-in" of the edTPA process as faculty are equipped with an accessible and concise strategy for supporting teacher candidates. The edPASR Strategy is also conceptually framed on the Performance-Based Assessment Cycle, which is an experiential learning model of the Performance-Based Assessment Cycle. More research is needed, though, related to the effectiveness of the edPASR Strategy. A future research agenda related to the edPASR Strategy would include a quasi-experimental research design to investigate the strategy's effectiveness in comparison to a control group. A mixed-methodology research design (Tashakkori & Teddlie, 1998) related to teacher candidates' perceptions of the edPASR Strategy in relationship to their edTPA Portfolio findings would have the potential to yield fruitful findings. More longitudinal research is needed to investigate the percentage of teacher candidates who pass their edTPA Portfolio and go on to become Nationally Board Certified Teachers. Anecdotally, the chapters authors' surveyed many of the teacher candidates in this present study and asked them the following question: One of my professional career goals is to complete the National Board Certification for Teaching in order to become a nationally board certified teacher. Of the 83 teacher candidates surveyed, 59 candidates (71%) positively responded with a "yes" to the statement. EdTPA prepares

teacher candidates exceptionally well to become nationally board certified. More research is needed to investigate why teachers who pass edTPA choose to go on or not go on to pursue NBPTS.

Future research could also broaden and compare the teacher candidate levels. For example, a future research agenda could include sample populations of middle level and secondary teacher candidates. The work of Petty, Heafner, LaChance, and Polly (2016) provides a detailed overview of what middle level edTPA Portfolios entail. Finally, more research is needed into the features of the edPASR Strategy. Are there features that are missing in the strategy? For example, recognition of when teacher candidates' pass edTPA seems to be missing from the edPASR Strategy.

CONCLUSION

More and more education policymakers are calling for the adoption of edTPA as a performance assessment to ensure that a professional cadre of teachers fills up new teacher jobs. Research shows that high-quality, professional teachers generate great benefits for the students they teach as well as the schools that they teach in (Hanushek, 2010). Indeed, professional teachers provide a greater amount of economic value for their students and communities. Value that goes well-beyond a teacher's meager wages. For teacher candidates to become professional, though, there needs to be guidance in how to successfully navigate authentic assessments like the edTPA Portfolio. The edPASR Strategy provides a methodical way to supporting teacher candidates through the edTPA. It is an easy to follow strategy that is based on an experiential learning model of the Performance-Based Assessment Cycle. The edPASR Strategy can help switch the mindset about rather than edTPA being pain-inducing it is, as one teacher candidate put it, "a practical activity that mirrors real life because everything you do for it you will be doing and thinking about it when are teaching." Indeed, the edPASR Strategy can help alleviate the pain of edTPA by providing a keystone that is the foundation of a developing professional teaching practice.

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KEY TERMS AND DEFINITIONS

edTPA Portfolio: A teacher candidate performance assessment that was developed by Stanford University. The assessment includes a capstone like portfolio project.

edPASR Strategy: An organized and systematic strategy for teacher candidates to use in order to prepare for their edTPA Portfolio. EdPASR is an acronym that stands for: ed- Educate yourself; P- Practice, AS – Assess Self, and R – Review.

Licensure: The process by how a teacher candidate gets a state teaching license.

National Board of Teaching Certification: Education organization that recognizes and certifies accomplished and high-quality teachers.

Performance Assessment: The evaluation of authentic experiences that engage learners in activities that are relevant to life situations.

Performance-Based Assessment Cycle: A theoretical model that explains the process of evaluating relevant experience and includes doing, concluding, connecting, and reengaging

Teacher Professionalization: An accountability movement to ensure teacher candidates are being prepared, assessed, and licensed in high-quality ways.

Chapter 6
Evaluating Teacher Education Programs for Philology Students

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ABSTRACT

The chapter will deal with the process of training philology students for their future careers as language and literature teachers in the compulsory education system of Romania. Based on the concurrent model, their training implies studying at the same time for the Bachelor's and Master's degree and a teaching qualification. An analysis of the transformations undergone by Romanian teacher training education in the last twenty years may enable an exchange of opinions among the researchers concerned with the improvement of the field. The chapter will offer a chronological analysis of the process of training philology undergraduate and graduate students paying particular attention to the creation and development of new programs at academic level.

INTRODUCTION

In the context of an ever-changing society, teacher education has been a permanent concern of practitioners, researchers and education policy makers. In the particular case of Romania, an ex-communist country that is now part of the European Union, any discussion about the teaching and learning process has to refer to two major periods, that is, before and after the implementation of the Bologna reform in the education system. Briefly speaking, the Bologna process took place between 1999 and 2010 with a view to establishing a European higher education area by promoting common organizational and educational principles such as introducing a two-cycle system (undergraduate/graduate) into universities, using a system of transferable credits (ECTS), stimulating student and teacher mobility, strengthening cooperation to assure the quality of the instructional process and founding higher education on European dimensions and criterion.

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As to pre-service teacher education, it is significant that before the Bologna process schools and universities were dominated by a traditional educational trend that survived in various forms ranging from curriculum design to teaching methods and style, whereas after the introduction of the Bologna model teacher training had to adapt to new educational purposes required by a new social and historical environment. Consequently, the new initial teacher training education programs shifted from teacher centered education to the various advantages of student centered education, to competence-based curriculum and assessment, and a better interrelationship between theory and practice.

Starting from these pre-requisites, the purpose of the chapter is to show to what extent university-based teacher training programs reflect the new educational standards required by the reform applied to the Romanian higher education system. Specifically, it attempts to analyze the relevance of the curriculum that forms the basis of the language teachers' preparation focusing on its content, structure, and educational aims and purposes. It also tries to highlight the degree to which such programs meet not only learners' needs but also of society. Last but not least, the study aims to identify what elements resulted from the Romanian educational reform could be useful for the researchers interested in the field of initial language teacher training.

BACKGROUND

Over the past decades teacher education has been critically reviewed by numerous researchers and educators in an attempt to rethink the model of teacher training and adapt it to the requirements of a constantly changing world. There have also been various studies in the field of language and literature teaching, which have helped the conceptual understanding of the process and led to the design of better pre-service teacher training programs. From the vast amount of existing research, the present analysis has selected several views and principles that lie at the basis of teacher education. Thus, some researchers (Bansal, 2009) make the distinction between "the technical rationality" approach and the "realistic approach" to teacher training. The former tends to neglect all aspects dealing with the affective side of teacher education because the focus is mainly on "information processing" (Bansal, 2009, p. 33) which is seen as the "rational or logical" (Bansal, 2009, p. 33) side of such an approach. The latter, on the other hand, adds to the cognitive processes involved in learning teaching an affective dimension consisting in the feelings, emotions, beliefs, values and attitudes which are inherent to any teaching activity. The author calls psychological factors "gestalts" to "refer to the personal conglomerates of needs, concerns, values, meanings, preferences, feelings and behavioral tendencies united into one inseparable whole" (Bansal, 2009, p. 35), whose influence can be manifested at the conscious and unconscious levels. Strictly speaking, teacher education means a dynamic interplay between two main components, abstract knowledge and concrete experience, or in other terms, theory and practice.

The traditional viewpoint on teaching considers "classroom practice to stand out as being the most significant element of professional training to student teacher because of its vividness and emotional associations" (Calderhead & Shorrock, 1997, p. 10). Generally speaking, the practical dimension of teacher education can be defined as a cyclic process based on five phases, A.L.A.C.T., as stated by Korthagen:

1. **A**ction,
2. **L**ooking back on the action,
3. **A**wareness of essential aspects,

4. **C**reating alternative methods of action,
5. **T**rial, which itself is a new action. (Bansal, 2009, pp. 36,37)

In spite of the fact that Korthagen lays emphasis on the practical dimension of teacher education, it should be added that theoretical knowledge serves as a guiding tool for this five-phased experience. To take action and assess its outcome in order to find better practical approaches requires theoretical awareness of teaching. Being simultaneously a practical and intellectual activity, the success of teaching depends on the effective collaboration between the two factors. As many researchers emphasize, a key to professional development is to reinforce "the link between practice and student achievement" (Hine, 2013, p. 153) by stimulating reflective practice and teaching. In this way, students' skills and knowledge will turn into effective classroom practices and vice versa.

Other researchers use different concepts to analyze teacher education. For instance, K.M. Bailey et al. (1996) refer to "the principle of ownership" and "the principle of modeling", which they consider to be essential for understanding students' preparation for the teaching profession. The first denotes students' involvement in the decision-making process in the classroom in order to encourage their initiative in the learning activities, while the second one "does not refer to an individual demonstration of a technique" but to "the consistent enactment of a teaching philosophy over time, in essence to practicing what we preach" (Bailey et al., 1996, p. 25, 26). In other words, teaching skills can be formed and consolidated through an active instructional process that is always modeled by teachers' behavior and attitudes towards it.

Narrowing the focus on future language teachers, Freeman & Richards (1996, pp. 5, 6) draw attention to several aspects regarding the specific features of language teachers' initial training:

1. "To understand the nature of language teacher education" we have to clarify "how they conceptualize and make use of their experiences" in their training and in the classroom;
2. The models of teaching are useful but teachers adapt and adopt their own teaching style according to the circumstances they have to face;
3. The professional discourse provides "particular schemata and metaphors" that help teachers interpret their personal experiences;
4. Learning to teach help language teachers put theory into practice and develop further class management skills;
5. Teachers' previous training (knowledge and beliefs) may sometimes lead to resistance to new approaches;
6. Individual teachers follow particular routes depending on their knowledge, beliefs and experience.

As seen from the points above, language teacher education cannot be reduced to simply knowing how to put teaching skills into practice. On the contrary, it implies the participation of various objective and subjective factors that work together determining the quality of the learning process. This wide range of elements that continuously shape the pre and in-service teachers' professional development can be found within the individual, within the school or within the social and cultural context. As Freeman and Richards (1996, p. 5) specify teacher training is "a process of reconstruction (…) shaped by experience, previous knowledge, personal beliefs and responses to macro- and micro-level contextual factors."

Despite the complexity of teacher education, it cannot be confused with the wider concept of education which refers to "knowledge of skill and attitude of a general nature (….) important from the point of view of the large community or society" (Rao, 2004, p. 9). To put it differently, education offers basic

knowledge, skills and values to form human personality and prepare it for life and the requirements of society, whereas teacher training aims to develop specific knowledge, abilities and attitudes related to a certain field of activity. In the case of language teachers, the major purpose of initial training education is to develop professional skills by providing theoretical awareness of language teaching and practical contexts for applying it. These programs are meant to encourage language students to learn from their own experience and develop those cognitive and affective abilities which will help them become effective teachers in the future.

When referring to the effectiveness of teaching, some theorists (Karras & Wolhuter, 2010) operate with the notion of competence on the grounds that it is "a more integrated" or "relational concept". Competence covers the complexity of the teaching abilities, denoting the knowledge, skills and attitudes that teachers are expected to demonstrate in particular environments. According to Barbieri (2010, p. 317), competences may be grouped in five interrelated categories which are as below:

1. "Understanding the curriculum, and professional knowledge;
2. Subject knowledge and subject application;
3. Teacher strategies and techniques, and classroom management;
4. Assessment and recording of pupils' progress; and
5. Foundation for further professional development."

As far as skills are concerned, they are related to the instructional process and the educator's relationship to students and others. Thus, in service teachers should be able to organize students' learning activities, manage their progress, cope with their heterogeneity and stimulate them to learn and work in teams. They are also required to design and develop the school curriculum, to be familiar with new technologies and use them on a regular basis, and to be responsible for their own professional development. Moreover, skills may reflect the teacher's ability to strengthen the relationship between school and parents or community. To sum up, in the author's view, teacher training and assessment should be founded on competences because, besides cognitive abilities and skills, they include attitudes and behavioral patterns needed to perform the teaching profession adequately and effectively.

To reposition teacher education in the context of the present social, cultural and technological developments, designing teacher education programs within universities is of major importance. In Lynch and Smith's opinion (2013, pp. 33,34), effective pre-service teacher education needs "two essential attributes" that consist in providing students with "an integrated, coherent approach to teaching throughout the program" and in having graduates able to "empirically demonstrate effective teaching capability on graduation". On the basis of these conditions, the researchers argue that a reform of teacher education can be achieved if five pre-requisites are taken into consideration: the contents of the program should be agreed on and implemented by all factors involved in the process (university, school, teaching staff), an emphasis should be laid on pedagogy to optimize student achievements by effective teaching, students should be supported by different means (coaching, mentoring, and guided implementation) by skilled educators who take part in the program, practicum evaluation should be based on effective teaching and not on the attributes of "the ideal teacher", and finally clear "effective teaching outcomes" and not criteria specific to other purposes should account for the teaching competencies of the graduates (Lynch & Smith, 2013, pp. 33,34). The idea of improving university-based teacher education programs starting from the prerequisites proposed by these researchers is extremely valuable. If these programs are conceived and organized according to the principles of effective teaching, they may contribute, as

the two authors state, to the implementation of an "authentic model of teacher education that focuses specifically on the future skills needed for teaching in the 21st century" (Lynch & Smith, 2013, p. 19).

MAIN FOCUS OF THE ARTICLE

Issues, Controversies, Problems

Pre-service teacher training in Romania is university based and is organized in semesters and modules within the "concurrent" model which implies the simultaneous study of the specialty subjects and of the academic disciplines included in the psycho-pedagogical module.

The present state of teacher training in Romanian higher education is the result of several major changes in its philosophy, structure and organization. Starting from 1995 the Ministry of Education initiated the establishment of teacher training departments within universities, their role being to offer psycho-pedagogical education and programs of study for the teaching profession. Table 1 shows the curriculum that philology students had to follow to become teachers.

After the implementation of the Bologna system in the Romanian higher education institutions in 2006, teacher training departments had to adapt the former curriculum to a new structure of academic studies, as a result of the passage from 4 to 3 years of study for philology undergraduates. The Bologna curriculum maintained the subjects of the previous one, such as Psychology, Pedagogy (which was divided into two separate subjects, as seen in Table 2.), Language Teaching Methodology (Didactics in Table 2.) of the first (A) and second (B) language specialty, and Practicum, but new study areas were also introduced along the years to meet the training needs' of the future teachers (Education Management, Class Management and Computer Assisted Instruction). Following the promulgation of a new education law in 2011, this curriculum was reviewed and adopted at national level, and forms the basis of today's initial teacher training, as indicated in Table 2.

A contrastive analysis of the content of the two curricula listed above shows significant differences in terms of subjects, taught time and student assessment. First, the study of Pedagogy was widened and diversified in the 2012 curriculum, the emphasis being placed on fundamental concepts and theories of

Table 1. Initial teacher education curriculum for philology students in 1996

Year of study	Semester	Subject	No. of Classes/ Course	No. of Classes/ Seminar	Practical Classes	Total Number of Classes	Evaluation
I	2	Child Psychology	28	14	-	42	Exam
II	3	Pedagogy	28	14	-	42	Exam
II	4	Pedagogy	28	14	-	42	Exam
III	5	Language Teaching Methodology A	14	28	-	42	Exam
	6	Language Teaching Methodology B	14	28	-	42	Exam
IV	7	Practicum – language A	-	-	56	56	Oral exam
	8	Practicum – language B	-	-	56	56	Oral exam

Table 2. Initial teacher education curriculum for philology students in 2012

Year of study	Semester	Subject	No. of Classes/ Course	No. of Classes/ Seminar	Practical Classes	Total Number of Classes	Evaluation
I	1	Educational Psychology	28	28	-	56	Exam
I	2	Pedagogy I (The fundamentals of pedagogy, Theory and methodology of curriculum)	28	28	-	56	Exam
II	3	Pedagogy II (Theory and methodology of instruction, Theory and methodology of evaluation)	28	28	-	56	Exam
II	4	Didactics of language A	28	28	-	56	Exam
	4	Didactics of language B	28	28	-	56	Exam
III	5	Computer assisted instruction	14	14	-	28	Exam
	5	Practicum – language A	-	-	42	42	Oral exam
III	6	Class management	14	14	-	28	Exam
	6	Practicum – language B	-	-	36	36	Oral exam
		Final Examination		**Pedagogical Portfolio**			

the field (curriculum, instruction, evaluation, and methodology), as well as on particular pedagogical theories treated as an independent subject (class management). It should be noted that the diversification of the approach to pedagogical education may provide student - teachers with a better understanding of the complexity of the instructional dimensions. Similarly, the shift from child psychology to the wider field of educational psychology shows the concern for a more comprehensive study of the cognitive, affective and behavioral elements that determine and influence the learning processes. As to the academic discipline dealing with language teaching, either Language Teaching Methodology or Didactics in the 2012 curriculum, it equips student - teachers with complex knowledge of and skills in teaching and learning. They need to know and apply pedagogical principles, learning theories, instructional models, teaching methods and strategies, especially student centered, that are conducive to effective language teaching, enabling them to conceive and implement successful learning activities in the classroom. At the same time, the new technological developments of today's society make it necessary for future teachers to become familiar with the educational software that represents an indispensable tool for the teaching career nowadays. Therefore, this curriculum includes both courses and seminars on computer assisted instruction during which students get IT skills and theoretical knowledge about the design of lessons using modern teaching aids.

Second, in the 1996 curriculum the number of classes designated to various practical activities (seminars and practicum) was lower than the one in the 2012 curriculum. Thus, in the former the total number of hours allocated to both forms of practical activities is 210, whereas in the latter is 246 hours. It is also important to mention that in the first case the number of hours was taught during 4 years of study, while in the second during 3 years of study, which shows an increase of approximately 30 hours per year. Significantly, this increase is not only quantitative, but also qualitative, as the focus is on developing future teachers' skills in accordance with a new pedagogical paradigm that values teaching in student centered ways and the instructional role of classroom practice as a means of making future students aware of the importance of practical activities as well. Moreover, the equal number of hours allocated to courses and seminars in the 2012 curriculum demonstrates that theory and practice are seen as inseparable and equally important dimensions of the teacher training process.

Thus, despite the obvious tendency of the program to equilibrate the time allocation to courses and seminars, the explanation of the fact that the number of practicum hours designed for language B is lower than that for language A consists in: the last semester of the academic year is shorter, as the last four weeks of the this semester are allocated to the elaboration of the graduation paper. This difference, however, cannot be justified because practicum A and B receive the same number of credits if the exam is passed.

Third, if graduation was formally based on traditional evaluation consisting in oral and written final exams, now student teachers are required to make capstone projects which are complex assignments meant to prove the knowledge and skills they have acquired. Such projects involve long-term investigation and research with a view to creating a final product that generally implies a paper, a portfolio and an oral presentation of the project topic to a panel of evaluating teachers. Due to the complexity of the task, students have to demonstrate a wide range of abilities that reflect intellectual experience inside and outside the academic environment. Thus they should be capable of reflective and critical thinking, goal setting, problem solving, treating the topic in an interdisciplinary way, integrating knowledge into a broader social and cultural context etc.

In today's curriculum students' assessment follows principles of professional competence according to the European Qualification Framework (EQF) and the Qualification National Framework in higher education. In this evaluation system competences are grouped in two major categories, professional and transversal, each one comprising various abilities. The first one refers to knowledge and skills related to the teaching profession itself (ability to operate with pedagogical concepts and methodology, to design and evaluate the educational process etc.), while the second refers to the character traits, attitudes and social skills that a teacher needs to demonstrate not only in school but also in community (responsibility, moral integrity, ability to promote the positive values of the social community etc.).

The introduction of competence-based learning and evaluation in the present curriculum is a positive aspect as its main goal and objectives are to develop 21st century teaching skills, namely a wide variety of professional capabilities and attitudes that are believed to be necessary for a successful career in today's world. To sum up, the present initial teacher education curriculum for philology students is carefully structured, the choice of the subjects to be studied being relevant and appropriate to students' needs. It should be mentioned that the educational aims and the combinations of subjects are not the result of the competition among academic disciplines for gaining a place in the curriculum, but of an educational policy whose main purpose was and still is to develop teacher education in accordance with the national and European requirements.

Focus Group on Teacher Education

In order to discover teachers' and students' perceptions of the teacher education curriculum for Philology students, a focus group of 10 participants was organized within the Petroleum - Gas University of Ploieşti. The participants expressed their opinions about the teacher training program they attended both before the implementation of the initial teacher education curriculum for philology students in 2012 and after this year up to the present. The group consisted of 3 teachers who had from 12 to 16 years of experience, 3 beginner teachers whose experience varied from 2 to 4 years and 4 final year Philology students. It should be mentioned that the participants teach Romanian, English and French in state and private schools, and 2 final year students attend the University of Bucharest and the other 2 the Petroleum - Gas University of Ploieşti. They took part in a 60 minute session which was moderated by the authors of the present chapter. The questions discussed during the session were:

- *What is your opinion about the university teacher training you received?*
- *Do you think that the theoretical knowledge you acquired within the* psycho-pedagogical module *helped you, or will help you in your teaching career?*
- *Do you consider that the practicum allocated time was enough for you to exercise your theoretical knowledge?*
- *Were the practicum activities effective?*
- *What were the most beneficial aspects related to the program?*
- *What were the problems you faced during your teacher education studies?*
- *Would you change anything in your teacher education program?*

Focus Group Transcript

The focus group transcript can be found in Table 3.

DISCUSSION OF THE FINDINGS

The analysis of the perceptions of the participants in the focus group revealed useful information which, together with the data examined previously, can point out the positive and negative aspects related to the teacher education programs adopted in Romanian universities. First of all, it should be noted that most participants have a favorable opinion about their teacher education program which is generally perceived as useful for their career on the grounds that the disciplines they studied provided them with fundamental knowledge and skills necessary for the teaching profession. Secondly, they consider that the practical activities performed during seminars or in schools were effective because they could gain basic teaching experience. Thirdly, all participants are aware that teacher education is a life-long process and that personal growth and the development of specific competences require a permanent effort to adjust yourself to the concrete reality of the classroom. It should be noted that all these perceptions demonstrate that the program offers a valuable educational paradigm for language teachers.

On the other hand, the participants' opinions about initial teacher education raise several important issues that should be taken into consideration. One of the major limitations of the curriculum refers to the fact that it does not include optional subjects or alternative studies to the compulsory ones, which

Table 3. Focus group transcript

Location: Petroleum - Gas University of Ploieşti			
Facilitators			
Mihaela Badea, Ph. D., Teacher Training Department		Diana Presadă, Ph. D., Philology Department	
Participants			
1.	M.D., English teacher, 15 years of teaching experience	6.	L. I., Romanian teacher, 2 years of teaching experience
2.	E. N., French teacher, 12 years of teaching experience	7.	I. N., student in Romanian and English, 3rd year
3.	D. L., Romanian teacher, 16 years of teaching experience	8.	S. B., student in Romanian and English, 3rd year
4.	O. R., English teacher, 3 years of teaching experience	9.	G. R., student in English and French, 3rd year
5.	B. V., English teacher, 4 years of teaching experience	10.	A. M., student in English and French, 3rd year

Person	**Discussion**
Diana Presadă	Good morning, we are pleased that we have finally managed to bring all of you together here in order to talk about the initial stage of our training as teachers, and future teachers. Most of all, we would like to share your opinions on the degree to which the training programs provided by universities succeed in laying the basis of our teaching career. Although I have been teaching for a long period of time, I cannot say that the teacher education received as a student provided me with a solid enough basis for a profession that has had to cope with all the challenges and requirements of an ever-changing society. I believe, however, that my initial teacher education introduced me to the fundamental knowledge and skills required by such a profession. So, let's get started, but before doing that I will ask my colleague to introduce herself to you.
Mihaela Badea	Hello, my name is Mihaela Badea and I have been teaching here for almost ten years. I also thank you all for coming and I am eager to learn your opinions. I am positive that you want to share your experience with us here today, don't you? The reason why we are here is not to become experts at giving advice to others but to conduct an exploratory research on advantages and disadvantages of the teacher education programs in universities, and ours included. So, feel free to express your ideas. But, before doing that, would you please introduce yourself?
M. D.	Thank you, my name is M.D. and I am an English teacher and I have been teaching for 15 years in a college here, in Ploiesti.
E. N.	I am a French teacher, my name is E. N. and I have been teaching French and English for 12 years in two different schools in Bucharest.
D. L.	And I am D. L., I have been teaching Romanian for 16 years in a highschool near Ploiesti.
O. R.	Hello, my name is O. R., I have been an English teacher for 3 years here, in Ploiesti. I teach in a pre-secondary school.
B. V.	Hi, everybody, my name is B. V., I have been teaching English for 4 years in a private school in Bucharest.
L. I.	Hello, I am L. I., I am a Romanian teacher and I have only 2 years of teaching experience. I teach in a private school too.
Diana Presadă	Good, thank you all, and now let me introduce our final year students who are preparing to become teachers as well. They are I. N, S. B, G. R. and A. M. Now that we know each other, let's get started. First, I would like to ask you *about the university teacher training you received. Are you satisfied with it? And maybe our future colleagues here would like to share some of their opinions taking into account the fact that you are about to finish your studies soon.*
G. R.	Generally speaking, I have a good opinion about my teacher training classes, but I believe that more emphasis should be laid on pedagogical practice in schools. I mean, we had some classes but I do not think they covered all the problems that we will encounter in the future, especially because we will teach a diversity of students who, as I have noticed, tend to have more and more discipline problems. We did have some classes on Class management, but unfortunately I felt that theory could not really help me when facing the reality.

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Table 1. Continued

I. N.	I agree with my mate, because I have encountered the same problems. I dare say that I did not feel comfortable, especially when I had to face disruptive behaviors. But, overall, the knowledge I got during these three years of study provided me with knowledge about how to select the materials for my classes, how to conceive the stages of the lessons, what teaching and assessing methods I can use.
A. M.	Yes, it's true, there are serious problems a teacher has to cope with especially us, as beginner teachers. But I hope at least that what I have learned during these courses and seminars and practical activities will help me in my future career: lesson planning, assessing my students, providing feedback.
S. B.	I found all the subjects I have studied so far very useful, but I still feel there is much more to learn.
D. L.	Obviously there's more to learn. I am still learning even if I have been teaching for a quite a long time… as for my initial training when I was a student I remember learning a lot of theory and not really contextualizing it. However, practical activities in real teaching environments were very important for us. Sometimes, I even had to repeat a lesson over and over again until my coordinator was satisfied with my teaching performance.
E. N.	Ha, ha, ha….I have to join this club, I mean that of experienced teachers, and support this opinion. Indeed, as a student, I had moments when I felt that I wanted to give up because I had to teach a lesson five times… It was a lesson about the conditionals which students found complicated and I did not know how to make them understand my explanations. I did study a lot of psychology, this I remember, and it helped me a lot in knowing my students better, in knowing how to respond to their needs and in adapting my teaching to their interests.
M. D.	As for me, I have to say that I am not as enthusiastic about the training I received as my colleagues are because the tendency was to learn much theory and you could not really know how to manage the problems encountered in the classroom. From what I have heard, nowadays students have other subjects, more specialized ones, teaching them how to deal with various conflicts that occur during the learning and teaching process.
B. V.	Sorry, but I do not agree with you. For instance I studied a sufficient number of hours of class management, but actually it is my class experience as a teacher that has helped me more. What I mean is that the university courses taught me theory, but sometimes theory is not enough.
L. I.	Yes, you are right, the training we received was only a beginning and reality is much more complex and you have to find your own ways to face it. I did learn psychology, pedagogy and these helped me a lot but it is the experience that we gain that helps us to become good teachers.
O. R.	I agree that the magic formula is to combine theory with practice and I have to say that the training I received was the basis I needed in order to continue my own development.
Mihaela Badea	Ok, now let's focus on the subjects you studied within the *psycho-pedagogical module*. Do you think that the theoretical knowledge you acquired during these courses helped you, or will help you in your teaching career? In what way?
E. N.	I don't know if my colleagues share my opinion, but the theoretical content of *the* psycho-pedagogical module was a great help to me, especially when I was a beginner teacher because I had to face large classes of pupils with different personalities. As I said before, psychology, which was one of my favorite subjects, provided me with a deeper understanding of the particular features of children's age, their behavior, their motivations…
D. L.	Yes, I remember that the courses in psychology and pedagogy were interesting because they provided us with general information and theories of education that were absolutely necessary for the teaching profession. The enrichment of this knowledge depends on each teacher and the situations he is confronted with. And let's take another example….
M. D.	Sorry for interrupting you, but I would like to say that the courses on language teaching methods helped me to a greater extent than psychology and pedagogy which were too theoretical for me. What I mean is that the methodology of teaching introduced me to what I needed to know in order to design my lessons, no matter the stages of my career. It is true that teaching methods have evolved over the years, but what I learned as a student was a base and I continued building on that base myself as a teacher.

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Table 1. Continued

B. V.	I agree with you, yes, the language teaching methods that I studied were a great help when I became a teacher, needless to say that all I knew about the communicative method I applied in class, but I also found useful some pedagogical theories, the basic principles of education which guided me in the relationship with my students…. But I could not say the same thing about the courses in psychology which I found….how shall I put it? …yes, too sophisticated.
L. I.	Well, I have to admit that when I was a student I hated the courses in psychology because I believed that they were not as helpful for my career as the study of the teaching methods. Now, I have changed my opinion because, you know, you cannot interact with your pupils effectively if you do not have any idea about their psychology. And even general pedagogical knowledge is necessary, for example, when we design the curriculum, or the syllabus, and so on.
O. R.	I understand why you changed your view because I had the same experience when I was a student, I mean I did not like the courses dealing with psychological or pedagogical aspects, but now I regret that I did not pay too much attention to them…now I am convinced that we need such knowledge if we want to understand our pupils' needs. I recognize that sometimes I had to improve my psychological or pedagogical knowledge because I teach at a pre-secondary school and my pupils are not so easy to cope with. They are full of energy, sometimes cheeky, sometimes reluctant to learn…
Mihaela Badea	Now, let's hear the opinions of our final year students. Do you find the theoretical knowledge you got during *the* psycho-pedagogical courses useful for your future career?
I. N.	Yes, I do. I think that the psycho-pedagogical module equipped us with general knowledge about the teaching profession. We know, for instance, what teaching methods and strategies should be used in the classroom, we have general ideas about the theory of education, the principles of evaluation and many other things, and I believe that all this knowledge will help us in the future. I hope that we will be able to apply this knowledge to the classes we will teach.
S. B.	Yes, you are right. I believe that the disciplines we studied, such as didactics of language, pedagogy, psychology, and class management, will help us as future teachers, but I believe that we will have to develop this knowledge in the years to come because we will encounter different situations in the classroom and we will have to be prepared.
A. M.	Well, unlike you, I do not think that all the theories that we studied will prove to be useful. In my opinion, some courses dealt with too much information that I have already forgotten, especially the courses in psychology, pedagogy and class management. Of course, I do remember the essential things that I will certainly use in the future, but I think that courses should be focused on the information that is really needed.
G. R.	Yes, I agree with you. I also believe that some courses focused on detailed information that will not be used in the future, but I cannot say the same thing about the didactics of English or French. We studied important aspects about the process of teaching foreign languages and I am sure that they will help us when we become teachers. I also believe that our computer assisted instruction classes will help us in our future career.
Diana Presadă	Ok, now let's talk about your practicum classes. Do you consider that the practicum allocated time was enough for you to exercise your theoretical knowledge? Were the practicum activities effective?
M. D.	Well, I do not remember the exact number of hours allocated for practicum courses, but all I can say is that, like some of our final year students, I had a feeling of discontent about learning too much theory. However, practical activities were seriously done in both forms, I mean, seminars and teaching practice in schools. We paid great attention to the school-based teaching practice even if we perceived it as stressful, especially when we had to repeat our unsuccessful classroom performance. We had good coordinators that guided our first steps as teachers and I think that practicum activities were useful because they enabled us to gain teaching experience.
E. N.	I do agree with you. Yes, it was awful to feel awkward in front of the students and, moreover, to be asked to teach a lesson again, but, all in all, I think that we had enough practicum classes that helped us a lot. They were based on too kinds of activities, I mean that we first took part in classes as observers and when the lesson was over we had discussions with the mentor teachers. Then we taught several lessons and, by the way, I remember that we had to prepare those lessons very carefully. Yes, I think that our teaching practice was useful for building a base for our profession.

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Table 1. Continued

L. I.	I am glad to hear that you appreciate your teaching practice classes, but I must tell you that, as a beginner teacher, I had problems in the first year of my current job because I did not really know how to apply the principles of good teaching to my classes, although I knew a lot of theoretical aspects from the courses in didactics or other courses and I took part in the teaching program in schools. I admit that we had the opportunity to put our knowledge into practice when teaching in schools, but these classes could not cover all our needs and I had, of course, to learn from experience.
D. L.	Yes, we all learn from experience, there is no exception. Like you, my young colleague, I felt unsure when I began my career, I mean, I knew many things but I did not know how to use them. I remember that at first I find it extremely difficult to make a lesson plan, but then, when I gained more experience, I was an expert at planning my lessons. As for the practicum courses I attended as a student, well, I think that the curriculum included enough practice classes that put to test our theoretical knowledge. I believe they were helpful in developing our teaching skills, but, of course, when I became a teacher the problems were more complex and I had to enrich my teaching experience.
A. M.	I'm still a student and I have to recognize that making the lesson plan for my first teaching experience in school was awful. It took a lot of time and my teaching performance was not as expected. Fortunately, my second teaching experience was much better…well, regarding our practicum courses, I can say that they were useful for us and we could demonstrate our knowledge of teaching methods. As regards the other disciplines, I doubt whether we will make use of the theories we studied for psychology or pedagogy in our future classes.
S. B.	I disagree with you because, when I taught my first lesson, I realized that I needed everything I knew about class management or children's psychology. My first teaching experience was quite unpleasant because I had to cope with disruptive pupils. That is why I think that our teacher training classes were necessary and very useful. I even believe that our curriculum should have included more practice.
I. N.	I agree with you too, because I had a similar experience when I taught my first lesson and the principles for class management that I know proved to be useful. I believe that we our teacher training program made us understand what the teaching profession means…
G. R.	Sorry for interrupting you, but I would like to emphasize that more teacher training classes would have been beneficial for our teaching experience. As you know, some of our courses insist on theoretical knowledge and I think that a greater focus on practical activities in schools could have helped us to a great extent.
O. R.	Yes, practical activities in schools are very useful, but they represent only the beginning of our profession. As far as I am concerned, I believe that our curriculum comprised a sufficient number of teacher training classes and our practice experience in schools was very helpful. But, when I was a student, I liked some courses more than others and as a result my skills and competences differed from one field to another. When I became a teacher, I realized that teaching is more complex than I thought and, of course, I had to continue the development of my knowledge and skills.
B. V.	Well, I want to emphasize that the teacher training classes were of great help to me, but, as you all know, such a program can't possibly cover everything, I mean all things a teacher should know and do in the classroom. That is why I don't think that the program should include more practice classes than it has now. I believe that our class experience as teachers should be our guide.
Mihaela Badea	Ok, now I would like you to sum up the positive and negative aspects of the teacher training program you took part in as students. When answering, try to focus on the following questions: What were the most beneficial aspects related to your teacher training program? What were the problems you faced during your teacher education studies?
B. V.	Well, I believe that the teacher education program offered us the opportunity to study what we need to know as teachers, I mean both theory and practical abilities. I can say that the program was equilibrated and what I liked most was the fact that it offered us a general framework which is required in this profession and which can be developed according to the reality a teacher has to face in the classroom. What I disliked was the tendency of some courses, but not all courses, to be too descriptive and insist on too much information which may not be relevant to us.

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Table 1. Continued

O. R.	I would like to mention that the most beneficial aspect related to this program was that the disciplines we studied helped the development of the knowledge and skills required by the teaching profession. At the same time, I think that the teaching practice classes should have been better organized. For example, sometimes my university timetable did not match with the school timetable and it was difficult for me to take part in these classes.
L. I.	I agree with you, because I had the same problem and, in addition, the mentor teacher was always busy and did not have enough time to discuss the lessons with us. I also believe that the teacher training practice should have been better organized and seminars more motivating for students. I also disliked the insistence of some instructors on knowing theory but despite that the program was beneficial and what I appreciate most is that it provided us with basic knowledge which, as teachers, we can develop according to our interests and goals.
M. D.	Well, what I like most about my teacher education program as a student was that it introduced us to the basic concepts and methodology that we should know as teachers. I also liked the teaching practice in schools where I could learn a lot. Now, in retrospect, I think that the program should have been more diversified from the point of view of its content, I mean, it should have insisted not only on general principles but also on specific aspects such as curriculum design, evaluation, etc.
D. L.	As far as I am concerned, I think that our teacher training program provided sufficient scope for the development of our knowledge and skills and this is what I appreciate most about it. As to the problems I encountered, well, I think that a better implementation of theory into practice would have helped us more substantially. For instance, I had some problems when I had to put some of the information I learned in context and I think that seminars should have focused on what today we call active learning.
E. N.	Well, in my opinion, the most beneficial aspect related to the program was the fact that it was well-balanced because it aimed at developing both theoretical and practical knowledge. Moreover, I think that the practicum activities were well-organized and effective. As regards the disadvantages of such a program, I think that the curriculum should have included more specialized subjects, for instance studies related to class management and so on, because they can be a real support for our career.
I. N.	As a final year student, I think that the most beneficial aspect related to our teacher education program was the fact that it combined theory with practice. I also think that by studying all the subjects that are part of this program the main goals of the teaching career can be fulfilled. What I didn't appreciate was that sometimes the teaching practice was done superficially because we didn't really understand the problems of a lesson for various reasons: we didn't have enough time to discuss with our monitor teachers, we didn't have time to make a good lesson plan and so on.
A. M.	Unlike my fellow-student, I think that the focus of the program, and especially of evaluation, was on the quantity of information, which I disliked very much. That is why I don't think that the program entirely corresponded to our expectations. What I liked was the teaching practice because I could check my knowledge and improve my skills.
S. B.	As for me, I appreciate the fact that the program offered me the possibility to study the disciplines that are necessary for training a teacher, but I would have liked to have more teaching classes in schools to be able to exercise and consolidate my knowledge and skills.
G. R.	I agree with you, it would have been better for us to take part in more teacher training classes, especially because we were asked to learn much theory. On the other hand, I appreciate that we studied some disciplines that correspond to our needs and I'm sure that they will help us in the future, such as didactics of foreign languages or computer assisted teaching.
Diana Presadă	Well, we have shared many interesting opinions about your teacher education program. Now, let's focus on another question. Would you like to change anything in this program? What would it be?
M. D.	Well, I think that the program should be adapted to the needs of the student and of the society in general. Consequently, it should focus on the disciplines that reflect these needs and I believe that optional subjects could be a very good solution to respond to students' goals.
O. R.	And these needs also require a better design, organization and evaluation of the practical activities. I also believe that the monitoring system should be improved during the period of teaching practice in schools.

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Table 1. Continued

I. N.	I do agree with you, but I think that not only the monitoring system of the students should be improved, but also the means of evaluating them. I think that the grades we get for the teaching practice should count more than they do now.
E. N.	Well, I would change only a few things because, as I have already said, the teacher education program that I attended was well-designed in general. In fact, I would adapt its content to the requirement of a modern community by diversifying the pedagogical studies, I mean, by studying curriculum design, evaluation etc. And, of course, optional disciplines would be a good idea for the improvement of the program.
D. L.	I agree with everything you have suggested, but I would like to add that a better coordination between theory and practice will be necessary too, especially in the cases in which the tendency to favor theory prevails.
B. V.	I dare say that the content of the courses that deal with theoretical knowledge should be rethought and adapted to students' needs, and also the focus of the teaching style during the seminars should be on practical activities and interactivity and so on.
L. I.	As for me, I think that the improvement of the collaboration between universities and schools is necessary for a better organization of the teaching practice. I also believe that the program should reflect a balance between theory and practice.
A. M.	Yes, this balance is necessary and it should be reflected in students' evaluation, too. Such a program should require students not to learn a great quantity of information, but to improve their knowledge and skills. And I also think that optional subjects would be a great advantage because students are more motivated to study what they have opted for.
S. B.	I also think that courses and seminars should be really motivating. If I were to teach in such a program I would provide students with important and relevant information and I would use a teaching style able to engage them in learning. I would also introduce other assessment criteria able to reflect our abilities.
G. R.	I agree with you, it is necessary to increase students' interest and cooperation during classes and to provide them with basic information, absolutely necessary for their career. At the same time knowledge needs to be consolidated through practice and that is why I think that the program should insist on practical activities in seminars and efficient teaching practice in schools. And let's not forget that optional disciplines would be a good thing.
Mihaela Badea	I'm glad that I have taken part in an interesting and useful discussion and I hope that you have the same opinion. Thank you all for your participation.
Diana Presadă	I also want to thank you for your openness and your sincerity during the discussions and have a nice evening. Thanks again. Goodbye.

deprives student teachers from the opportunity to choose the studies corresponding to their own interests. As this is a major drawback of pre-service teacher education, all factors involved in the process of conceiving and implementing it, such as teachers, curriculum designers, and education policy-makers, should review the program and optimize it by introducing optional courses which are indispensable for developing complex teaching skills.

Furthermore, in spite of the fact that theory and practice are equally treated in the curriculum from the point of view of the amount of time allocated to each one, the participants in the focus group believe that some trainers pay greater attention to theoretical information than to practical skills and knowledge. In addition, they complain about the loose connection or lack of connection between the university-based part of the course and the reality encountered in the classroom. A solution to the long standing gap between theory and practice is to consistently teach what we preach, that is, to coherently apply the pre-requisites of efficient teaching suggested by Lynch & Smith (2013) and use active learning strategies throughout the program. Exposed to meaningful learning experiences and encouraged to be actively

engaged in learning, student - teachers can acquire effective teaching abilities that will enable them to transfer theory to practice and adapt easily to any teaching environment.

The tendency of academic training programs to concentrate more on cognitive abilities and less on the realities of modern life is also reflected in the present system of evaluating students' knowledge. As the participants in the focus group pointed out, some courses focus on teaching large amounts of information which, being difficult to assimilate and process, may lead to students' over-reliance on memorizing the data presented during the lectures. Most often, the evaluation of student outcomes in such cases is limited to checking mechanical memory and measuring the quantity of information acquired in the learning process. As a result, both the syllabus and student assessment are perceived as ineffective because students are not offered the opportunity to apply what they have learned in real contexts. In order to improve the educational process by shifting the stress from rote learning to meaningful learning, the content of courses as well as assessment criteria should be carefully reviewed and adapted to students' needs. In other words, these goals can be achieved if pre-service teacher education is more firmly oriented to "a more integrated approach to competence based training and assessment" (Barbieri, 2010, p. 315). By bringing together "the knowledge, skills and abilities of the individual and the professional tasks to be performed in particular situations" (Barbieri, 2010, p. 315), these programs will be more successful in preparing students for life and the imperatives of a changing economy.

Another issue signaled by the respondents refers to the fact that the organization of the practicum activities is sometimes dysfunctional, resulting in a series of problems such as the superposition of the university timetable on the school one, disconnected practicum activities, insufficient monitoring and coaching offered to students by the teaching staff involved in the program. All these deficiencies can be eliminated if the training program is coordinated in a coherent and rigorous manner, based on partnership and effective collaboration among the local factors in charge of the teaching practice program. A better control of the implementation of the program and a stronger commitment of the individuals involved in it may also contribute to the effectiveness of the training activities.

To sum up, the instructional goals established by Calderhead & Sharrock (1996) can serve as a very useful recommendation to curriculum designers who aim at improving the quality of teacher education in the philological field. According to them, an effective curriculum should have the following features: focus on the student and the learning process, adaptation of psycho-pedagogical and language teaching education to the complex requirements of the present-day reality, equal importance attached to theory and practice, and use of "a reflexive practitioner model" in training. The reflexive practitioner model is crucial because it heightens "teachers' awareness of the context in which they work" and empowers them "to take control over their professional growth and to influence future directions in education" (Calderhead & Sharrock, 1996, p. 16).

FUTURE RESEARCH DIRECTIONS

The chapter dealing with university-based teacher education in Romania, which has undergone structural and ideological changes throughout time, invites researchers to ponder over the theme of innovative ideas about education and their effective implementation at different levels of the education system. The analysis of the initial teacher education program for Philology students may help curriculum designers and educators with useful suggestions about curriculum content and the learning process characteristic of

the field. Equally, the opinions of the focus group participants offer various perspectives on the process of teacher training, which may lead to new directions in the investigation of the phenomenon.

Some of the aspects identified in this chapter can be developed by further explorations of the role of reflective practice and action research in developing professional skills. Moreover, an interdisciplinary study on teacher education in different cultural contexts could provide observations and experiences that may help researchers rethink the paradigm of teacher education.

CONCLUSION

After the implementation of the Bologna reform in the Romanian higher education system, pre-service teacher education adopted a new instructional paradigm that forms the basis of the present training programs offered by universities. Starting from the observations and comparisons between two curricula and the perceptions of the focus group participants, the analysis shows that the success of such programs depends on the degree to which they are student-centered, reflect the goals of the individual and the community, and foster a tight relationship between theoretical and practical knowledge. Moreover, the investigation of the focus group participants' opinions led to the conclusion that training programs are appreciated if effective teaching strategies are used and competence-based learning is promoted. Designed according to these criteria, initial teacher education programs may lead to a genuine development of the specific knowledge, abilities and attitudes that teachers need to successfully fulfill their duty both in the classroom and in society.

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KEY TERMS AND DEFINITIONS

Curriculum: The official study plan of an institution.

Focus Group: An interactive group of people who are asked to exchange opinions about a particular topic.

Pre-service Teacher: A student that prepares to become a teacher.

Student-Teachers: Students that prepare to become teachers.

Teacher Education: Theoretical courses and practical activities preparing students for the teaching profession.

Teacher Training: Theoretical courses and practical activities preparing students for the teaching profession.

Teacher Training Programs: Special educational programs meant to teach undergraduates the teaching profession.

Chapter 7
Teacher Education and Teacher Professional Development:
Current Issues and Approaches

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ABSTRACT

This chapter reveals the prospect of teacher education; teacher education and technology utilization; the issues with professional development (PD); and the perspectives on teacher professional development (TPD) in the digital age. Teacher education offers teachers ways to keep their classrooms and curriculum highly educational. By providing teachers with teacher education programs, they are able to continue their own education, gain vital skills that they may not have been able to learn while taking college courses, and stay current with new technologies. TPD is an essential method of improving teaching and learning for teachers. TPD provides time, resources, and educational personnel to support teachers to improve their skills about teaching and learning. The effective teacher education and TPD programs should include technology pedagogy, the 21st century skills, and ethical perspectives toward improving preservice teacher's technological skills and enhancing both learner's educational opportunities and learning outcomes.

INTRODUCTION

The field of teacher education has been evolving for several decades, and current approaches to teacher education aim to help preservice teachers teach diverse populations and develop a wide range of skills, dispositions, and attributes in the modern learning environments (McLoughlin & Nagabhushan, 2016). The most critical factor within the school in facilitating student learning is the teacher and the ability of those in leadership positions to shape a collaborative, motivated, and effective teaching community (Momanyi, 2016). Teacher education programs worldwide are engaging in a digital conversation around best practices for teaching teacher candidates in the creation of digital content for the 21st century blended classroom (Dickenson & Sistek-Chandler, 2016). Teacher education programs should consider how they

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support preservice teachers to become the self-reflective consumers of technology (Amador, Kimmons, Miller, Desjardins, & Hall, 2015).

The quality of educational services in universities is mainly influenced by the quality of teachers (Ionescu, 2013). Educational technologies can provide a continuous source for professional growth and community-building in teacher education programs (Brown, 2014). The need to train untrained teachers and to offer professional development (PD) significantly dominates the teacher education perspectives (Moon, 2012). In teacher education, field experiences in clinical settings considered as the essential licensure requirements for preparing preservice and lateral entry teachers (Heafner & Plaisance, 2013). The more transformational leadership characteristics teacher educators possess, the more multicultural education practices are executed by them toward producing and transforming teachers to arrange the same practices in their classroom (Greene-Clemons, 2016).

In order to thrive in the increasingly demanding school contexts, teachers must adapt to the diverse students' needs through educational adjustment to new pedagogical approaches, education policies, and educational reform efforts (Jimoyiannis, Gravani, & Karagiorgi, 2014). In this regard, teachers need continuous support through multiple PD opportunities to deepen content and pedagogical knowledge and to improve teaching skills (Jimoyiannis et al., 2014). The increased impact of information and communication technology (ICT) in the society has lead teachers to engage in teacher professional development (TPD) activities related to the use of ICT (Lindberg & Sahlin, 2012).

TPD comprises a major challenge in many countries (Klieger & Bar-Yossef, 2011). In TPD, the component of collaborative participation among teachers is emphasized (Gröschner, Seidel, Pehmer, & Kiemer, 2014). Teachers are a significant factor related to student achievement (Heafner, 2016) and play a vital role in addressing TPD programs (Zehetmeier & Krainer, 2011). TPD helps teachers develop the appropriate knowledge to accomplish the educational goals is necessary (Harlow, 2014). Sztajn et al. (2014) stated that TPD has been recognized as a knowledge delivery mechanism. The utilization of TPD programs for teachers is the important strategy for facilitating the educational changes in classroom practices (Singer, Lotter, Feller, & Gates, 2011).

This chapter aims to bridge the gap in the literature on the thorough literature consolidation of teacher education and TPD. The extensive literature of teacher education and TPD provides a contribution to teachers by describing the issues and approaches of teacher education and TPD in order to maximize the educational impact of teacher education and TPD in the digital age.

BACKGROUND

Traditional teacher education has been under attack from those who believe it is not worth the investment (DeMink-Carthew, Hyler, & Valli, 2016). Many standards from professional organizations (e.g., INTASC, NCATE, NCTAF, and NCLB) point to the importance of the university faculty and quality teacher education programs to support the needs of preservice teachers and to prepare the teacher education programs (Koch & Kush, 2015). Teacher preparation programs historically have been contained on campus using face-to-face instruction (Lemoine, Yates, & Richardson, 2015). Teacher preparation programs need the reliable performance assessments to provide actionable data upon which programs can direct the meaningful change (Lys, L'Esperance, Bullock, Dobson, & Patriarca, 2016).

Increasing external demands on student time, calls for more cost-effective programs, and a growing demand for course offerings are the important factors that have prompted colleges of education to expand

and diversify the way they deliver instruction (O'Brien, Freeman, Beattie, Jordan, & Hartshorne, 2013). In the context of teacher education, information technology (IT) and information system (IS) involve the gathering, processing, storing, distributing, and use of information in a range of strategy, management, and operational activities with the aim of improving the effectiveness and efficiency of teachers (Ololube, 2015). Preservice teachers should utilize technology as a tool to enhance content, student learning experiences, and academic achievement of their future students (Friedman & Heafner, 2010).

Education is dispensed by teachers and thus, if education occupies a crucial role in national development, then teacher education is at the center of national development (Noah, Oni, & Dosunmu, 2015). Teacher preparation must enhance the preservice teacher backgrounds in educational technologies, in addition to the pedagogical skills to successfully incorporate educational technologies into their instruction (Clemmons, Nolen, & Hayn, 2014). If innovative, student-centered ideas can be implemented with technological tools in teacher education programs, preservice teachers will be simultaneously exposed to both tools and teaching practices of the 21st century (Clemmons et al., 2014).

As with any transition in educational practices, TPD is the important approach to bringing about changes that make a difference for students (Ostashewski & Reid, 2016). Effective TPD has long been a central goal of education (Torff & Sessions, 2009). Many TPD programs have emerged to support the classroom teachers in changing their instructional approach to be consistent with inquiry-based instruction (Capps, Crawford, & Constas, 2012). Teachers are positioned as learners during TPD (Bell & Odom, 2012) and must be prepared to provide technology-supported learning opportunities for students (Boling & Beatty, 2012). TPD is the major source of a professional continuum and lifelong learning in the knowledge society (Duta & Rafaila, 2014) toward promoting the possibility of matching various educational methods (Falcinelli & Laici, 2012).

Many TPD efforts have attempted to effectively support teachers in developing connection-making skills, knowledge, and dispositions (Orrill & Kittleson, 2015). TPD experiences that prepare teachers and coaches in inquiry and content may help build a shared language for the educational reform and accelerate the instructional changes (Lotter, Yow, & Peters, 2014). TPD is a key factor in improving science education (El-Hani & Greca, 2013). More support is required for TPD efforts to be successful, such as educational resources and time (Johnson, 2006). In order to promote the educational change in the teaching profession, there is an urgent need to prepare the TPD facilitators to effectively foster the newly developed PD models that offer the high-quality learning opportunities for teachers (Borko et al., 2014).

ASPECTS OF TEACHER EDUCATION AND TEACHER PROFESSIONAL DEVELOPMENT

This section describes the prospect of teacher education; teacher education and technology utilization; the issues with PD; and the perspectives on TPD in the digital age.

Prospect of Teacher Education

With the rising focus on accountability by policymakers, accreditation agencies, and the general public, greater expectations are no longer the aspiring ideals of a few educational leaders but the obligations people share for preparing the new generations of teachers and learners with the knowledge, skills, and dispositions needed to meet the demands of the 21st century (Huang, 2012). A typical component of

most teacher education programs are early field experiences where preservice teachers are placed in local schools to observe for a set amount of time over the course of a semester (So & Hixon, 2013). Teacher education refers to the systematic, structured, and professional training that is offered to people for them to qualify as professional teachers (Adjei-Boateng, 2016).

The basic purpose of teacher education is to prepare teachers to be able to function effectively in the classroom by facilitating student learning (Adjei-Boateng, 2016). Technology is shaping and reshaping K-12 (kindergarten to 12th grade) teaching and learning across grade levels and subject areas (Taylor, Vintinner, & Wood, 2016). To meet the needs of teachers who cannot easily travel to a university to complete coursework or attend PD sessions to satisfy licensure requirements, teacher education programs have increasingly turned to distance education as a method of providing teacher learning opportunities (Stockero, 2010). In an era of increasing distance education, an additional challenge is to effectively prepare the preservice teachers who connect with higher education in an online environment (Mitchell, 2015).

The structure of a teacher education program is of importance to the success of the individual teacher in his or her impending classroom (Gonzalez & Balderas, 2016). Today's K-12 classrooms are the learning environments that present teachers with the challenge of meeting the diverse needs of learners (Frey & Knackendoffel, 2012). There is a need for teacher education programs to equip all teachers with initial training in how to design, deliver, and support the K-12 online learning (Barbour, Siko, Gross, & Waddell, 2013). Educating a diverse population in America's K-12 schools continues to receive attention in the media and professional literature (DeSutter, 2013). Student learning in supplemental virtual schools and full-time cyber schools, using a variety of delivery models that include the independent, asynchronous, and synchronous instruction, in almost every state in the United States (Barbour, 2012).

Professionals within university teacher preparation programs are making continual attempts to find the effective ways to attract students from diverse backgrounds (DeSutter, 2013). Teachers' knowledge and skills in working with students of diverse backgrounds depend largely on their knowledge of ethnic groups and appreciation of culture and language differences (Zhou, 2015). As Pre-K-12 schools become more racially and culturally diverse, there is a need to better prepare teacher candidates for diverse school environments, especially given that many teachers have asserted that they do not know how to teach diverse students (Delano-Oriaran, 2016). Effective online teaching techniques must be defined, empirically proven, and efficiently implemented by both future and current K-12 teachers (Larson & Archambault, 2015). Teacher candidates in online courses engage in authentic learning to foster the 21st century practices similar to those of their K-12 students, such as technology literacy and media production (Lawrence, 2013).

The increasing nature of demographic changes in the schools and the U.S. society has ramifications for student learning and preservice teacher preparation (Adjei-Boateng, 2016). To become a teacher in the United States, preservice teachers (i.e., students who want to be teachers), must undergo the rigorous preparation and certification systems that include various assessments (Ottenbreit-Leftwich, Millard, & van Leusen, 2012). These assessments include performance assessments from field experiences in classrooms, state-mandated tests, and completed accredited program from a higher education institution (Ottenbreit-Leftwich et al., 2012).

Today's technology-driven society requires digital literacy, which means that an individual can read and write digitally in order to access the Internet (Taylor & Yearta, 2013). Adopting literate practices that are based on a wider definition of digital media literacy offers teachers a broader focus to what is currently described as technology-integration curriculum for teachers (Shambaugh, 2014). In order for

technology knowledge to be transferred to the classroom, teachers need to find the knowledge being taught relevant to their future classrooms (Ottenbreit-Leftwich, 2012).

A challenge for preservice teachers is that they do not have the pedagogical and content knowledge to be able to effectively implement their technology knowledge in the classroom (Robertshaw, Leary, Walker, Bloxham, & Recker, 2009). Teacher education programs usually provide preservice teachers with separate courses in which content, pedagogy, and technology literacy skills are introduced to learners (Hao, 2011). The TPACK (Technology, Pedagogy, and Content Knowledge) framework connects technology to curriculum content and specific pedagogical approaches and describes how teachers' understandings of these three knowledge bases can interact with one another to produce the effective discipline-based teaching with educational technologies (Koehler, Shin, & Mishra, 2012).

When newly graduated teachers enter the classroom, they are expected to possess the knowledge to adequately teach students with a wide variety of needs including students with special needs (Harris, 2012). Teacher education-related reflective activities (e.g., case studies, discussions, and presentations) help preservice teachers identify their strengths and weaknesses concerning classroom activities, use of materials (e.g., use of technology and visuals) and classroom management, leading to self-awareness about their understanding and application of teaching skills (Dollar & Medem 2016). Classroom management and working with special needs' students are among the top three areas preservice teachers are least prepared (Fletcher, Mountjoy, & Bailey, 2013). Teacher self-efficacy is an important motivational construct that informs the actions associated with teaching (Lemon & Garvis, 2015). Teacher self-efficacy develops during teacher education. Highly effective teacher education is able to enhance self-efficacy (Lemon & Garvis, 2015).

This section is dealing with the overview of teacher education and the next section is dealing with teacher education and technology utilization. Great teachers help create great students. An inspiring and informed teacher is the most important school-related factor influencing student achievement, so it is critical to pay close attention to the teacher education programs toward training and supporting both preservice teachers and experienced teacher educators. The effective teacher education programs significantly emphasize subject-matter mastery and provide many educational opportunities for preservice teachers to spend time in real classrooms under the supervision of an experienced teacher educator.

Teacher Education and Technology Utilization

Technology has changed the methods by which education is delivered (Zirkle & Fletcher, 2009). The use of technology in teaching requires the integrated knowledge between technology, pedagogy, and subject content, and this blended knowledge is developed through teacher education programs (Zhou & Xu, 2013). The affordances offered by modern Internet technologies provide new opportunities for the preservice training of teachers, making it possible to overcome the restrictions of shrinking resources and geographical locations and to offer high-quality learning experiences to geographically dispersed teachers (Meletiou-Mavrotheris, 2012).

The integration of technology continues to inform the ways that the future teachers are being prepared in teacher education classrooms (Hucks & Ragan, 2013). Teacher education programs experience a similar challenge in having preservice teachers integrate technology and model best practice for teachers in public schools (Shambaugh, 2013). Teacher education programs should enable candidates to rise to the challenges ahead of them by providing necessary training in integrating technology into their instruction (Okan & Taraf, 2013).

The management of the equipment dimension of educational technologies in teacher education is the effective utilization of the available equipment (Erdem, 2015). Teachers must be prepared to use technology in their classrooms as schools become computer competent (McMurtry & Burkett, 2010). In order to deeply integrate technology into instruction and learning, a change in pedagogy is required (Courduff, Duncan, & Gilbreath, 2014). Leadership in instructional technology emphasizes the abilities of the leaders in teacher education program to develop, guide, manage, and direct the application of technology in classroom instruction for the purpose of aligning with the best classroom practices that is the foundation of teacher education in universities (Akuegwu, 2015).

Successful technology integration needs a paradigm shift in pedagogical approaches and reform in teacher education programs to better support the teachers' integration of technology into instruction (Oigara, 2013). Video plays a significant part in effectively preparing preservice teachers (Hodge & Carbonara, 2015). Video analysis as a reflective tool can help preservice teachers hone the specific aspects of their developing practice (Cuper & Gong, 2010). Videoconferencing is one form of distance learning that can enhance teacher education programs by linking students in higher education with Pre-K–12 schools (Barnett, 2011). Teachers can utilize the certain conversation perspectives (e.g., critical thinking, hypothesizing, and challenging) as they transact with the multimodal information in the video to support their generation of ideas for literacy instruction (Arya, Christ, & Chiu, 2015).

Changes in the role and influence of ICT in teacher development occur very quickly (Elliott, 2009). The preparation of teachers to utilize social media instruments continues to be a new concern of teachers' educators on the international level (Mâţă, 2014). ICT tools, ranging from blogs to virtual learning environments, can be employed to support the second language teacher education (Wildner, 1999). Through the use of blogs, preservice teaching candidates grow in their abilities to reflect on their own teaching and to provide constructive comments to peers (Rinke, Stebick, Schaefer, & Gaffney, 2009). As a communication tool, blogs can promote further collaboration among teachers, and increase social interaction (Lock, 2006). Blog is a free and simple resource for teachers to do research and obtain information beyond their contexts (Kuzu, 2007).

There is a growing need for preservice teachers to learn how and when to implement mobile technologies so that they can assist the 21st century Pre-K-12 students in the meaningful and real-world learning (Maxfield & Romano, 2013). In addition, ePortfolios have grown in acceptance by teacher education programs across the United States (Ritzhaupt, Parker, & Ndoye, 2012). ePortfolios enhance students' educational technology learning, reflection, and collaboration (Bartlett, 2008). Although portfolios are a popular method of teacher evaluation, they must be properly implemented if they are to realize their full potential (Greenhalgh & Koehler, 2015).

This section is dealing with teacher education and technology utilization and the next section is dealing with the issues with PD. With the advent of educational technologies, many colleges and universities are revamping their education schools to include an emphasis on content knowledge, increased use of educational technologies, creation of PD schools, and innovative training programs to promote teacher education programs and support student learning in the modern learning environments.

Issues with Professional Development

A growing body of empirical research on the structure, content, and outcomes of effective PD offers the insights into the characteristics of programs that provide the high-quality learning opportunities (Desimone, 2009). When planning PD programs, there are three major elements to consider (i.e., the aims, the

content, and the processes by which the PD will be delivered) (Tirosh, Tsamir, & Levenson, 2015). PD programs should be designed to meet the diverse nature of teacher needs (Arbaugh, Lannin, Jones, & Park-Rogers, 2006). In difficult economic times, PD finds itself squeezed between the real necessity to train educators and administrators in emerging technology, and the financial realities of dwindling taxpayer dollars and increasing demands for resources (Mark, 2013).

Whitaker et al. (2007) indicated that a large-scale PD project can benefit from nurturing the elements that promote the teacher's perceptions of support. Ebenezer et al. (2012) explained that PD aimed at integrating the innovative technologies into science education classrooms has been an important aspect of preparing teachers for the changing educational environment. The high-quality PD refers to both the process and structure of the PD programs (Borko, Koellner, & Jacobs, 2014). Institutions need the effective methods of PD for preparing graduate students to teach as the teaching assistants (Hardré, 2005).

Understanding and working from the predispositions of the teachers is an essential component of effective PD (Koch & Appleton, 2007). PD enhances teachers' ability to design the inquiry-based activities (Wee, Shepardson, Fast, & Harbor, 2007). Concept maps are effective for assessing teacher knowledge gains from PD (Greene, Lubin, Slater, & Walden, 2013). The high-quality PD programs provide opportunities for teachers to collaboratively participate in a professional learning community, situated in the practice of teaching (Brodie & Shalem, 2011) and helps teachers develop the knowledge and skills they need to support their student learning (Desimone, 2009).

This section is dealing with the issues with PD and the next section is dealing with the perspectives on TPD in the digital age. PD programs are meant to provide opportunities for learners to gain knowledge and skills that will enhance their professional growth in the workplace. Learners utilize their newly developed skills and knowledge, thus increasing their contributions within the community. Regarding TPD, educational opportunities begin with a foundation of basic knowledge, skills, and competencies, followed by more purposeful learning that builds on previous experiences. TPD keeps teachers up-to-date on new research on how students learn, emerging technology tools for the classroom, and new curriculum resources in real-world settings. The effective TPD is derived from working with students and understanding their learning culture.

Perspectives on Teacher Professional Development in the Digital Age

Nowadays, teachers require the wide range of skills related to the increasing proliferation of technological tools in modern education (Pachler, Daly, & Turvey, 2010). Developing the knowledge society in education requires new curricular, didactic and organizational strategies, as well as an optimal development of educational professionals (e.g., teaching staff, directors, social educators, and pedagogues) (Gairín-Sallán & Rodríguez-Gómez, 2012). TPD emphasizes the metacognitive teacher with positive dispositions toward technology integration as an essential factor in ensuring that teachers implement the knowledge of content, technology, and pedagogy (Wilson, Zygouris-Coe, & Cardullo, 2016).

Prior research has mainly focused on what makes TPD effective from the educational program establishment (Zhang, Parker, Koehler, & Eberhardt, 2015). Engaging teachers in identifying the important issues in their own TPD is an effective strategy (Lotter, Harwood, & Bonner, 2006). While the use of emerging technologies requires a learning curve in terms of technical skill, the pedagogical understanding and affordance of those teaching and learning platforms have to be equally acquired (Hanewald, 2014). The use of technology in all teaching disciplines and administration requires the systematic training of every individual within the organization (Gruich, 2013). Teacher leaders embrace the challenge of school

improvement as they are given the opportunities to participate with their colleagues by facilitating the process of student inquiry, dialogue, and reflection in order to meet the challenge (Kent, 2013). Teacher leadership can promote the innovative TPD strategies that sustain the growth and development of an organization (Dickenson & Montgomery, 2016).

With many teacher educators needing either initial preparation or ongoing TPD to build and sustain the educational expertise in their specific disciplines, online TPD program arises as a viable and effective tool for teacher training (Zygouris-Coe & Swan, 2010). Online technologies present the innovative ways to overcome the impediments to effective TPD (Scott, 2010). Possibilities to communicate through online TPD communities have made reflective activities through action research between distant educational environments easier to organize and facilitate (Helleve, 2010). Teacher participation in online communities should be promoted and encouraged since online communities help teachers with informal learning and emotional sharing (Hur, Brush, & Bonk, 2012).

TPD programs that include teacher collaboration can help teachers meet their professional needs and control their professional lives (Murugaiah, Ming, Azman, & Nambiar, 2013). To meet an increasing demand for teacher's learning opportunities, TPD programs must be both sustainable and scalable (Marrongelle, Sztajn, & Smith, 2013). The learner-centered TPD approach is context specific since it facilitates the teachers' capacity to enhance student learning through quality teaching (Mungai, 2015). On the job training and TPD provide the learning opportunities for professional teachers in K-20 education (Loose, 2016). Learning to reflect on individual's learning should be an integral part of TPD experiences (Monet & Etkina, 2008).

New technologies offer the increased opportunities to facilitate personal reflection on practice, collegial collaboration, problem solving, and the sharing of teaching resources through the creation of online TPD communities (Scott & Scott, 2010). Since there is an increasing recognition to address the need to move practicing teachers to a higher standard of practice, mentoring has been receiving the increasing attention (Zubrowski, 2007). Educative mentoring seeks to meet the immediate needs of novice teachers while focusing on the long-term goals for TPD (Bradbury, 2010). Engaging experienced faculty in peer coaching as an effective TPD method practically offers various benefits for the institution (Huston & Weaver, 2008).

Through the Internet, videoconferencing, and online teacher professional communities, teachers are accessing the instructional resources and participating in the collegial networks to improve their teaching practice (Dickerson, Winslow, & Lee, 2016). In capturing experience as a sharable entity, video effectively enhances the educational collaboration and acts as a mediating tool for reflective practice (McCullagh, 2012). Regarding video-based TPD programs, the role of establishing a teacher learning community and a trustful exchange among group members is important (Gröschner et al., 2014). Classroom video recordings are the significant method of supporting the learning of teacher communities (Visnovska & Cobb, 2013).

By choosing video clips, posing substantive questions, and facilitating productive conversations, professional developers can guide teachers to examine the central aspects of learning and instruction (Borko, Koellner, Jacobs, & Seago, 2011). Laptop computers contribute significantly to teachers' professional and personal development and to a shift from teacher-centered to student-centered teaching (Klieger, Ben-Hur, & Bar-Yossef, 2010). Chretien et al. (2015) stated that Twitter can serve as a professional tool that supplements the traditional education. In addition, the YouTube training tool is an important training tool to assist teachers in the implementation of higher-order teaching strategies regarding TPD programs (Copper & Semich, 2016).

In the digital age, social networking sites (e.g., blogs, Facebook, and Twitter) provide teachers with the opportunity of creating a personal learning network (PLN), which is an increasingly significant way of acquiring new knowledge and enhancing pedagogical skills while having the capacity of making teachers feel they belong to the communities of practice (Xerri, 2016). Blogs can facilitate reflection, reveal the elements of the hidden curriculum, and provide opportunities to promote TPD (Chretien, Goldman, & Faselis, 2008). Social media enables the creation of knowledge value chain to customize information and delivery for a technological business growth (Kasemsap, 2014) and improves effective communication (Kasemsap, 2016a). Communities of practice help teachers reflect on their practices, develop new skills, and find motivation through mutual collaboration (Murugaiah, Thang, Azman, & Nambiar, 2016). In addition, communities of practice help promote a growing cycle of knowledge sharing activities that allow for the members to regularly meet, reflect, and evolve in the knowledge management environment (Kasemsap, 2016b).

Belonging to an online TPD community significantly offers teachers the opportunity to exchange ideas, make connections with a wider peer group, and establish collaborative networks (Lloyd & Duncan-Howell, 2010). Knowledge of informal learning networks can facilitate the informed design for learning, teaching, and TPD (Haythornthwaite & de Laat, 2012). Collaboration and cooperation are recognized as the key factors in TPD (Gellert, 2008). Regarding TPD, patterns of collaboration have been developed between teachers and teacher educators and have contributed to a closer relationship between research and practice (Potari, 2013). Collaborative learning model can serve as a viable mechanism for TPD (Deni & Malakolunthu, 2013). Regarding TPD tools, cogenerative dialogues are a promising method to improve teaching and learning across subject areas and grade levels (Martin & Scantlebury, 2009).

FUTURE RESEARCH DIRECTIONS

The classification of the extensive literature in the domains of teacher education and TPD will provide the potential opportunities for future research. Educational technology can provide learners and students with individualized learning platforms and instant feedback and assessment. While the potential value of educational technology tools is high, the way in which educational tools are implemented can considerably impact the actual value provided to the classroom toward encouraging teacher education and TPD programs. Learning analytics is an educational application of web analytics used by businesses to analyze commercial activities, identify spending trends, and predict consumer behavior (Kasemsap, 2016c). Electronic learning (e-learning) allows students to choose content and tools appropriate to their differing interests, needs, and skill levels in the modern learning environments (Kasemsap, 2016d). Web-based learning allows students to learn at their own pace, access the information at a time that is convenient for them, and provides education to the remote students (Kasemsap, 2016e). Facilitating teacher education and TPD through learning analytics, e-learning, web-based learning, and learning analytics would seem to be viable for future research efforts.

CONCLUSION

This chapter highlighted the prospect of teacher education; teacher education and technology utilization; the issues with PD; and the perspectives on TPD in the digital age. Teacher education offers teachers

ways to keep their classrooms and curriculum fresh, exciting, and highly educational. Teacher education programs have shown a great deal of benefit, such as the ability to earn teacher education certification, improve their general skills, improve overall organization, improve time management, improve educational technology knowledge, and learn ways to better motivate students. By providing teachers with teacher education programs, they are able to continue their own education, gain vital skills that they may not have been able to learn while taking college courses, and stay current with new technologies.

TPD is an essential method of improving teaching and learning for teachers. Regarding TPD, the expertise of the teacher is the most important determinant of student success. TPD provides time, resources, and educational personnel to effectively support teachers to improve their knowledge and skills about teaching and learning. TPD must fit the needs of individual teachers and their schools. The effective teacher education and TPD programs should include technology pedagogy, the 21st century skills, and ethical perspectives toward improving preservice teacher's technological skills and enhancing both learner's educational opportunities and learning outcomes.

Encouraging the development of teachers' competence in teaching traversal competences and heterogeneous classes is recognized as essential in global education. High-quality TPD program includes improving the supply and quality of teachers' continuous professional development (CPD) programs; providing educational institutions high-quality teacher education programs which respond to the evolving needs of schools, teachers, and educational society; and facilitating the acquisition of the competences that teachers need, such as teaching transversal competences, teaching heterogeneous classes, and collaborating with colleagues.

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KEY TERMS AND DEFINITIONS

Collaboration: The situation of two or more people working together to create the same thing.

Education: The wealth of knowledge acquired by an individual after studying particular subject matters or experiencing life lessons that provide an understanding of something.

Knowledge: The understanding of a circumstance, gained through experience.

Learning: The measurable and relatively permanent change in behavior through experience and instruction.

Mentoring: The activity of supporting and advising individuals with less experience to help them develop in their works.

Teacher Professional Development: The process of improving and increasing capabilities of teacher through access to education and training opportunities in the workplace.

Training: The organizational activity aimed at imparting information to improve the recipient's performance toward gaining the required level of knowledge and skills.

Chapter 8
Prospects and Challenges of Social Studies Teachers Professional Development in Nigeria

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ABSTRACT

Social Studies as a subject was introduced in several countries to meet certain specific needs and aspirations of the people. In Britain for instance, Social Studies was introduced into the school curriculum after the first and second world wars, as a panacea for social problems (Edinyang & Ubi, 2013). While in America, Social Studies was introduced with the intent of social competency and citizenship education (Adeshina, 2013, 2010). Social Studies is called different names in different countries, such as cultural studies, oriental studies, environmental education/studies, citizenship education or social science (Amos, 2014). In this chapter Social Studies in Nigeria is discussed with a focus on teacher education and professional development.

INTRODUCTION

Social Studies concepts were introduced into the educational systems in several countries to meet certain specific needs and aspirations of the people. In Britain for instance, Social Studies was introduced into the school curriculum after World War I and II, as a panacea for social problems (Edinyang &Ubi, 2013). While in America, Social Studies was introduced with the intent of social competency and citizenship education (Adeshina, 2010, 2013). Social Studies is referred to as multiple names in different countries, such as cultural studies, oriental studies, environmental education/studies, citizenship education or social

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science (Amos, 2014) This is due to the ways people perceive the concept, which is as a result of variations in countries objectives depending on the needs, aspirations and desires of the people (Bertrand, 2004).

Mezieobi (2008) elucidates that that the goal and emphasis differs from country to country and from one level of the educational system to the other. Education is a potent instrument that facilitates the attainment of national development goals through the production of responsible citizens that are contributing maximally to the growth of the society (Edinyang & Ubi, 2013; Edinyang, 2015). The school is considered by the Nigerian government as an instrument par excellence for effecting national development (National Policy on Education, 2004). The goals of the National Policy on Education (2004) amongst others include the development of the individual into a sound and effective citizen; and the full integration of the individual into the community. Social Studies is one of the subjects to achieve these lofty goals.

The basic education in Nigeria comprises 9 year program, comprising 6 years of primary education and 3 years of Junior Secondary School education. In Nigeria, Social Studies is taught at primary and secondary schools. Social Studies is taught as a core subject in primary and Junior Secondary School; while it is offered as a single –major and double major course in most colleges of education and tertiary institutions . The importance of to Social Studies is recognized by the Nigeria Policy on Education (1977, 1981, 2004) as a compulsory subject in the Junior Secondary School (JSS) and elective at the Senior Secondary School (SSS). The National Policy on Education (2004) underscores the importance of Social Studies Education as an effective platform for inculcating the norms of active citizenship.

Brief History of Social Studies in Nigeria

Social Studies concepts were introduced into Nigeria's educational curriculum shortly after independence to assist in understanding and finding solution(s) to the problems confronting Nigerian society (Woolman, 2001). Makinde (1979) call to attention that 'Social Studies ' as a school subject in Nigeria was first used in 1958 by educators of the Ohio University Project which sought to introduce its teaching into Teachers' Colleges in the former Western Region of Nigeria. Prior to its formal introduction into secondary schools curriculum, Social Studies has evolved through different stages .Notable among such are the London Oxford conference of African Educator in 1967, Mombasa Conference of 1968, Ayetoro Comprehensive High School 1965 experiment, and the 1969 Social Studies Association of Nigeria (SOSAN) collaboration with the Nigeria Educational Research Council ([NERC], Kadiri 2007, Sofadekan, 2003; Osakwe & Itedjere,1993; Ezegbe, 1987; Obebe,1987). This series of events lead to the production of organized Social Studies textbook in order to make the subject relevant to Nigeria's need. It is important to note that Social Studies gained momentum in Africa, after the Mobamsa, Kenya Conference of 1968. At the conference, twenty-five African educators, seven British, and six Americans representatives at the conference deliberated on Social Studies curriculum. At the conference, it was agreed that a new approach based on integration of the traditional subjects such as history, geography and civics, and some elements from economics, sociology and anthropology was needed. The questions the conference addressed were:

1. What is Social Studies?
2. What should be the objectives of Social Studies?
3. What approach should be the used in teaching Social Studies?

The conference also led to the establishment of Africa Social Studies Programme (ASSP) in 1969 founded by 11 countries at the initial formation. The Programme is now referred to as Africa Social and Environmental Studies Programme, (ASESP) comprising seventeen countries. These countries include Botswana, Ethiopia, The Gambia, Ghana, Kenya, Liberia, Lesotho, Malawi, Nigeria, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe. The ASESP is still responsible for monitoring Social Studies curriculum, and instruction. In parallel line, in Nigeria, the Comprehensive High School, Ayetoro, experiment is worth mentioning because it was the first attempt to develop Social Studies by school staff for secondary schools in Nigeria, albeit the scope was limited to the western region. But through the assistance of Ford Foundation under its joint auspices, comparative education study and Adaption Centre (CESAC), the Aiyetoro project was broaden to national scope through Social Studies publication, as core subject in junior secondary school. The Nigerian Educational Research Council (NERC now NERDC) on the other hand, implemented the decisions on Social Studies teaching in Secondary Schools after publishing the National Curriculum Conference Report in 1970.The NERDC is still charged with Social Studies curriculum planning and book development. Albeit, it cannot be ignored that prior to the formal introduction of Social Studies, subjects such as geography, history and civics inherited from the colonial education system was been taught(Amos, 2014). However, these subjects were criticized for being irrelevant in purpose and content to the immediate needs of the Nigerian students, and the society at large (Mbaba & Omabe, 2012). The subjects also encouraged learners to know more about the colonial master's country rather than their environment and the pressing problems in their society (Oweredu, 1972; Ikem & Reuben, 2012). The review of literature seems to indicate that there are diverse opinions among scholars on when Social Studies was officially introduced into Nigerian schools. Mezieobi (1992) argues that Social Studies have been an integral part of the Nigerian indigenous curriculum from the earliest times except for certain modifications to accommodate societal dynamics and international prescriptions. Social Studies have come a long way but more still need to be done to maximize its benefit to the citizens and the nation (Ololobou & Kadiri, 2007).

Defining Social Studies

Defining Social Studies in a clear and indisputable manner is perhaps an impossible task. The difficulty centres on what precisely distinguishes it from the older fields on the one hand, and the variation in its conception according to time and place. In the United States of America from where Social Studies was introduced into Nigeria and where it has survived for close to one century, the subject is still in "a state of flux" (Amos, 2014). However, a common consensus is its objectives and the modification of the subject to be related to African culture, as colonial educational system did not serve the interest of Africans. The need for students to be informed about the society they live is crucial. The National Policy on Education FGN (2004) reiterates that the inculcation of the right type of values and attitudes for the survival of the individual and the Nigeria society. This has become important for building the desired social orientation needed after independence in mobilizing young citizens for national development (Odoh, Edinyang & Ogbaji,2014). Social Studies Education according to Mezieobi (1992) and Adekeye (2008) is "the knowledge, ideas, concepts, generalizations, skills, attitudes, methods, structure, procedures, values and principles which the learner is exposed to and guided to learn. Contents are derived from various sources or disciplines. NERC (2007) defined Social Studies as a way of seeing, viewing and approaching things with special regard to their proper place and function in the ordering and management of man's total natural social and technological environment. Obed (2009) view Social Studies as a programme of

general education for the new generation on the study of humans, societal institutions, and human relationship with nature and with one another. Awoyemi and Ndagunnu (2005) explains that Social Studies embraces those studies which are concerned with how people build a better life for themselves and their fellow human beings; how people deal with the problems of living together, how people change and are changed by their environment. Social Studies as a discipline, involves experiences which deal with the problems of human relationship in the school and the larger community (Adesina&Adeyemi,2003). Social Studies is the integration of experience and knowledge concerning human relations for the purpose of citizenship education (Adewuya, 2002). Ogundare (2003) defined Social Studies as a study of problems of survival in an environment and how to find solutions to them. The Comparative Education Study Adaptation Centre -CESAC (1993) defined Social Studies as a subject is the study of man in his physical and social environment (Ololobou, 2010; CESAC, 2002).

Objectives of Social Studies

The objectives of the secondary school Social Studies curriculum as stipulated in the National policy are to develop positive attitudes of togetherness, comradeship, and collaboration towards a sound nation (Federal Republic of Nigeria, 1981). According to the Nigerian National Policy of Education, the primary objective of Social Studies is to raise good and responsible citizens (FRN, 1998). Opoh, Edinyang and Ogbaji (2014) highlights the following as the objectives of Social Studies: self-confidence and initiatives, power of imagination and resourcefulness, desire for knowledge and continued learning, sense of compassion for the less fortunate, sense of respect for and tolerance of the opinion of others, a spirit of national consciousness and patriotism, social values and attitudes such as: cooperation; participation; interdependence; open mindedness; honesty; integrity; trustworthiness; diligence and obedience (Garb, Singh, Yusuf and Saad, 2012).

According to Meryfied and Mutebi (1991), the objectives according to the Mombasa Social Studies Education conference in 1968 include:

1. To create awareness and an understanding of the evolving social and physical environment as a whole, its natural, man-made cultural and spiritual resources, together with the rational use and conservation of these resources for development.
2. To develop a capacity to learn and acquire skills of observation, analysis and inference which are essential to the forming of sound judgment.
3. To acquire the relevant knowledge which is an essential prerequisite to personal developments as well as to the positive personal contribution to the betterment of mankind.
4. To develop a systematic appreciation of the diversity and interdependence of one
5. To equip students in Africa the understanding with peoples' interaction with their cultural, social and physical environment, appreciate home and heritage, develop skills and attitudes expected of citizens and learn to express ideas in many ways

Obidoa (1991) highlights the objectives as:

1. To understand their environments, other human beings and their relationships with the physical, economic, social and cultural environments

2. To develop, encourage and strengthen enquiring minds in students that can help them to rediscover what has been neglected or forgotten. (p.11).
3. To develop the ability to solve problems, and inculcate certain values and attitude
4. To develop an understanding of the immediate surroundings
5. Inculcating in the learners the knowledge, skills, attitude and actions important in human relationship in the society.

Social Studies concepts have been recognized by the Nigerian school curriculum as a vital instrument for inculcating good attitudes in learners (Rakum, 2011). Okam (2008) and Awe (2001) reiterated that Social Studies is expected to provide students with insights to use of various knowledge, structure and procedures relevant to modern civilization by fostering understanding of movement and event and personality that have influenced the history of Nigeria.

Rationale for Teaching Social Studies

Social Studies concepts are designed in line with Nigeria National Policy on Education (2004). The need for nation-building and national development in Nigeria after the civil war contributed to the emergence of Social Studies as a subject to forge the idea of citizenship and patriotism. Amos(2014), Adesina (2013), and Alexander (2001) expressed that in almost all nation, Social Studies is a platform for teaching the ideals of Citizenship, patriotism, molding youths into responsible citizens, while coping with social change in the midst of burgeoning tide of crime and violence, participate effectively in public life. Opoh, Edinyang and Ogbaji,(2014) observes that the national philosophy of education in Nigeria recognizes Social Studies education in building the desired social orientation needed after independence in mobilizing young citizens for national development. In this same vein, Jekayinfa (1999) expressed that the primary goal of the junior secondary school's Social Studies is the provision of knowledge to produce informed citizens who will translate knowledge and attitudes into desirable socio-civic behavior.

Social Studies was integrated into the Nigerian school curriculum to restore Nigeria from social vices and to inculcate good citizens values in students who would help the country realize her national goals and objectives (Obidoa, 1991; CESAC, 1993; Gabriel, 2008; Gbenga, 2001; Ogunsanya, 1984, Woolman, 2001). Kerr (2002) point out that in England, citizenship education has been introduced into schools as an antidote to decreasing levels of participation in public life by young people. Citizenship education in school became statutory for learners between the age of 11 and 16years. The aim of citizenship education programmes is to help children develop the attitudes, skills and knowledge to equip them for participation in public life (Alexander 2011).

The Social Studies Association of Nigeria (SOSSAN, 2006) posit that "Social Studies Education is as important to prepare students in the 21st Century, to deal with rapid change; complex, local national and global issues; cultural and religious conflicts; peace and conflict resolution and national security. Social Studies address the social needs, social realities and social aspiration of Nigerians (Mezeobi et al, 2013).

Social Studies is an approach through which man studies and learns about problems of survival in his environment (Olatunde, 2006; Okunloye, 2004). It makes students understand their own culture and the cultures of other Nigerians necessary to appreciate the differences and the need to live together as one society (CESAC, 1993; Obidoa, 1991). The general belief of curriculum planners for Social Studies is to provide a forum whereby children would be taught how to imbibe the values in Nigerian society (Adeshina & Adeyemi, 2003). Social Studies education develops in learners the right type of values

and attitudes that are needed to create a peaceful and sustainable society. Values taught include those relating to the social environment, physical environment, cooperation and conflict, integrity and justice, honesty, tolerance, hard work, service to the people, civil rights and responsibilities, culture and identity, truthfulness, discipline, respect for law and order, recognition of the principles of cultural relativity and the effect of cultural ethnocentrism, respect for other people's rights, formation of social competency, and citizenship education and a wise use of resources, cultural patterns, common heritage and national symbols(Ediyang, 2015; Akpan, Martha & Magret, 2008) .

These values are important factors in the human relationship with society and essential for the development of the individuals as contributing members in the society. Many scholars (Adedoyin, 1981; Adaralegbe, 1980, Makinde, 1979; Morriset, 1980; Onyabe, 1979; Wesley, 1946) assert that the basic goals of Social Studies education are to prepare, modify and change pupils' behavior in the direction of acceptable norms, values, beliefs, attitudes and practices of the society, responsible citizens in a world in increasingly complex and interdependent world. Mezieobi (2012) posits that Social Studies education places important responsibilities of connecting citizens with the dynamic world. Esu and Inyang-Abia (2004) pointed out that Social Studies Education develop competencies that will prepare citizens for rapid growth, peaceful living and mounting inequalities. Insights and critical thinking skills gained in Social Studies is crucial in fighting poverty and homelessness, crime and discrimination, and to make the nation fairer and freer, which are critical efforts in the quest for National Development (Obama, 2009). Social Studies is to emphasize the social relevance of Social Studies in which case it addresses the social needs, social realities and social aspiration of Nigerians (Mezeobi, et al., 2013). Social Studies has come to be accepted as "a school subject that should assist students to acquire the basic knowledge, skills and positive attitudes needed to be responsible citizens and contributing members of society", (Alberta, 2000). These aims are summed as citizenship, patriotism and unity.

THE SECONDARY SCHOOL SOCIAL STUDIES CURRICULUM

Social Studies curriculum is designed with the aim of building a sound and balanced functional social education directed towards the development of intelligent, responsible and self-directing citizen as well as a spirit of national consciousness and patriotism (Garb, Singh, Yusuf & Saad, 2012). Thus, Social Studies curriculum should include citizenship education, which emphasizes how students develop positive attitudes towards their duties, and obligations as citizens (NPE, 1981). The Comparative Education Study and Adaptation Centre (CESAC) and the Nigerian Educational Research Council (NERC) are the bodies mandated with Social Studies Curriculum development. The CESAC drafted both the Junior Secondary School (JSS) and the Senior Secondary School (SSS) Curricula in 1977. Since then the JSS syllabus has been approved, and implemented in all schools in Nigeria. Since then, Social Studies have been a core subject at the Junior Secondary School (JSS) level. The scope of Social Studies Education is broad; however the content bothers on aspects of societal development politically, economically, socially, culturally, technologically or educationally (Opoh, Edinyang & Ogbaji, 2014). Effectively organized Social Studies Education curriculum content should satisfy criteria such as sequential or logical ordering of content, learning continuity in terms of accumulation in learning, content integration and a measure of contents flexibility (Mezieobi, 1992). Kelly (2009) reiterates the importance of curriculum planning which requires specifying the objectives and planning the content and the methods that will lead towards achieving the objectives.

The Course Content

Most of these themes or concept clusters are repeated yearly to enable them to be treated at wider and deeper dimensions. The overriding goal of the JSS syllabus appears to be the provision of knowledge to produce informed citizens who will translate knowledge and attitudes into desirable socio-civic behavior. According to Adeshina (2010, 2013) and Mezieobi et al. (2008), some of the content of traditional Social Studies bothers on the learning of the people's local and family history, myths, oral literature, proverbs and riddles, and the geography of the community and the adjourning neighbourhood. More specifically it includes:

1. Respect to elders, honesty and truthfulness, learning of family gods and goddesses;
2. Character, values and virtues development and inculcation which traditional religion encouraged and promoted;
3. Instruction on loyalty to the community, recognition of seniority, hospitality to people, cooperation in common tasks, respect for others.

Themes for Junior and Senior Courses

The Junior Secondary Two syllabi include themes such as: physical environment, educational institutions, leadership and followership, development and growth, social changes over time (between 1861 and 1960), science and technology, national economic life, and culture and identity. The Junior Secondary Three Syllabi include these themes: origin of man, society and community, institutions, socialization, lack of cooperation and its effects, national economic life, the world and its peoples, world issues, and national unity and integration.

During Senior Secondary One student learn about: aspects of cooperation, religion as an agent of socialization, development and its consequences, historical aspect of development, social attitudes to development, concept of culture and identity, loyalty to the nation, and nation-building in multi-cultural settings. During Senior Secondary Two students Social Studies themes include: social change, alienation and personality, social institution, political institution, ethnicity, class and social stability, values, technology and development, national economic life, cross-cultural influence, and the utilization and conservation of world resources. The Senior Secondary Three course includes: Nigeria in World Economic Order, human rights education in Nigeria, comparative economic and political systems, and international relations.

TEACHING METHODS IN SOCIAL STUDIES

The lofty ideals and objectives of Social Studies can be achieved by properly educated teachers, who possess subject mastery, use of instructional materials and effective teaching methods. Teachers are crucial in the implementation of Social Studies curriculum. The right combination of teaching techniques and effective use of instructional material are the hallmark of an effective teacher. Appropriate teaching method is crucial for the delivery of the subject matter, sustaining student interest and academic performance. According to Fareo (2013), a teacher is an individual certified to engage in interactions with learners for the purpose of effecting a change in their behaviors. A teacher assumes different capacities such as

educator, instructor, tutor, lecturer and professor.Teaching method is the way the teacher organizes his lesson (Rakum, 2013). Amadi, Mezieobi, and Joof (1994) observed that techniques are embedded in methods, and are thus narrower in scope than methods. NTI (2006) explain that the teaching of Social Studies has relied on conventional methods of teaching such as, the lecturer method, dictation and note taking, which are not interactive. The need for teachers professional development, have become crucial in pedagogical changes that requires new roles for the teachers on the field (Fareo, 2013). One of the techniques of teaching that facilitates learning in Social Studies is the Advance Organizers Learning Strategy (Adesina 2003; Adesina & Ogbondah, 2005; Odejobi & Adesina, 2005; Adeyemi, 2005. Rakum (2013) calls to attention that teachers' mastery and sophisticated application of methods in Social Studies teaching-learning process goes a long way in bringing the desired change in the learner's behavior. Lecture, demonstration and discussion methods are the common frequently used methods used in Nigeria secondary schools, while simulation, project and construction methods were the least methods less frequently used by teachers. The National Teachers Institute NTI (2006) argues that conventional method of teaching such as, the lecturer method, dictation, and note taking are prevalent in Social Studies teaching.

Okam (1998) reiterates the need for Social Studies education to be studied through problems-approach, because of its significant advantages as follows:

1. It conforms to life because life is simply problem- solving;- it arouses interest which aids the education process
2. It trains students on the art of good judgment formation; it develops critical thinking in learner activity.

However, based on yearly results of Nigerian students in Social Studies, Adesina (2003) found out that students perform poorly in Social Studies . Plausible reason is that the subject is complex and difficult to understand, problem of getting current textbooks and teaching resources, inability of students to have financial backing to provide for themselves for the materials needed for effective learning, inadequate qualified teachers and insufficient training as memories using seminars, conferences, symposia.

Teacher's Professional Development in Digital Age

Teachers' at all levels of the educational system are very important in the overall development of any nation (Fareo, 2013). Teacher's initial and continuing training plays a key role in ensuring a supply of highly trained, competent, and motivated teachers. The professional development of teachers is studied and presented in the relevant literature in many different ways. Workplace learning is referred to as an "umbrella" term for professional development that takes place formally or informally in schools and that is not assisted by outside facilitators (Avalos, 2011). Teacher's development is the professional growth a teacher achieves as a result of gaining increased experience and examining his or her teaching (Fareo, 2013). The professional development of teachers is presented in the literature as workplace learning, an "umbrella" term for professional development that takes place formally or informally in schools (Avalos, 2011). Teacher's development is the professional growth a teacher achieves as a result of gaining increased experience and examining his or her teaching systematically (Glatthom, 1995). Teachers' education nurtures prospective teachers and updates qualified teachers' knowledge and skills in the form of continuous professional development (Anho, 2011). Teachers' education revolves around the policies and procedures designed to equip prospective teachers with the knowledge, attitude, behavior and

skills required in the performance of effective duties in the classrooms. Fareo (2013) identifies teachers' education into stages namely:

1. Initial teacher training; Pre-service teachers are trained in teacher training institutions and the curriculum for such training usually includes studies in Educational Foundations, Teaching Practice, at least one Teaching Subject and methods of teaching. The teacher must use his initiatives to vary his teaching methods to suit different lesson topics, "teachers have a 'make or break' role in curriculum…"(p.14) (Kelly, 2009:14). Teachers' professional development has two main phases: initial preparation and continuing professional development. Initial teacher training most often takes the form of full-time residential pre-service programmes in teachers' colleges or universities. Initial training may also be available to serving unqualified teachers through distance education, 'out-of-school' programmes during vacations or on release from schools for extended periods of time. The professional components of initial teacher training programmes can be either consecutive or concurrent with academic subject.
2. The induction process involving the training and supports of the trainees during the first few years of teaching or the first year in a particular school; and
3. Teacher development or continuing performing development and intensive process for practicing teachers.

The need for teachers professional development is crucial, as education is dynamic, thus teachers need to be at par with societal changes, knowledge expectations, new roles and demands. Inadequate teacher preparation, and relevant teaching method can affect students interest and academic performance in Social Studies . Professional development of Social Studies teacher is crucial in digital age as the initial training, skills and knowledge teachers acquire at initial teacher training school cannot be sufficient .Professional Development Programmes can bridge this deficiency Digital Social Studies should explore research, effective teaching strategies, and technologies for Social Studies practice in the digital age (Russell, 2013).The 21st century is witnessing innovations and transformation. There are wide range of knowledge, skills and attitudes that are expected to be acquired by 21st' century Social Studies students. Acquisition of such vast array of knowledge, skills and the acquisition of good attitudes is crucial (Rakum, 2011). Fareo (2013) argues that pedagogical changes, demand new roles for the teachers on the field. The aim of these CPDP is to enhance teachers' professional competencies (Fareo, 2013). The need for teacher development is crucial in the era of information age with existing knowledge becoming obsolete and knowledge acquired in schools is no longer enough for any professional who wants to be useful and effective in his or her profession. Connell (2006) posits that ideas about what makes a good teacher are important in thinking about educational reform, these ideas are contested and open to change. He discusses the incoherent but insistent way the good teacher is now defined under neoliberal governance by teacher registration authorities. Ideas about what makes a good teacher vary over time, between cultures, and within cultures. Moore (2004), in the study, *The Good Teacher*, identified a good teacher as a "competent craftsperson" model, preferred by government; a "reflective practitioner" model, widespread in universities; and a "charismatic". A teacher is conceived of as a reflective practitioner, someone who enters the profession with a certain knowledge base, and who will acquire new knowledge and experience based on the prior knowledge (Cochran-Smith &Lytle, 2001). The need for teachers to update professionally emanate from gap in initial teacher training. Teachers pass through teaching process stages model of a novice, advanced beginner, competent performer, proficient performer, and expert

teacher. The journey from being a novice teacher to becoming an expert will be facilitated, quickened and made less stressful by planned continuing professional development programs (Robinson &Latchem, 2003).Professional development of teachers assist in building new pedagogical theories, practices and help them develop expertise in the field (Dodds, 2001). The OECD project on "teacher policy" in 25 countries; *Teachers Matter* (OECD 2005) discuss academic debate on professionalism, standards, and the impact of globalization. Research on teacher education has consistently stressed the need for continuous teachers development as a platform for teachers to improve knowledge on the subject matter and teaching skills they learned in the pre-service courses they attended. This is based on the tenet of rapidly changing world, such that whatever knowledge and skills teachers acquired in their pre-service training becomes outdated in the context of socio-economic and political environments (Mohammed, 2006). Unfortunately studies have indicated that private schools have consistently out-performed public schools in Social Studies learning achievement (National Teachers' Institute, 2010). This is worrisome because less privileged children whose parents cannot afford the high cost of private schools are left with no alternative to good education as enjoyed in private schools (Rakum, 2011). Avalos (2011) pointed out that conditions and factors influencing professional development are based on macro-societal conditions and the micro-contexts provided. These conditions ranges from the nature and operation of educational systems; policy environments and reforms; and teachers working conditions which hinders the school's organizational context, affect the quality, possibilities and success of teacher professional learning.

Conditions for Professional Development

For effective professional development to be in place, it need to take much greater cognizance of the kinds of teacher knowledge that teachers need to acquire and the various ways in which they acquire these different types of knowledge (Bertram, 2011). School culture and leadership also matters for effective professional development. School leaders should facilitate systemic processes to develop these professional cultures (Hipp & Huffman, 2010; Brodie, 2013). Avalos (2011) discusses conditions and factors influencing professional development, some of these affect the quality, possibilities and success of teacher professional learning and some focus more closely on macro societal conditions and the micro-contexts provided by school cultures. Macro conditions are the nature and operation of educational systems, policy environments and reforms, teacher working conditions as well as historic factors that determine what is accepted or not as suitable forms for professional development. Avalos (2011) refers to school culture as an indicator of the school's ethos and social environment (traditions, beliefs). The concept covers the operation of the administrative and organizational structures, and how these interact to facilitate or constrict teacher workplace learning. Professional development that incorporates all-school inquiry can either be hindered by the school's organizational context or on the contrary, under certain.

Erant (1994) suggests that the following criteria are important for teacher professional development:

1. An appropriate combination of learning settings (on-the-job, near the job, home, library, course etc.); time for study, consultation and reflection
2. The availability of suitable learning resources
3. Prepared and Willing teachers
4. The learner's capacity to learn and to take advantage of the opportunities available

Avalos (2011) identifies principles for successful professional development as:

1. Long term and Developmental,
2. Focus on artifacts of practice such as student thinking,
3. Engage teachers in tasks and instructional practices,
4. Encourage design and reflection on the part of teachers and job-embedded (school-based) activities.

The document STEM Teachers in Professional Learning Communities: From Good Teachers to Great Teaching in National Commission on Teaching and America Teaching (2011) explains that every school needs good teachers, but a school does not become a great place to learn until those teachers have the leadership and support to create a learning culture that is more powerful than even the best of them can sustain on their own. STEMS (2011) identified six principles for effective PLC's which includes: shared values and goals, collective responsibility, authentic assessment, self-directed reflection, stable settings, and strong leadership support. Further, Brodie (2013) stated that PLC's are time consuming and demanding and teachers. If other parts of the education systems work against this, it will not work. Avalos (2011) point out that the effectiveness of professional development has impact on teachers' knowledge and practice, including effects on pupils.

Avalos (2011) identified conditions and factors influencing professional development (learning and change), some of these affect the quality, possibilities and success of teacher professional learning and some focus more closely on macro societal conditions and the micro-contexts provided by school cultures. Macro-conditions are the nature and operation of educational systems, policy environments and reforms, teacher working conditions as well as historic factors that determine what is accepted or not as suitable forms for professional development.

Teachers Professional Development and Types in Nigeria

In Nigeria, there have been quite a number of initiatives on teachers' professional development such as sandwich, distant learning, workshop, conferences, seminars, refresher courses and other activities aimed at enhancing teachers' knowledge, skills, classroom and curriculum teaching effectiveness. These trainings and programs are offered at different levels and institutions by different teacher institutions at both public and private levels. Teachers continuing professional development may be regarded as all forms of 'in service', 'continuing education', 'on- the –job-training', 'workshop', 'post-qualification courses' etc. whether formal or informal, structured or unstructured, teacher-initiated or system-initiated, accredited or not (Mohammed,2006). The techniques for the retraining are: inquiry, guided discovery concept mapping, games, storytelling, discussion, resource persons, role play and debate. Professional development includes formal experience such as attending workshops and professional meetings, mentoring; and informal experiences such as reading professional publications, watching television documentaries related to academic discipline (Fareo, 2013; Avalos, 2011; Ganser, 2000).

Professional teachers development emanates from various sources and agencies, and in various forms: orientating teachers to curriculum or examination changes, upgrading qualification levels, donor-funded projects, professional teachers' associations in developing subject teaching (e), or sometimes teachers' unions, school based improvement initiatives, or individual teachers working to improve their qualifications, career prospects or teaching skills (Mohammed, 2006). School based professional development where teachers are active through experimentation, inquiry, writing, dialogue and ques-

tioning, collaboration and teachers working together, focuses on student learning, takes place over time and provides follow-up support, mentoring and coaching in teachers' classroom are effective (Bertram, 2011). Avalos (2011) contradicts that formal structures such as courses and workshops may serve some purposes, but not every form of professional development, even those with the greatest evidence of positive impact, is of itself relevant to all teachers. Opportunities for continuing professional development must be created to re-skill the potential teacher, re-motivate the interested teacher, retrain the dedicated teacher and retain the practicing teachers teaching in the country (Jegede, 2004). In Nigeria, the two most commonly Continuing Professional Development (CPD) models are the workshop model and the school-based teacher professional support model. The workshop model is one of the most popular, (CPD C, outside the school it may be short or long-term (Mohammed, 2006). The school-based teacher professional support and mentoring model is an alternative strategy for in-service training of teachers. Under this type of training, teachers, supervisors and facilitators are involved collaboratively carrying out a series of classroom/school-based activities that will help the teacher to improve. The teacher gets professional support from facilitators and supervisors who serve as mentors. Activities may include direct classroom support by the facilitators and supervisors; staff meetings within the school and involving head-teachers and the participating teachers; demonstration lessons by teacher-educators or mentors; visits to the school by mentors (if external). Thus formal structures such as courses and workshops may serve some purposes, while involvement in the production of curricula, the discussion of assessment data or the sharing of strategies may serve other purposes (Avalos, 2011). While it cannot be ignored there have been a plethora of programs to support reforms for more effective teachers in Nigeria, inform of conference, seminar, training, workshop to mention but a few but there have been hue and cry that such initiative are ineffective as it is often generic learning without helping and supporting the teachers to understand and address teaching challenges that emerge as they implement the new practices within the classroom. The weakness of these types of training is that conventional conceptualizations of teacher workshops promote isolated and unrelated lecture style formats of professional development and ultimately prevent the creation of an educational structure that will challenge every student and teacher to meet their greatest potential (Darling-Hammond, 1998; Guskey, 2006). Reasons for ineffective teachers professional development initiative is that they are not clearly focused on specific teaching subjects but too general. Although Opfer et al. (2011) claim that there is merit in individual learning; they argue that 'teacher learning is a dynamic process and cannot be understood by separating the professional development of teachers from the environments in which teachers undertake their learning. The lacuna of these types of professional development brought about advocate for paradigm shift to professional learning communities. However, Avalos (2011) cautions that teacher's professional learning is a complex process, which requires cognitive and emotional involvement of teachers individually and collectively. Not every form of professional development, even those with the greatest evidence of positive impact, is of itself relevant to all teachers. There is thus a constant need to study, experiment, discuss and reflect in dealing with teacher professional development on the interacting links and influences of the history and traditions of groups of teachers, the educational needs of their student populations, the expectations of their education systems, teachers' working conditions and the opportunities to learn that are open to them. Schools in developed countries are shifting towards professional learning communities (PLCs). There is still paucity of information and practice of professional learning communities' in Social Studies teaching in Nigeria secondary school.

Professional Learning Community Teacher Development

Many schools in the world are embracing the ideas of professional teaching communities (PLC's) as increasing recognition for quality education; school reform efforts and professional development. As too often student's success and growth have been dependent upon the expertise and experience of the teachers. Hord (1995) stressed that "teacher development is the flip side of the coin of school change. Unless teachers become more effective at what they are doing, schools will not improve (p. 34)." The traditional structures of professional development have not proven to be successful in promoting professional growth or helping foster institutional change (Darling-Hammond, 1996; Hord, 1995). Evidence also abound that educational organizations in various countries are currently underwriting this concept (e.g., The National Commission on Teaching and America's Future; the National Board for Professional Teaching Standards; The National Council of Teachers of Mathematics; The National Science Teachers Association; The Southwest Educational Development Laboratory; American Federation of Teachers; The National Middle School Association; The National Association of Elementary School Principals; The National Association of Secondary School Principals; The North Central Association Commission on Accreditation and School Improvement). PLC's has become very pertinent from the 'growing recognition of education as a dynamic, professional field', where knowledge about the teaching and learning process is constantly being discovered and new types of expertise are required of teachers at all levels(Guskey, 2000). Bertram (2011) points out that community of practice as a concept emerges from industrialized countries such as the United States and the United Kingdom; there are examples of such concept in South Africa; programmes often linked to Universities been practiced and located within a situative perspective of teacher learning and which focus on creating teachers community of practice. Terms associated with PLC's are

'professional learning community' 'learning communities', 'critical friends', 'critical friends', 'networks', 'teacher collaboration', 'lesson study', 'professional development', 'collaborative teams', 'joint lesson planning', 'facilitated learning community', 'supported learning community' (STEMS, 2011).

Due to its importance, the Republic of South Africa, Department of Basic Education integrated strategic planning framework for Teacher Education and Development in South Africa points out that 'a professionally confident, fully capable and continually learning community of teachers is the necessary requirement for success and introduced PLC's in 2011. The plan suggests that established and functioning PLCs should be in schools across the country by 2020. Joy du Plessis and Muzaffar (2010) elucidate that a community with shared interests, crafts, or professions are called communities of practice. Learning is fundamentally a result of social participation and that learning is both a kind of action and a form of belonging. Learning through participation in a community is consistent with the views of African indigenous learning based on the tenet of learning as holistic, takes place in the community and is ongoing in everyday life. They are organized as communities of practice consisting of both novice beginners and experts. Avalos (2011) point out that the power of teacher co-learning emerges from informal exchanges in school cultures that facilitate the process continues in networking and interchanges among schools and situations. Teachers learning in school contexts draw on situated learning theory and consider this learning to be both individual and collaborative as well as facilitated or not by a range of factors including, different school cultures and traditions. Brodie (2013) refers to 'professional learning communities' as teachers critically interrogating their practice in ongoing, reflective and collaborative ways in order to

promote and enhance student learning. It is learning for pupils, teachers, leaders and schools. The focus of PLC's is not on individual teachers' but on collective professional learning within the context of a cohesive group that works with an ethnic of interpersonal care, which permeates the life of the teachers, students and school leaders. PLC's can take many forms, are inspired by varied purposes, and function in different ways. However, they all focus on improving teachers practice and learning together about how to increase student learning. Brodie (2013) cautions that the definition of a PLCS is broad and allows for a range of meanings and consequences, some of which are contradictory. She advocated for clearer definitions to indicate exactly how the term is being used.

Forms of PLCs

The model for a STEM PLC's is a group of teachers working in the same school, either in grade level (in elementary schools) or curricular groups (as in high schools). Some PLCs also function across districts, with teams meeting face-to-face in afterschool, summer, or weekend workshops.

Annenberg Institute for School Reform (2004) asserts that Professional learning communities comprise small groups of educators, administrators, community members, and other stakeholders who collectively examine and improve their own professional practice; and instructional coaching whether school-based, educator-led professional learning for groups of teachers in specific content areas. Joy du Plessis and Muzaffar (2010) elucidates that learning through participation in a community is consistent with the views of African indigenous learning based on the tenet of learning as holistic, takes place in the community and is ongoing in everyday life. PLC's are organized as communities of practice consisting of both novice beginners and experts. The novices begin at the margins of the community and, through interactions with more experienced participants, continually become more involved and experienced members. The notion of communities of practice is already practiced in many parts of Africa. School-based teacher groups or conferences that allow teachers to engage with their peers in local problem solving, share experiences and ideas, interpret the curriculum and reforms, and assist new teachers, are all examples of such communities in action. In such activities, advisors or senior teachers provide expert assistance [or outside counsel] to groups when needed. These outside experts are usually classroom teachers who have been promoted to provide assistance to others because of success in the classroom and assisting other teachers. In addition to school based professional learning communities, teachers often meet with teachers from other schools in a school cluster and other increasingly larger administrative units (circuit, district, county, etc.). Participation at most levels in most places, and especially at the school level, is often included in the conditions of service or terms of work of teachers, and there are rarely external incentives (monetary or otherwise) for participation. Importance of this to teacher education is change in the teacher educator as fundamental to improved teacher practices in schools that lead to increased learner performance and whole child development.

Benefits of Professional Learning Community (PLCs)

Huffman and Hipp (2003) highlights the benefits of Professional Learning Communities (PLCs) to alleviate apathy, create engaged and critical thinking community of practice. On-going and job-embedded professional development, coupled with support structure improves the likelihood of improving teaching practices and learning increases to nearly 90 percent. duPlessis and Muzaffar (2010) elucidate that PLC's are more than just networks, being part of a professional learning community is preferable to working

as a "lone wolf." Collegiality and networking improves practice. PLC is in contrast to general "staff development" where teacher development is often individualized, off-site, unconnected to the context of school, teaching experience, and increased mastery of content. PLC's is valuable tools for teachers' learning, growth and development, and increase in learners' performance and whole child development.

Annenberg Institute for School Reform (2004) enumerate that PLCs have the potential to build productive relationships that are required to collaborate, partner, reflect, and act to carry out a school-improvement program. In addition to engagement of educators at all levels in collective, consistent, and context-specific learning; addressing inequities in teaching and learning opportunities, supporting teachers who work with students requiring the most assistance; and promoting efforts to improve results in terms of school and system culture, teacher practice, and student learning. STEM (2011) reiterates that teacher's collaboration supports student learning, and teachers who work in strong learning communities are more satisfied with their careers and are more likely to remain in teaching long enough to become accomplished educators. Individual teacher efforts at the expense of collaborative professional capacity building could seriously undermine the ability to prepare today's students for 21st century college and career success. PLCs develop and hone teacher's skills; build efficacy, and school reform (Hipp & Huffman, 2010).

The National Teachers' Institute

The National Teachers'' Institute is mandated by Act No 7 of 1978 to organize programs for upgrading and updating practicing teachers at all levels, a task, which it has been engaged in since its establishment. The National Teachers'' Institute, was directed to execute the Millennium Development Goals Project, to retrain teachers in Nigeria. The National Teachers' Institute is fully committed to capacity building for secondary school teachers as demonstrated by the range of retraining programs. Mohammed (2006) observes that in 2002, the institute drew a five-year master plan on the professional development of teachers (2002-2006). The components of the plan are:

1. Training workshops on teaching the core subjects of English, Mathematics, Primary Science and Social Studies
2. Training workshops on improvisation and utilization of instructional materials
3. Training workshops on school based assessment
4. Training workshops on improvisation and utilization of instructional materials
5. Distribution of multimedia learning packages (audio, video, print) on innovative teaching methods that provide on-the-job professional support for teachers, disseminate information on preventive education especially malaria, tuberculosis and HIV/AIDS .

Apart from the upgrading courses that the institute has been implementing for many years (TCII, NCE and PTTP), the institute introduced proficiency Diploma Courses in Early Childhood Education, Guidance and Counseling, School Supervision and Inspection, and the Postgraduate Diploma in Education. The institute believes in-service training and re-training of Social Studies teachers will achieve the following:

1. Disseminate innovative practical skills that will enhance the teachers' effectiveness and thereby enhance the quality of learning
2. Update the teachers' knowledge on subject matter

3. Contribute to the development of positive attitudes and self-concept by the teacher
4. Enable teachers to make pupils perceive learning as an interesting pleasant activity that promotes self-understanding, inquiry and critical thinking.

Retraining of Teachers under the Millennium Development Goals Project (MDGs)

The Millennium Development Goals (MDGs) project is an effective continuing professional development in terms of scope, funding, impact and logistics, it surpasses all previous CPD interventions. The MDGs are a set of eight time-bound goals agreed to in 2000 at the General Assembly of United Nations in New York, where Nigeria was one of those countries that signed the declaration that set the target date of 2015. To this end, the President of Nigeria directed that all gains from the Debt Relief grant from the Paris Club should be invested in MDGs related projects. The training focused on the innovative techniques of teaching four core subjects of English Language, Mathematics, Science and Social Studies including School-Based Assessment and Improvisation of Instructional Materials. The objectives of the programme are to:

1. Disseminate practical skills that will enhance the teacher effectiveness and promote greater mastery of the subject matter by pupils
2. Update the teachers knowledge of subject matter
3. Contribute to the development of positive self-concept and attribute towards the teaching profession
4. Enable teachers to make pupils to perceive learning as an interesting and pleasant activity that promotes the development of self-understanding, inquiry and critical thinking skills

The training programmes have been well monitored by various agencies such as National University Commission (NUC), Nigeria Union of Teachers (NUT), National Assembly, Federal Inspectorate and Non-Government Organizations, the press and the public.

The National Teachers'' Institute in collaboration with the Teacher Education in Sub-Sahara Africa (TESSA) programme, at the Open University, U.K. have provided support for the institute by integrating some sessions of the TESSA modules into the manuals for the retraining of primary and secondary school teachers in Nigeria.

Teachers Registration Council of Nigeria (TRCN)

It is in recognition of the importance of teachers and teacher professional development that the Federal Government initiated professional institutes such as the Millennium Development Goals Project, Teachers Registration Council of Nigeria (TRCN) and The National Teachers' Institute. This is based on the premise that effective implementation of education and Social Studies education will be attainable strengthening the capacity of existing teaching force through in-service training and re-training. Teachers Registration Council of Nigeria (TRCN) mandate Continuous Professional Education (MCPE) part of the requirements for the renewal of teachers' practicing licenses. The Teachers Registration Council of Nigeria (TRCN) was established in 1993 as an effort to standardize and professionalize teaching profession. The TRCN are doing the following: a) launching of campaign for the registration of teachers, b) initiating awareness and organizing continuous training and professional development programmes for teachers, and c) Holding regular and consultations with stakeholder and programmed partner.

Mohammed (2006) observes that in 2005, more than five hundred thousand teachers have been registered. The council has organized many continuous training and development activities to enhance the instructional skills of teachers. The TRCN since its establishment has been working relentlessly to uphold the teaching profession in the country. The TRCN (2006), Continuous Professional Development Programs (CPDP) are focused but not limited to:

1. Mathematics and Sciences.
2. Technology and Creative Arts
3. Teaching in English Language
4. Learner-Friendly Strategies
5. The Management of Large Classes
6. Gender and Child Rights Protection
7. Eradication of Examination Malpractices
8. HIV/AIDS Prevention and Management
9. Drug Abuse and Cultism
10. Professionalization of Teaching

CHALLENGES OF PROFESSIONAL DEVELOPMENT OF SOCIAL STUDIES TEACHERS IN NIGERIA

Despite the loft idea behind the teaching of Social Studies, and the objectives of Social Studies education, it is yet to attain its objectives. While teachers in developed countries have harnessed the power of ICTs, technology and digital media in teaching and learning Social Studies, teachers in Nigeria are still lacking behind. Students are losing interest in Social Studies despite teacher professional development (NPE, 2001). Enu (2011) opined that it is unclear if Social Studies have realigned their goals to prepare citizens to be competent, adjustable and comfortable in an era of global insecurity. These trainings are hampered by teachers' attitudes. Authors (e.g., Osakwe, 2012); Mezeobi, Fubara & Mezieobi, 2013) concur that Social Studies education in Nigerian schools and colleges is failing in its educational mission. Other challenges are getting current textbooks and teaching resources, inability of students to have financial backing to provide for themselves for the materials needed for effective learning, unqualified Social Studies teachers and the inability of practicing teachers to refresh their memories using seminars, conferences, symposia, Workshop and other relevant academic gatherings (Adesina & Adeyemi,2003). The teacher concentrates on only available instructional materials provided by the school, tests and written assignments for deriving achievement measures for evaluation (NTI 2006: p. iii). They suggested the need for Nigerian Social Studies to restructure and reconceptualize the subject to be more relevant to current challenges, events and developments. The weak correlation between school enrolments and the number of teachers employed in each school is the most obvious indicator of poor deployment. Variations in pupil-to-teacher ratio between schools are typically very large in Nigeria, ranging from 50 to 70 pupils to one teacher (Fakoya, 2009). Joy du Plessis and Muzaffar (2010) notes overloaded tutors' schedules, large numbers of student teachers, lack of a supportive environment for professional development, lack of resources, and traditions of professional engagement.

Other challenges and barriers include low and insufficient teachers' inability to teach with Information and Communications Technology (ICT). Nigerian teachers are yet to be developed professionally of ICT

skills, competencies and capabilities which are required for the effective implementation of ICT education. Further, working conditions are a challenge. Teachers rarely enjoy the same work environment as other professions. The government schools are with poor furniture for students and teachers, dilapidated staff rooms and classrooms; and these could inhibit teaching-learning process and poor salaries which result in low, commitment to the growth of the profession.

Another challenge is teachers lack of involvement in planning curriculum. Further, although the main objectives of Social Studies is to promote good citizens and nation builders, the subject remains surrounded by a lack of transparency, incoherence, and contradiction that further confound the problem (NCSS, 2009). As established in literature, the junior secondary school's Social Studies syllabus was too broad and ambiguous for junior secondary students (Kizlik, 2013; Abudu Kabir, 2013). These evidences indicate that the Social Studies curriculum used in Nigerian schools is too broad and difficult for some students to comprehend. In other words, there are too many topics to be covered within a short period that there is literally no time to integrate moral or societal values in the teaching and learning processes.

Teacher involvement in the curriculum development process is of great importance, "either in the definition of the problems or the presentation of concrete solutions in the form of programs of studies" (Ben- Peretz, 1980, p. 1). Non-involvement of teachers in curriculum planning and decision-making would lead to ineffective implementation and diminish teaching and learning processes (Nigeria Education Sector Diagnosis, 2005). However, the study by AbuduKabir, (2013) and other research like Adewuya (2013) and Onyeachu (2008) found that teachers who are crucial agents in interpreting and implementing the curriculum were not involved in the curriculum development process in Nigeria. They opined that this may lead to teacher misconceptions and misinterpretation of the purpose of the subject. This could possibly be the reason why Onyeachu (2008) said that, "for the set objectives of secondary education to be achieved, teachers must be involved in decision-making and planning of curriculum" (p. 568)

Similarly, Kabir (2013) and other related studies found that Social Studies was not included in the senior secondary school in Nigeria which hinders the subject's ability to achieve its aims and objectives in learners. Jekayinfa (1999) posits that the non-involvement of the curriculum in senior level has not enhanced full realization of the objectives of Social Studies. Opoh, Edinyang, and Ogbaji (2014) observe that paradoxically, the apparent euphoria that characterized the expectation of the founding fathers of Social Studies Education in Nigerian Schools appears to be flagging in the face of society characterized by moral decadence and man-made woes. The lofty ideal behind Social Studies is still a mirage. The new Social Studies curriculum at the senior secondary school is suffering from lack of implementation and the problem of resistance to change. Though teachers who will implement the new curriculum are favorably disposed to the curriculum, there should be a change of attitude particularly from the government, school administrators and examination bodies (Jekayinfa, 2005). Inadequate political, administrative, professional goodwill and commitment for the new Social Studies curriculum at the senior secondary school level in Nigeria is making it difficult to implement the new curriculum .The National Teachers Institute (2010) and Federal Ministry of Education (2009) have expressed dissatisfaction with the level of teacher's use of teaching methods. Mezeobi, Fubara and Mezieobi (2013), affirms that, "…Social Studies education in Nigerian schools and colleges… has failed in its educational mission in Nigeria or rather is falling in this enterprise" (p.210). Osakwe (2012) suggests focusing on restructuring and reconceptualising to make the subject more relevant to current challenges, events and developments.

NTI (2006) call to attention that Social Studies in schools have been implemented for many years now without success in terms of inculcating the values of good citizenship among the youths. The youths are rich in knowledge of Social Studies concepts and facts but deficient in expected social values, attitudes

and behaviors that commensurate the subject taught and learnt in the classrooms. Bertram (2011) argues that teacher development initiative do not always translate into better classroom practice because of the nature of the new pedagogy required by curriculum reforms which makes it impossible to implement in under-resourced conditions; social and material conditions which they work; difficulty for individual teachers to change their practice without the support of colleagues and those in management position in the school; design of problematic curriculum. Enoh (2009) concur that the goal and objectives of Social Studies curriculum is yet to be achieved, after about five decades of its full scale introduction in Nigeria school curriculum. This is signaled by a society characterized by moral decadence, religious intolerance, man-made woes, corruption, tribal crises, and terrorism.

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KEY TERMS AND DEFINITIONS

Curriculum: The set of standards, objectives, and concepts required to be taught and learned in a given course or school year.

Policy: An enforced guideline or regulation.

Professional Development: Programs and experiences for current teachers to develop knowledge and skills related to teaching.

Professional Learning Community: A group of teachers who meet to examine learners' needs, plan instruction, and participate in ongoing learning experiences.

Social Studies: The set of concepts related, but not limited to history, geography, economics, and the study of cultures.

Section 2

Supporting Candidates' Efficacy, Identities, and Dispositions

Chapter 9
Personality and Education: Contemporary Issues in Psychological Science about Personality in Teacher Education

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ABSTRACT

The purpose of this chapter is to sensitize the public about the importance of research on personality in the process of teaching and learning, regardless of whether it refers to the personality/temperament of children or teachers. By analysing the personality of teachers, the job-fit theory and different theoretical models of personality and temperament in psychology are showcased. With the aim of a better understanding of the moderator's role of personality in the context of education, a systematic review of relevant studies is presented within Croatian cultural context. Finally, an empirical study is presented which was conducted on future preschool teachers who evaluated their personality as well as their best and worst teachers' personalities. It was determined that there are significant differences in estimated personality traits of the best and worst teachers. Finally, further guidance in exploring the role of personality in education was provided, with an emphasis on methodological aspects and some specific scientific research designs.

INTRODUCTION

What you are comes to you. — Ralph Waldo Emerson

The contemporary education process, in the formal or informal context, is influenced by numerous factors that have strong effect on the quality of teaching and learning, and consequently on learning outcomes (Vizek-Vidović, Vlahović-Štetić, Rijavec & Miljković, 2003). With the aim of creating high quality teaching and learning, it is very important to clearly determine which factors those are and what kind of effect they have on the education process. The main focus of many studies has been, and still

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is, the teachers' competences, which is understandable. However, despite the teachers' highest competences, few teachers succeed in creating the most quality teaching and learning, and some of them do not (Tatalović Vorkapić, 2012; Tatalović Vorkapić, Vujičić & Čepić, 2014). Therefore, certain non-cognitive and implicit factors have a specific effect on the education process. In addition to that, there is very little debate on the personality as one of the mentioned factors in contemporary educational sciences from the psychological perspective. Even though educational psychology has emphasized the significance of the personality role in the education process, either the child's or the teacher's personality, there has been very little systematic research on this subject. Especially, since the focus of research interest is on the personality effect on the educational process or learning outcomes.

Therefore, this theoretical review and empirical research focuses on the attempt to systematize recent and relevant research on the role of personality in the field of psychology of learning and teaching taking thereby into account the characteristics of two contexts: the context of learning and teaching in kindergartens and the context of learning and teaching in primary schools. So, the main contemporary issues in psychological science regarding the role of personality in educational settings will be discussed. It is inevitable that teachers possess personality traits that are specific to the educational work with children of (pre)school age. This is in accordance with the personality-job fit theory (Holland, 1985). Besides, a large number of current studies have demonstrated their relevance for an efficient process and outcomes of teaching and learning (Tatalović Vorkapić, 2012; Tatalović Vorkapić, Vujičić & Čepić, 2014; Čepić, Tatalović Vorkapić, Lončarić, Anđić & Skočić Mihić, 2015). Nevertheless, teachers' personality traits are still very deeply stored within the framework of the process of implicit learning in practice, which is not good (Jančec, Tatalović Vorkapić & Lepičnik Vodopivec, 2015). In addition to the neglect of the influence of personality in practice, the similar situation could be recognized in the selection for admission to the relevant study programme and during the study. To be precise, there is no any kind of personality assessment in that selection as an indicator for study admission at Croatian faculties. The aim of this chapter is to present contemporary research from a broad definition of identity, through the implicit definition of personality to the known theoretical models of personality in psychological science that prove the importance of specificities in the educators' personality in the context of learning and teaching.

A similar situation of a lack of systematic scientific studies is also evident in the field of research of the personality of (pre)school aged children and its role in the education process and learning outcomes. With the goal of an efficient and healthy development of a child, a significant number of international studies have stressed the need for quite different reactions of different preschool teachers to behavioural patterns of the children's temperament (Arcus, 2001; Kochanska, 1997, 2007; Tatalović Vorkapić & Lučev, 2014; Zentner & Bates, 2008; Zupančić, 2008). Similarly, adequate teachers' reactions to children's behaviour in the process of teaching and learning are very significant, since they often have a direct impact on the atmosphere and climate, motivation and the learning outcome itself. Although there are longitudinal developmental studies of personality and temperament, there is a lack of a direct analysis of the moderator effects on children's personality in the process of teaching and learning. The relevance of very few studies of interaction between different temperaments of educators, children, and parents should be added. This chapter also addresses some relevant methodological issues in this research area, related to the variable context and the variable of individuals who evaluate the children's temperament, evaluator's subjectivity and bias in evaluations, and the type of evaluation (self-evaluation and evaluation by others).

Apart from giving relevant and contemporary overview of the theory and research about personality in education and its relevance for quality teaching and learning, some empirical results are presented

here as well. In a sample of Croatian students at the Faculty of Teacher Education, University of Rijeka – future preschool teachers, their personality traits and personality traits of their best and worst teacher are analysed. It would be interested to analyse some correlations between self-evaluations of the students' personality and the students' evaluations of their teachers' personality. The theoretical framework for evaluating the personality is the Big Five model. In addition, all five dimensions are analysed and discussed.

THEORETICAL BACKGROUND

If we start from the hypothesis that certain personality gives a *"special colour"* to education, the question arises in what ways this hypothesis can be argued. First, it is an indisputable fact that personality traits have a significant moderating effect on learning outcomes, and the same can be observed (more or less successfully) within implicit cognition (Jančec, Tatalović Vorkapić & Lepičnik Vodopivec, 2015). On the other hand, it is also an unquestionable fact that there is an unenviably small number of systematic studies in this area. The situation is quite similar, although the psychology of education has dealt with the characteristics of children in the process of teaching and learning, e.g. with various features and modes of the extravert's and introvert's ways of learning, with the characteristics of children in the process of teaching and learning, and with their relationship with learning outcomes. In the same way, a child's moderating effect on learning outcomes is unknown, depending on the method of teaching and learning. In addition, the area of construction and development of scholarly self-esteem (academic self-esteem) compared to that of children and their learning outcomes have not been examined. Here the question arises, what about the situations of informal learning in relation to formal learning? When, why and how is the personality more in line with the process of teaching and learning - in formal or informal situations?

Can the teachers "exploit" the benefits of informal learning and apply them to situations of formal learning with the aim of harmonizing the personality and the learning process, which would result, in some children, in better and higher quality learning outcomes? All this combined has a significant effect on the climate in a kindergarten group or classroom. In addition, it is important to mention the compatibility of personality traits and the choice of the future profession when enrolling the study programmes for preschool teachers/teachers. The practice is different on this account - some Faculties of Teacher Education test the students' personality during the enrolment in the studies and the testing is an integral part of the enrollment selection process, while this is not the case at some other Faculties, such is the case in Croatia. Furthermore, the question arises (it will be attempted to provide a response to this within the empirical part of this chapter) if the compatibility of personality traits of preschool teachers and children is even important in the process of learning and teaching, and what effect it has on learning outcomes? Finally, questions related to the research methodology of personality in education are extremely important, particularly those related to the context variable and the evaluators of the children' temperament, subjectivity and bias in evaluations, and those related to the type of evaluation (self-evaluation and evaluation by others).

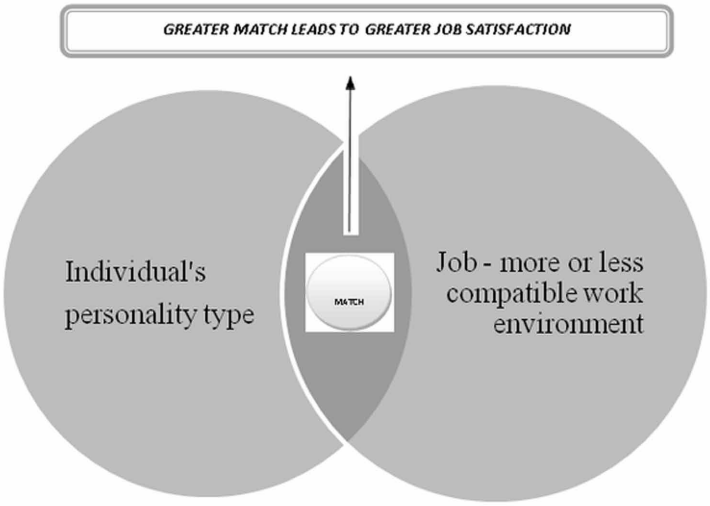
Before going any further, it is necessary to emphasize some crucial theoretical models followed by recent empirical findings. Therefore, the first part will be dedicated to the brief description of the personality-job or personality-environment fit theory (Holland, 1985), considering its relevancy for this chapter. Furthermore, the empirical model of preschool teacher identity will be described. In addition, research findings on personality among preschool teachers in Croatia and the students of Early and

Preschool Care and Education are presented with some future guidelines. Finally, some research on preschool children's personality is described within the context of early and preschool learning and teaching.

Personality-Job Fit Theory

This theoretical model, i.e. the personality-environment fit theory (Holland, 1985), is relevant for the subject about personality in education since the main question about personality in education has its background in the questions about personality fitness to educational setting. Within this theory, the author emphasizes that the congruence between personality of an individual and environmental characteristics of his job is the vital step to a person's success (O'Reilly, Chatman & Caldwell, 1991). Therefore, Holland (1985) states that individuals that are fit to perform their job are more satisfied at their work, have more enjoyment and greater success, more positive interactions with colleagues, and are less vulnerable to experience job stress or burnout (Edwards, Caplan & Harrison, 1998; Nikolaou, 2003). In addition, Nikolaou's (2003) analysis of the relationship of personality traits according to the Five-Factor model shows that agreeableness and openness to experience are the two characteristics that are significantly correlated with positive business success and pleasure in those professions where there are important and dominant interpersonal interactions. Generally speaking, in reference to the personality-job fit model, the greater the overlap in the similarities between the personality of an individual and his work environment the greater the business success and satisfaction, as shown schematically in Figure 1. In addition, Holand (1985) determined that there are six major personalities regarding job characteristics and he divided these personalities into six personality types: realistic, investigative, artistic, social, enterprising and conventional.

Figure 1. Relationship between personality type and work environment regarding job satisfaction according to Holland's personality-job fit theory (1985)



Big Five and Eysenck's Theoretical Models of Personality and Education: Psychological Perspective

Big Five Model

When it comes to the theoretical Big Five model, individual differences of human feelings and experiences are structured in five basic tendencies: extraversion, emotional stability, conscientiousness, benefits and intellect. The Five-factor model of personality, starting from the revision of Cattell's 16PF questionnaire and not the lexical approach that is fundamental for the Big Five model, determines the initial three factors that make up the basic structure of personality: neuroticism, extraversion and openness to experience; later conscientiousness and agreeableness were added. In other words, these two models overlap significantly in the determined factors, i.e. in four factors, while most disagreement exists with factors *intellect* and *openness to experience*, or as Tupes and Christall (1961) called it *culture*. Today, not without reason, the Big-Five model is considered as the greatest contribution to personality psychology, in areas of all social sciences.

This is true not only in the analysis of the models, but also in situations of empirical verification, which due to the quality of elaborate measuring instruments, regardless of the fact that some individual researchers considered it as tautology, is extremely fast, simple, objective and reliable. Fundamental components of personality, the Five-factor model and theory, form five basic tendencies, characteristic adaptation and self-image, which in part "grow" from adaptation. Apart from them, McCrae and Costa (2008) point out the peripheral components related to the biological background or genetic factors, objective biographies and external influences. All these parts are characterized by very dynamic processes, which rule among them, but also within them.

Linking the process of teaching and learning to the Five-factor model of personality, specifically in situations of conditioned fear reactions, Pineles and colleagues (2009) determined that learning through conditioning is a lot more complex than scientific research managed to show it. In other words, they suggest that the answer does not lie in questioning learning outcomes of conditioned learning, i.e. conditioned fear reaction, by analysis of the five dimensions of personality, given that certain facets within a single personality trait may have completely different effects in these learning situations. By analysing electrodermal responses, Pineles et al. (2009) found that individuals who exhibit maintenance of the fear reactions also show high facet levels of warmth, activity and positive emotions within the dimension of extraversion. Within the dimensions of neuroticism, individuals with high levels of self-confidence show greater weakening of the reactions of fear during conditioning. A stronger differential conditioning of fear is found in individuals with a greater openness to feelings as part of the openness to experience. Within the agreeableness dimension, individuals who show an increased maintenance of the reaction of fear at the same time show low scores on the facets of aggression and anger, as well as those who show high scores on the facets of empathy and concern for others. Finally, people with a high need for compliance with their commitments and order show significantly greater weakening of the reaction of fear during learning, within the conscientiousness dimension.

Eysenck's Dimensional Personality Typology

Although today, the application and empirical verification of the Five-factor personality model (Costa and McCrae, 1989, 1992, 1995) is undoubtedly dominant in the context of psychology, and the highest

number of research and educational settings uses precisely this theoretical model to analyse personality traits, it is worth mentioning some other models which are used to a lesser extent or could be used in similar studies in the future. Before that, it is important to mention the Eysenck's dimensional personality typology (1967), given that it is one of the few theoretical models in which differences in the learning process of introverts and extroverts were researched. Extraverts learn best through conversation and discussions with others. In fact, they love to be in the company of others, and their learning is most effective if they attain common information processing, i.e. if they learn in a group. At home, they create their own learning space. They do not like to work just on one thing for a long time, particularly if they are working alone on it; they prefer variety and a high level of activation, whereby they demonstrate forcefulness and enthusiasm. When acquiring new information and/or need to make a decision, they tend to frequently ask questions and think aloud. Thereby they often have less time between questions and answers, respond before thinking, and are characterized by understanding the world around them through their own activities and discussions. So when they get the option of discussing new information which they have gained and to talk with others, that is when they show the best learning outcomes. Given these characteristics and needs of extraverts during learning, they should be provided with such a place in the class/classroom where distractions have been minimized, i.e. they should sit away from doors and windows. In addition, the previously mentioned possibilities for interactive learning, learning in pairs, on a team, through discussion and debate in a noisy atmosphere, represent circumstances, which are characterized by high levels of activation and are optimal for extraverts and their learning (Myers, McCauley, Quenk, & Hammer, 1998).

On the other hand, for introverts, calmer and quieter surroundings are ideal places for learning. In fact, introverts prefer to observe things before trying anything with them or when making a decision in relation to them. A high level of activation, noise and similar conditions are actually overtly stimulating and interfering for introverts. Therefore, they prefer learning in small groups, connecting only with one individual or a small number of people. They like quiet places and enjoy working a long time on one thing. Since interaction with others can be very exhausting for them, they usually wait for others to make the first move. They learn more effectively when they have plenty of time to reflect on the information they are learning about, once they have managed to understand and process the information on their own. They like to think before they speak or act so they can feel very uncomfortable when asked to respond to some external request. They form their ideas very carefully before they articulate them. Also, it often occurs that they require trust and closeness with others before they share their ideas. They have the tendency to look for opportunities to read, listen, watch and quietly observe, and they don't like interruptions. Also, they like to gather as much information as possible about what they are learning even prior the learning situations, which requires time. They are oriented toward independent learning and mentoring, i.e. learning one-on-one (Myers, McCauley, Quenk, & Hammer, 1998). Also, introverts are conditioned faster; punishment has a greater effect on them, and they have a better delayed memory. That is, introverts learn conditioned reactions to fear in conditions of low or medium excitation more easily and faster than extraverts do. They are prone to interference of the memory process, increase of the task difficulty has a more negative effect on them, and they have a slower pace of forgetting (Eysenck, 1983). This is supported by the study of Nichols and Newman (1986), which specifies that, unlike introverts, extraverts react faster in situations in which they expect a reward.

Overview of Research on Personality of Students and Preschool Teachers in Early, Preschool and Primary School Education

A more than significant mediating role of personality in the educational setting can be identified in the following definition of professional competences of teachers, "an ensemble of cognitive, affective, motivational and managerial capacities which interact with the educator's personality characteristics giving him/her the qualities necessary to performing a didactic work which should ensure the projected objectives to be carried out by the most part of the students, and the obtained performances to be located near the maximum level of everybody's intellectual potential" (Jinga, 1998, p. 78). Nevertheless, a significantly small number of studies in this area send a different message. Both with the research which has mostly been carried out in Croatia and with this chapter, it is aimed to show the importance of this mediating role, and the very results of empirical research provide clear guidelines for a number of different future research in the area of personality in education. Brunello and Schlotter (2011) point out how, in addition to the existing teacher competences, the non-cognitive factors are crucial, which can clearly be associated with the personality variable, however, we understood it methodologically. Since correlation research is more easily enforceable, which also happens to use the most practical and widely used Big Five model of personality (Goldberg, 1990), this path was also taken in research commenced in Croatia.

Empirical Findings on Preschool Teacher Identity

Taking into account all relevant factors that are important in the context of the presented models of identity, and have as such proved extremely important and empirically valid especially in relation to different working environments and professions (Tatalović Vorkapić, 2014), in the chapter that has analysed Preschool teacher identity (Tatalović Vorkapić, Vujičić & Čepić, 2014) teachers are described from three different aspects:

1. The changing role of teachers in the context of contemporary changes in the study programme of the Faculty of Teacher Education in Rijeka;
2. A significant role of personality traits and temperament of teachers in the context of the contemporary identity model; and
3. The teachers' biographies through interviews.

Empirical research carried out in three successive generations of students from Rijeka (N=101) who enrolled in the undergraduate study programme of Early and Preschool Care and Education showed that they very clearly recognize the future professional role through the selected six categories or aspects: professional knowledge, preschool teachers' personality, professional development, working environment, activity types in kindergarten and the relationship with children. Within the analysis of preschool teachers' identity, the second empirical research was conducted with the aim of determining four temperament types that correspond to the four classical temperament types. So, the participants (85 preschool teachers) were divided in four groups based on their extraversion and neuroticism results: Sanguine, Melancholic, Phlegmatic and Choleric. It was determined that 29.41% of preschool teachers were in the group of the phlegmatic type, 21.18% of them were melancholic, 27.06% of them were sanguine and 22.35% of them were in the group of the choleric type. These findings were expected since a higher level of emotional stability is logically to be found within the personality profile of individuals who work with preschool

children (Tatalović Vorkapić, 2012). Finally, the third empirical qualitative research on the sample of five preschool teachers demonstrated that the personal educational philosophy of preschool teachers is very much dominant in their professional work and dominantly shapes their work motivation and professional identity.

Preschool and Primary School Teachers' Personality in Educational Context

In an attempt to understand the teachers' personality and in fact, almost for the first time, to analyse it through a methodological framework of Eysenck's theory of personality and the Big Five personality model, a survey was conducted on a sample of 92 preschool teachers, average age 30 years in the range of 21-49 years (Tatalović Vorkapić, 2012). This simple correlation draft found significantly higher levels of extraversion, agreeableness, consciousness, openness to experience and social conformity than in the normative sample. The level of psychoticism was similar to the one from the normative sample. Regarding the level of neuroticism (Eysenck's and Big5), a significantly lower level was determined in this sample of preschool teachers than in the normative sample. These results have been also confirmed in the following studies (Tatalović Vorkapić & Lončarić, 2013; Tatalović Vorkapić & Jelić, 2016; Tatalović Vorkapić, Šekulja & Čepić, 2016; Lisjak, 2015; Peloza, 2015). The same results were confirmed on the sample of future preschool teachers, namely two successive generations of students of the first year of undergraduate study of Early and Preschool Care and Education at the Faculty of Teacher Education of the University of Rijeka (Tatalović Vorkapić & Puljić, 2013).

Furthermore, Martić (2013) examined the relationship between empathy and personality traits of preschool teachers, and Mlinarić (2014) focused on the relationship between empathy, hope, optimism and satisfaction with life among preschool teachers. The conducted research examined the relationship between empathy and personality of preschool teachers (Martić, 2013). Research results showed a high level of all dimensions of empathy (perspective taking, fantasy, empathic concern and personal distress) and personality traits of extraversion, agreeableness, conscientiousness and openness to experience. Partially confirmed was the significant relationship between certain dimensions of empathy and personality traits, and it was found that with the increase in age and seniority, the preschool teachers' personal distress also increases, and the levels of extraversion are reduced. The increase of personal distress with age and work experience can be explained by the specifics of working conditions and the increasing sensitization of preschool teachers in some stressful situations in the kindergarten. In related study about empathy in future preschool teachers, significant decline of fantasy was found what presents important implications for study program modifications (Tatalović Vorkapić & Ružić, 2013). The basic conclusion of these studies is that it is necessary to conduct such professional development of preschool teachers, which will be aimed at reducing the level of personal distress and thus the potential level of stress in preschool teachers. In addition, in the study of Gović (2012) it was found significant positive correlation between preschool teachers' flow and four personality traits: extraversion, agreeableness, conscientiousness and openness to experience. On the other side, flow was negatively correlated with their neuroticism level. So, the preschool teacher is a person who is of crucial importance for a quality early education, and this research indicated a significant need for more research in the area of their personality and experience of joy at work, in order to improve the work of the very preschool education profession.

Apart from learning the content prescribed by the school curriculum (programme or other public documents), pupils also learn *"something else"* at school. The production and transmission of knowledge in the school system occurs through curriculum content (*overt, official, explicit, written curriculum*) and

curriculum processes, the hidden curriculum (*unwritten, hidden curriculum*). Bašić (2000) and Pastuović (1999) point out that the notion of a hidden curriculum is covered with that part of the school (teaching) reality, which is not included in the official programme or other public documents. It is important because it influences the outcomes of education and appears as a set of affective outputs of education, i.e. as learned values, norms, attitudes and social skills necessary for a successful social integration. With regard to this, in the work of Jančec and colleagues (2014) some of the important factors of the covert curriculum are analysed that include values, attitudes, norms, rules and customs that are taught in kindergartens and schools, but have the characteristic of an unplanned and formally unorganized form. All this marks the process of implicit cognition and learning, and some of the most important factors are: personality traits, empathy and space (materials). In this chapter we set up the framework for empirical research of these three factors in two educational contexts: kindergartens and schools in Croatia and Slovenia.

Finally, in the next two studies, the evaluation of the self-perception of preschool teachers about what the characteristics of good preschool teachers are in relation to their implicit definitions (Čepić, Tatalović Vorkapić & Kalin, 2014) were analysed. Based on all the above characteristics that make a good teacher, those three were singled out that had the highest frequency in all respondents. Since both Croatian (N=73) and Slovenian (N=134) preschool teachers participated in the research, their results are presented separately. Croatian teachers highlighted the teacher's knowledge as the most important skill, then his creativity and then fairness, while the Slovenian preschool teachers pointed out consistency, then knowledge and empathy as the most important characteristics. In the following research, the results of Croatian teachers (N=73) were compared with the results of Croatian preschool teachers (N=67) using the same set of questions (Tatalović Vorkapić, Čepić & Mulc, 2014). It was found that, unlike teachers, preschool teachers named creativity, then empathy and finally flexibility as the most important characteristics. Findings of both researches will be used to set guidelines for the creation of lifelong learning programmes.

OVERVIEW OF RESEARCH ON CHILDREN'S PERSONALITY IN EARLY, PRESCHOOL AND PRIMARY SCHOOL EDUCATION

Bearing in mind personality traits, temperament or other individual characteristics of children in the process of learning and teaching, the literature in the field of educational psychology (Vizek-Vidović et al., 2003) focuses only on extraversion-introversion, anxiety and stress coping skills that are mostly related with the evaluation at school and the expectations of parents towards the child's school achievements. However, there is a lack of research that analyses the moderating effects of the child's personality in the process of learning and teaching as it could be seen through before the previously mentioned learning styles. When it comes to the Croatian cultural context, there is an especial lack of such research. Zentner and Bates (2008) point out how important it is to know the personality of the child because it will determine all the child's reactions to the environment, including the educational one. The reactions of significant others in the environment will also depend on the child's reactions. Thus, the reactions of adults in different manifest forms to the child's temperament are crucial for the proper development of children and their learning outcomes in learning and teaching (Zentner & Bates, 2008). In addition, Kochanska and colleagues (1997, 2007) point out and make a very clear distinction between the application of specific educational methods and direction of the children's development. They state that the tender (as opposed

to rough) educational methods are extremely effective as a parenting style with very shy children - shy children have psychologically the healthiest development with mothers who are warm and entertaining. Arcus (2001) points out that a challenging and provocative (unlike supportive) parenting style is more effective in children who often show very negative emotional reactions. Bates et al. (1998) suggest that mothers who are highly controlling in situations of children's unruly behaviour have the most success in preventing the development of externalized problems in children. Thus, it is possible to conclude that children's temperament has a significant moderating effect in the selection of the adults' reactions, so it is extremely important to know to objectively and properly measure the temperament of children so as to determine which methods are most effective in working with children.

In attempt to answer the question of evaluating the children's temperament, two validation studies of child temperament were conducted: analysis of the factor validity of the Croatian version of Pavlov's Temperament Survey for Children (PTS-C) based on Strelau's temperament model (Tatalović Vorkapić & Lučev, 2014), and the factor validity EASI Temperament Questionnaire for preschool children (Tatalović Vorkapić & Loncaric, 2015). In the first validity study, N=245 preschool teachers (all female) provided estimates on the PTS-C for a total of N=4,256 children (2,121 girls and 2,135 boys) with mean age M=4:59 (SD=1.289). A factor analysis on principal components with Varimax rotation was performed on the gathered data. The findings resulted with a three-factor solution as the most interpretable one, which explained 36.84% of the total variance. Reliability levels of the three subscales: Strength of excitation, Strength of inhibition and Mobility are very satisfying. Descriptive results demonstrated a similar pattern of all three dimension levels as previously found in adults. Based on the study results, it could be concluded that PTS-C could be a very useful tool for measuring the Pavlovian temperament characteristics of children in the context of an early and preschool educational setting. On the other side, having in mind some study limitations, in the future validity study of the instrument itself but used by some other evaluators, such as parents, should be conducted.

Secondly, with the aim of adapting and exploring the validity of the EASI temperament Survey, preschool teachers (N=192), all female, rated a total of N=3275 children (1612 girls and 1639 boys) with mean age M 4.368 (SD=1.482) within the age range between 7 months and 7.7 years. A factor analysis was performed on the principal components with Oblimin rotation, as well as a reliability analysis. Again, similarly as in the previous validation study, a three-factor solution was determined. Three temperament dimensions were found: Emotionality, Activity and Sociability, which explained 57.427% of the variance. Since a sample of preschool children was used it was assumed that Impulsivity component would not be determined, what was confirmed. Subscales inter-correlations and gender and age differences confirmed results from prior research (Tatalović Vorkapić & Lončarić, 2015).

Ružić (2015) conducted a study in order to test whether there are differences in the evaluation of temperament of preschool children between the parent's and the preschool teachers' evaluation. For the purpose of this research, the previously validated questionnaire EAS was used to evaluate a child's temperament. 313 parents and 15 preschool teachers evaluated the temperament of 313 preschool children. Significant differences in the evaluations of activities and sociability were determined, i.e. the parents evaluated these two dimensions as significantly higher than the preschool teachers, while differences in the evaluation of emotions were not. Also, preschool teachers estimated with an increase in a child's age the level of activity decreases and the level of sociability increases in girls as opposed to boys, while the level of activity is higher in boys. Significant correlations of age and gender with the temperament dimension have not been established in the parents' evaluations.

In addition, it is extremely important to mention a very interesting article by Duckworth and Allred (*in press*) that systematically shows what and how the temperament in the classroom has been researched in recent years. It stresses the importance of temperament in the process of teaching and learning, and finally points out that effortful control (attention control, inhibitory control and activation control) is precisely the facet of temperament that is most directly related to learning outcomes and school achievement, therefore future research should be directed toward this facet. Also, Wagner and Ruch (2015) determined that school success and positive classroom behaviour are positively related to several character strengths such as: perseverance, love of learning, hope, gratitude, self-regulation, prudence, social intelligence and perspective. In addition, Poropat (2009) presented an extremely important meta-analysis of the Five-factor personality dimensions and grades during elementary, secondary and higher education. This analysis confirmed the relevance and importance of the research of personality and temperament in the youngest children. The results of the cumulative sample of over 70,000 showed that all five-personality dimensions are significantly positively associated with grades in elementary education while this is not the case in later education. Specifically, the strongest positive correlations are present between grades and conscientiousness, openness and benefits – the three dimensions that are more influenced by the environment. Therefore, during further education the level of these correlations significantly decreases with the exception of conscientiousness and grades. Their correlation increases with the level of the child's education. These findings are extremely significant with regard that they fully argument the importance of research on the role of temperament/personality of children in the educational context. So, in the end they conclude that it is crucial to conduct interdisciplinary research which link psychologists and pre-school teachers in translational types of research in which the theoretically predictable mechanisms of change should be examined in detail (e.g. homework, regularly arriving to classes, active participation in learning, etc.) and moderators, such as the basic temperament, the quality of schools and demographic factors. Thereby the most common correlation research should be replaced with controlled research in the field and with laboratory experiments.

And finally, here is a review of a research which is one of the few in the world, and refers to the examination of the possible link between the evaluation of the children's temperament and the preschool teachers' personality (Žagar, 2015). Therefore, the aim of this research was to examine and analyse the preschool teachers' personality traits and children's temperament. The research was conducted on a sample of 10 teachers and 128 children. Two questionnaires were used to evaluate the preschool teacher's personality according to the Big Five model, and the other to evaluate the children's temperament – the EAS questionnaire. The results determined a significantly negative correlation between: the preschool teachers' openness to experience and the children's emotionality, and between the preschool teacher's neuroticism and the children's activity and sociability. In other words, preschool teachers with a higher level of openness to experience evaluated the children as significantly less emotional. On the other hand, teachers with a high neuroticism evaluated the children significantly as less active and sociable. In addition, preschool teachers with a high extraversion evaluated the children as significantly more emotional, as well as the ease of work is much higher with children who are low in emotionality and less active, but highly sociable. Finally, research found that children prefer those preschool teachers with a higher level of conscientiousness and agreeableness. This research belongs to the category rare but extremely important ones as it clearly points to the fact that the evaluation of the children's temperament directly depends on the evaluation of their own personalities, and that the rose-coloured lenses through which the preschool teachers observe children are largely determined by the teacher's own personality.

Therefore, an important question arises: how to educate a preschool teacher in objective evaluation of children with regard to the established existence of distorted perceptions of children's temperament in relation to their own personality? Can we educate preschool teachers to evaluate the children temperament, and thereby take a step back from their own personalities? On the other hand, if we cannot, how do we achieve objective evaluation of a child's temperament if preschool teachers are the evaluators? In line with what has been mentioned and shown so far, the following question imposes itself: if future preschool teachers, i.e. students of the undergraduate university programme of Early and Preschool Care and Education evaluate their personality within the Big Five model, and evaluate their best and worst teachers that they remember, what will these evaluations be like and should they be linked to each other, and how? It is important to note that for the evaluation of the best and worst teachers, the student himself starts the evaluation based on his own implicit definition of the best and worst teacher. The obtained empirical findings can be seen below.

CASE DESCRIPTION

The process of learning and teaching in kindergartens and schools depends on a variety of factors. Teachers and children independently create and direct the pace and direction of mutual learning. In this process, they are greatly assisted by mutual listening, respect, flexibility, openness, patience and other characteristics. What determines the behaviour of teachers and children/students, and results in their behaviour within the group is, among other important factors, their personality that is specific both to each teachers and each individual child. Personality indicates a man's behavioural characteristics, his response, motivation and action. Its presence can be explained by the fact that there are no two identical men in this world who would in the same situation react in the same way. Therefore, it is characterized by a specific kind of human activity, interpretation, and experience (Fulgosi, 1994). There are many definitions and theories that are trying to decipher its influence on human life and functioning, but in this empirical research, as it is the case in most previous research, the starting point was the Big Five personality model. Studies, such as one from Chamorro-Premuzic and Furnham (2003), in which the personality traits and academic success relationship has been analysed, demonstrated that students' personality has the major effect on academic success.

According to the Five-factor model of personality, five big personality dimensions are differentiated within which people differ. Extraversion is defined under the energetic approach to life and dynamism, and it includes assertiveness, sociability and others. The second dimension is benefit that indicates assertive behaviour of the individual and can be recognized by modesty, confidentiality, and similar traits. Conscientiousness regulates behaviour and implies organization, prudence and responsibility. Emotional stability as the fourth dimension is known as the opposite of neuroticism and is reflected in the calm and positive response to environmental stresses and problems. The last dimension is openness to experience based on Costa and McCrae's five-factor model, and is characterized by creativity and imaginativeness.

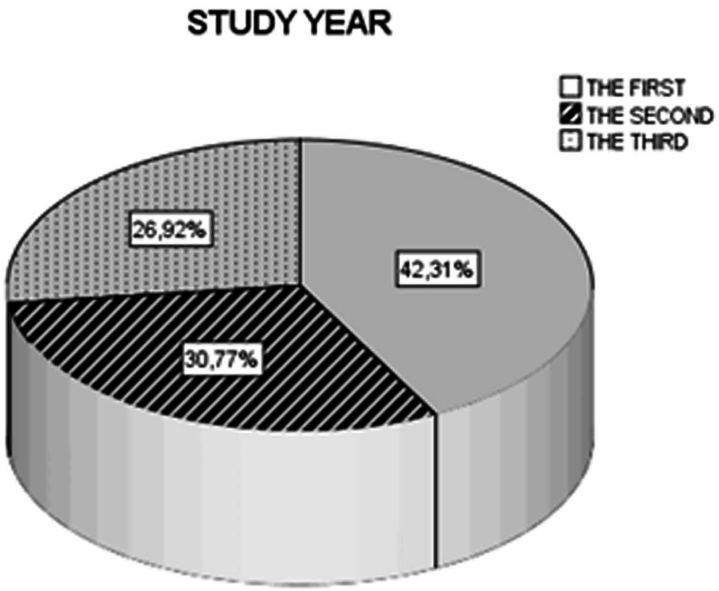
Today, there are many psychometrically reliable and valid scales for measurement Big5-dimensions of human personality, such as: Neo personality Inventory and its revised version (NEO-PI-R: Costa & McCrae, 1992); Big-Five Inventory (BFI; Benet-Martinez & John, 1998); Big-Five Questionnaire (BFQ; Caprara, Barbaranelli & Borgogni, 1993) and Goldberg's (1992) Trait Descriptive Adjectives (TDA). Even though they all are aimed to measure five personality dimensions, they vary in the item content and number (from 44-100). Even though long questionnaires have high quality psychometric

properties, they are not always practical within their application. Regarding to that reason, Gosling and his associates (2003) developed 10- and 5-item personality questionnaire which measure previously described five personality dimensions. In their validation report, even of the lower psychometric quality, authors demonstrated satisfying levels of validity results from both short personality scales. So, in this study, it was very practical due to limited time of running the research to apply one of mentioned two short Big5-scales. Therefore, Ten Item Personality Questionnaire (TIPI; Gosling, Rentfrow & Swann Jr., 2003), i.e. its validated and adapted version on Croatian language (Tatalović Vorkapić, 2016) was used. In addition, since it was very important to have the same measurement scales for measuring three personalities: students' own personality, the personality of the best teacher and the personality of the worst teacher, all at the same time, the application of long personality scale would not be recommendable at all. So, the use of short, ten-item scale was the proper solution, with the exception of the greater probability of getting the lower psychometric properties of that same used scale.

Subjects

With the aim of analysing the relationship between the students' personality traits and personality traits of their best and worst teachers, a sample of N=78 undergraduate students of the university study programme of Early and Preschool Care and Education from the Faculty of Teacher Education, University of Rijeka, Croatia, was examined. Students were all female, from all three years of study, of the average age M=20.46 years (SD=2.14), within the age range from 18 to 32 years. Their grade average was M=4.07 (SD=0.50) ranged from 3 to 5. The percentages of students regarding their study year may be observed in Figure 2.

Figure 2. Percentages of students according to their study year: first, second and third



Measure

The personality questionnaire of ten particles called TIPI, Ten-Item Personality Inventory (Gosling, Rentfrow & Swann Jr., 2003) was used to measure the dimensions of the Five-factor model. Several measuring instruments have been developed for dimensional measuring of the Five-factor model of personality. The most extensive one is that by Costa and McCrae (1992), NEO-PI-R, which contains a total of 240 items for the measurement of 6 facets within 5 factors, and which also has a shortened version of 60 items. As it is the case with the Goldberg instrument which contains 100 adjectives to describe personality, it also takes about 15 minutes to fill in the shortened version of the NEO questionnaire, which is often too long for many researchers' intentions. Apart from these, the BFI questionnaire (Big Five Inventory, Benet- Martinez & John, 1998) is often used, which consists of 44 items, designed to efficiently and quickly measure the dimensions of the Five-factor model when there is no need for differentiated measurement of individual facets (Kardum, Gračanin & Hudek-Knežević, 2008), and it takes 10 minutes to fill it in. However, because of frequent time limitations in data collection, researchers have been forced to develop an even shorter measuring instrument to measure the Big Five personality dimensions. That is why TIPI (Gosling, Rentfrow & Swann Jr., 2003) was developed – a measuring instrument, which contains 10 measuring items.

Short measuring instruments represent a reasonable compromise between precision and efficiency, so TIPI was designed as a short and efficient measuring instrument that retains validity. In constructing TIPI, separate descriptors were used from the existing instruments to measure the "Big 5", relying thereby mostly on Goldberg's (1992) inventory of bipolar markers, adjectives from BFI, and John and Srivastava's (1999) adjectival checklist of "big" markers. Each TIPI particle consists of two descriptors, separated by commas, that represent each pole of the 5 large dimensions, and they respond to the common question: *"I see myself as a person who is..."* The respondents evaluated each of the 10 particles on a Likert scale of 7 degrees by entering the appropriate numeric value depending on to what extent they agree or disagree with the above statement (*1 = I strongly disagree, 2 = I moderately disagree; 3 = I slightly disagree; 4 = maybe, I both agree and disagree; 5 = I slightly agree; 6 = I moderately agree; 7 = I strongly agree*). It was necessary to score the items 3, 4, 6, 8 and 10 inversely, and then sum up the results. The validity of the measurement instrument TIPI was confirmed in research by Jonason, Teicher and Schmitt (2011), which confirmed the results of previous numerous studies which use a longer measuring instrument such as the aforementioned NEO-PI-R and the BFI. Using TIPI confirmed a positive correlation between extraversion and self-esteem, and between negative self-esteem and neuroticism, as well as a positive correlation between extraversion and socio-sexuality, and a negative correlation between socio-sexuality and neuroticism. These results make TIPI a reasonably valid measuring instrument.

In the original study by Gosling and colleagues (2003), TIPI was applied to N = 1813 students of the University of Texas at Austin. Thereby the level of reliability of Cronbach alpha of 0.68 was determined for extraversion, 0.40 for benefits, 0.50 for conscientiousness, 0.73 for emotional stability and 0.45 for openness to experience. In this research, the linguistically adapted version of the questionnaire TIPI (Tatalović Vorkapić, 2016) was applied, and it showed a level of reliability of Cronbach alpha for all dimensions together with the students' personality self-evaluation $\alpha = 0.738$, with the evaluation of the best teacher $\alpha = 0.635$ and in the evaluation of the worst teacher $\alpha = 0.643$. Thus, the reliability of the obtained results is very high in the self-evaluation of the students' personality is satisfactory, in the evaluation of the best and worst teachers it is lower, but still within the limits of satisfactory reliability.

Procedure

The research was conducted at the beginning of the summer semester of the academic year 2014/2015, more specifically in March 2015 in all three years of study at the undergraduate university programme of Early and Preschool Care and Education. I asked the visiting students during their classes, which was coordinated with their professors, to participate in research about their personality traits and personality traits of their best and worst teachers. It was emphasized in the instructions that study is voluntary, anonymous and confidential, and that those students who are interested in receiving feedback would receive it in the form of a lecture. In all three years of study, filling out the questionnaire took about 10 minutes, always at the beginning of a lecture.

Results

Results of the descriptive analysis of collected data can be seen and analysed in Table 1. Considering only the results of personality self-evaluation of those students who were tested, it is observable that their evaluation is in accordance with previous research - increased levels of extraversion, emotional stability, conscientiousness, agreeableness and openness to experience (Tatalović Vorkapić, 2012, 2015). In contrast, when evaluations related to the personality of their best teacher are analysed, it is noticeable that these estimates are still positive as well as their own but at higher values. Also, if the evaluation of their worst teachers is observed, it is noticeable that the evaluation of personality traits is very low, and the students evaluated them significantly different from themselves and from their best teachers.

Table 1. Descriptives (Means, Standard Deviations and Results' Ranges) for all five personality dimensions regarding all three rates: self-rate, rate of the best teacher and rate of the worst teacher and t-test for all pairs within each of personality dimension

Big-Five Dimensions	Rate Variable	M	Sd	Range	Pairs	T-Test	P
EXTRAVERSION	1. SELF-RATE	5.04	1.27	2-7	1&2	**-4.57**	**.000**
	2. BEST TEACHER	5.74	1.15	2-7	1&3	**5.52**	**.000**
	3. WORST TEACHER	3.85	1.42	1-7	2&3	**8.25**	**.000**
AGREEABLENESS	1. SELF-RATE	5.65	0.95	3.5-7	1&2	**-4.79**	**.000**
	2. BEST TEACHER	6.22	0.90	3.5-7	1&3	**22.11**	**.000**
	3. WORST TEACHER	2.36	0.92	1-4.5	2&3	**28.78**	**.000**
CONSCIOUSNESS	1. SELF-RATE	5.69	1.26	2-7	1&2	**-7.74**	**.000**
	2. BEST TEACHER	6.65	0.60	4-7	1&3	**8.19**	**.000**
	3. WORST TEACHER	3.60	1.59	1-7	2&3	**14.43**	**.000**
EMOTIONAL STABILITY	1. SELF-RATE	5.29	1.26	1.5-7	1&2	**-7.67**	**.000**
	2. BEST TEACHER	6.39	0.73	3.5-7	1&3	**13.73**	**.000**
	3. WORST TEACHER	2.79	1.20	1-6	2&3	**22.03**	**.000**
OPENNESS TO EXPERIENCE	1. SELF-RATE	5.90	0.83	3-7	1&2	**-3.82**	**.000**
	2. BEST TEACHER	6.25	0.81	4-7	1&3	**15.25**	**.000**
	3. WORST TEACHER	3.07	1.31	1-6	2&3	**16.32**	**.000**

This is confirmed by statistical analyses of difference significance (t-test for dependent samples) that show significant differences in all personality dimensions and in all pairs: between self-evaluation and the evaluation of the best teacher, between self-evaluation and the evaluation of the worst teacher, and between the evaluation of the best and worst teachers.

Correlation analysis (Table 2.) revealed what was expected. Students' self-rated personality was significantly positively correlated with their rates of the best teacher personality, on all five personality dimensions. On the other side, as could be clearly observed in Table 2, there is no significant correlation between students' self-rated personality and their rates of the worst teacher personality. Also, what was expected too, some of their rates of the worst and the best teacher personality showed significant negative correlations. It is interesting that the trait conscientiousness showed the most consistent relationship between these three rates. This is the personality trait that is under environment influence, the most important for the educational system, and that is directly under effect of study program duration – the longer study program is the highest level of conscientiousness will be (Tatalović Vorkapić, Čepić & Šekulja, 2016).

Also, it is interesting to mention findings related to the three statements in respect of which the students expressed their views on the significance of the role of personality in the process of education. The students responded to these statements by making estimates on the Likert Scale using a 1-5 range (1 = *totally disagree*, 2 = *disagree*, 3 = *perhaps*, 4 = *agree*, 5 = *strongly agree*). The first argument: *"The more different my teacher and I are in terms of personality traits, the better success I achieve in learning",* the average response was M = 2.09 (SD = 1.4), students on average responded that they agree with this

*Table 2. Spearmans' correlation coefficients between self-rated personality, best teacher personality and worst teacher personality on five personality dimensions (***E***xtraversion,* ***A****greeableness,* ***C****onscientiousness,* ***E****motional* ***S****tability and* ***O****penness to experience)*

		Best Teacher					**Worst Teacher**				
		E	**A**	**C**	**ES**	**O**	**E**	**A**	**C**	**ES**	**O**
Self-rates	**E**	**.309****	.002	.216	.150	**.382****	.037	.071	.080	-.007	-.124
	A	-.126	**.346****	**.257***	.194	.023	.128	-.005	-.039	-.126	.189
	C	.042	.155	**.529****	**.413****	.038	.144	-.089	-.076	.056	-.006
	ES	.010	**.340****	**.304****	**.270***	.179	.111	.183	.133	.074	-.025
	O	**.247***	.198	**.363****	**.338****	**.516****	-.022	.075	.120	-.071	-.136
Best teacher	**E**	1.000	.034	.159	.044	**.397****	-.163	-.065	-.008	-.061	-.182
	A		1.000	**.427****	**.380****	.181	.067	.147	-.138	-.103	.025
	C			1.000	**.609****	**.289***	.120	-.061	**-.286***	-.103	-.074
	ES				1.000	**.290****	-.075	-.147	**-.313****	-.102	-.092
	O					1.000	**-.243***	.017	.036	.094	**-.298****
Worst teacher	**E**						1.000	**.224***	-.006	-.021	**.236***
	A							1.000	.196	**.293****	**.343****
	C								1.000	**.279***	.145
	ES									1.000	**.224***
	O										1.000

*p<0.01; **p<0.05

statement to a lesser extent. On the other hand, they fully agree (M = 4.03, SD = 1.1) with the statement: *"The more similar my teacher and I are in terms of personality traits, the better success I achieve in learning"*. They showed equal disagreement and agreement with the statement *"The relationship between my traits and the traits of my teacher has no influence on my learning"*, M = 3.01 (SD = 1.14).

These findings as well as the previous ones point to a large extent to the importance of the role of personality in the process of learning and teaching. Just as it is the case with the students' attitudes, their evaluation of the personality traits of the best and worst teachers shows that they associate the quality of teaching with the educators' personality traits. The fact that quality of teaching and learning in this study was operationalized and measured only by the terms the Best and the Worst teacher, by the students' definitions of the best and the worst teacher, must be emphasized, since there is no direct measure of quality teaching and learning. Therefore, by the students' implicit definitions of the Best and the Worst teachers, the worst teachers are evaluated as reserved, low in conscientious, not particularly nice, emotionally unstable and closed to the new experiences. The lowest levels were thereby tied with dimensions of benefits and emotional stability. On the other hand, evaluations of the best teachers were very high, which was set in a series of previous hypotheses of the described research. As the findings of the latter research, the findings of this empirical study, even though on a relatively small sample of students, show the importance of personality tests in the process of learning and teaching. This is especially important in the context of teacher education, since the majority of contemporary study program are not providing the courses about self-development or use selection system before study entry based on personality testing. Therefore, having in mind the significance of personality role in educational context, its place should be reconsidered.

CONCLUSION AND FUTURE RESEARCH GUIDELINES

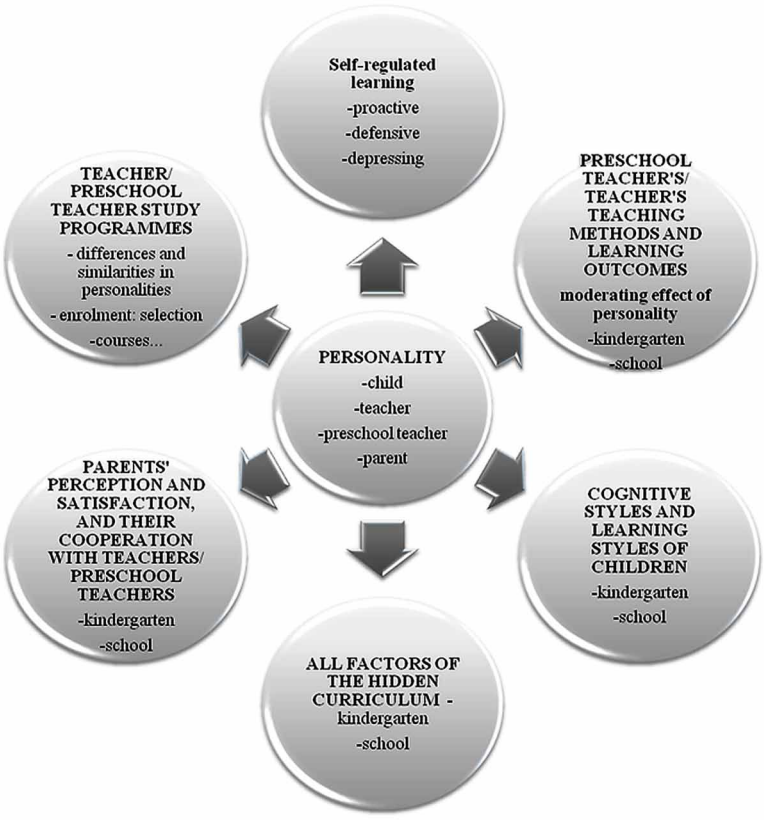
Considering all previously presented research studies with the one that was presented in detail, it is noteworthy to emphasise some other research ideas that are closely connected to the rolls of personality and education but have not yet been analysed in detail. As has been previously stated, it is important to carry out a large number of field and experimental research; given that almost all research are correlation drafts. The fact is that in science, therefore in psychology as well, the full truth is reached based on cause and effect relationships, and not just on the basis of determining the relationship between the variables. In addition, some previous research should be conducted on random and larger samples, as opposed to those that were initially applied. Also, application of different theoretical models in the field of personality but also models of identity can help to more comprehensively understand the role of personality in education. Furthermore, as it has already been pointed out, it is necessary to clearly distinguish between both the terminology and the methodology of learning styles from personality traits, and to clearly identify the role of both in the process of learning and teaching.

In her work Slunjski (2014) questions which qualities (traits, qualities) should we demand from potential preschool teachers today, given the tender age of the children they will be working with and the specifics of the times in which we are living. Furthermore, how can we determine/evaluate these features at the enrolment exam in the best possible way? She emphasized that precisely the best and the most educated people are good enough to work with the youngest children. In fact, we do not raise our children only with what we know but also with what we are (Stoll & Fink, 2000). By spending time with a quality adult, who is well mature at his/her adult level, the child is already at a gain, even if the

adult does not intend to raise the child. This is an adult who is emotionally and socially intelligent (i.e. emotionally and socially competent), which means that he works well primarily with himself and then with other people in their environment. Both a high quality initial education and a high-quality professional development are essential prerequisites of a quality of work of preschool teachers. They can certainly contribute to the development of their professional competences, but they cannot (and should not) change their temperament, specific interests and affinities, degree of its inwardness i.e. extraversion and so on. However, with the investment of time, energy and effort into one's own personal and professional development, the preschool teacher can be helped to gradually transform himself into the *"best version"* of himself. This is congruent with the emphasis of Sindik (2014) who points out that there is probably no general "recipe" for the best profile of a quality preschool teacher, but that there are a number of significant properties that allow virtually anyone to handle a complex situation.

In addition to the above mentioned methodological changes in future research, it is also vital to focus research wise on some of the areas that have been very poorly researched, and which are no less important for the question of the role of personality in education. Some of these research ideas are schematically illustrated in Figure 3. The personality of all those who are actively involved in the process of learning and teaching should be studied in relation to self-regulation of learning (proactive style is related with extraversion), teaching and learning methods (as previously demonstrated in relation with extraverted/ introverted students), cognitive styles and learning styles (relation pathways between them and personal-

Figure 3. Current research challenges in the field of personality role in education



ity traits are very various), parental perception parental satisfaction, and all other factors of the hidden curriculum. As previously mentioned, all this should be studied in an early stage of education, because as it has already been demonstrated, that is when the most significant impact on learning outcomes occurs. In addition to the existing theoretical models of personality, studies have shown that research should focus also on the characteristics called effortful control. Finally, it is important to highlight the fact that the higher education system in Croatia does not include courses in a way which reflect the so called *"work on yourself",* as well as that during the selection procedure for the admission to the relevant teacher study programmes there are no tests related to the candidates' personality traits. Also, within the framework of the offered programmes of lifelong learning and professional development, there are also no courses that would in any way be related to the educators'/teachers' personality traits. So, it is a fact that the research space is extremely large, and it is extremely important for a positive process of learning and teaching, and then for quality learning outcomes as well, to start filling it with new research.

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Chapter 10
Learning to Lead Collaborative Student Groups to Success

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ABSTRACT

This chapter discusses the barriers to achieving the myriad benefits often attributed to collaborative group projects. It begins with an explanation of what collaboration is and the value the method offers to both learners and instructors. It then presents a variety of ways in which these projects can fail to achieve their goals and even have a negative effect on student performance, attitudes towards collaboration and self-efficacy. It also explores some of the ethical concerns that accrue when these problems are not addressed. It then explains how instructors can mitigate these problems today.

INTRODUCTION

The week before final projects are to be submitted and presented, a student asks to speak with the instructor after class. Experienced with long-term collaborative group projects, the instructor can anticipate the topic of the discussion will be the team's dysfunction—even if the specific details are as yet unknown. Perhaps the student will explain that a member of the group seldom attended out-of-class group meetings or rarely completed the tasks assigned. Alternatively, the student might explain that one member dominated the rest of the group and would not hear of any alternative perspectives, or some other group dynamic in which one student exerted disproportional influence on the group's work product. The student might express frustration with the anticipated grading, with the group's results, or with the overall collaborative experience.

The instructor may or may not have reason to distrust the account offered by the student. Perhaps the instructor has observed some corroborating activity, or maybe another team member already expressed contradictory complaints. Maybe the student is part of a very large class and the instructor has only passing familiarity with the particular group. In any event, the instructor could not have been monitoring the group's every activity throughout the semester and would therefore be faced with a number of questions:

- Can instructors know what's really going on in a group?
- How can instructors know if student groups are having problems?

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- Is there any reason for instructors to try to resolve such problems? How can these problems affect the course objectives?
- What should instructors do when a group faces dysfunction?

The rest of this chapter explores these questions and provides some guidance to the reader intending to address those problems which arise. This chapter focuses on collaborative group work involving students beyond high school in a face-to-face environment.

WHAT IS COLLABORATIVE GROUP WORK AND WHY SHOULD I USE IT?

Definitions

Collaborative group work is a situation where individuals work together to achieve one or more shared goals, negotiating with one another to determine a shared path (Bruffee, 1995; Dillenbourg, 1999; Matthews, Cooper, Davidson, & Hawkes, 1995; Panitz, 1999). This is in contrast with cooperative learning, in which group members work together following a proscribed set of processes—learners are essentially assigned individual roles that contribute to the group's product. Simply put, collaboration is the subset of cooperative activity in which participants are expected to contribute as relative equals in terms of both skills and responsibilities (extending to equal partnership in negotiating those responsibilities). Because division of labor is explicit and clear, cooperative learning methods lend themselves more readily to student accountability and individual performance assessment than collaborative learning situations.

Similarly, this chapter uses the term *group*, rather than *team*, because teams are expected to exhibit complementary skills and mutual accountability (Katzenbach & Smith, 2005). Classrooms, on the other hand, often expect entering students to bring a similar set of skills and knowledge (prerequisites) and to exit having developed a similar set of skills. Furthermore, in these formal learning contexts, students are explicitly accountable to the instructor, who determines their grade. Mutual accountability is a desirable goal but in reality, students may or may not feel accountable to the other members of their group.

While collaborative groups may be of any size, Wheelan (2009) found that groups with three to six members were most likely to reach the highest stages of group development and levels of satisfaction. Therefore, this is the recommended range for collaborative group projects.

There exists a paucity of research on group dysfunction (Modell, 2015; Salomon & Globerson, 1987) and therefore, while it focuses on adults, some research on children has been included where it demonstrates concepts that apply to adults as well. These instances are clearly identified. Instructors working with children do assign group projects, but these are often scaffolded using cooperative structures in which individual roles and expected contributions are clearly defined. Adults, on the other hand, are commonly expected to express greater autonomy and therefore are more capable of collaboration as relative equals, co-negotiating roles (Bruffee, 1995).

Furthermore, while most of the material in this chapter reflects a face-to-face environment, this too is due to the general lack of availability of material on collaborative group dysfunction. Collaborative group projects are certainly used in distance learning environments and, as discussed in the chapter, this can interfere with communications and hinder the development of trust – both of which are key ingredients for successful collaboration. Material from distance learning contexts is included where available.

BENEFITS OF COLLABORATION

Collaborative group work is used often because many student benefits have been ascribed to the technique. These benefits naturally include opportunities to develop the skills of working with others—a skill that is increasingly important in professional life (Baldwin, Bedell, & Johnson, 1997; Hackman & Woolley, 2004; Ohland et al., 2012). However, collaborative groups also provide students with a greater opportunity to problem-solve through the use of real-world applications (Goldfinch & Raeside, 1990), and they increase student satisfaction (Oakley, Hanna, Kuzmyn, & Felder, 2007), self-efficacy (Cooper & Robinson, 1998; Haynes, 2012; D. W. Johnson & Johnson, 1998), and academic performance (D. W. Johnson, Johnson, Stanne, & Garibaldi, 1990; Oakley, Felder, Brent, & Elhajj, 2004; Peterson & Miller, 2004).

Peer-to-Peer Benefits to the Student

On a social level, collaboration develops students' appreciation for diversity in their peers. Students engaging in group work see improved attitudes towards and friendships among students from different backgrounds (Rude, 2010; Slavin, 1990). They are also afforded opportunities to practice, and receive feedback about, their ability to cooperate with others, further helping them to grow. Additionally, they work together to see from the perspectives of others, fill gaps in one another's understanding, and vet alternative the approaches proposed by peers (Badke-Schaub, Goldschmidt, & Meijer, 2010; Baldwin et al., 1997; Barron, 2003). All of this serves a social networking function, as these relationships often extend beyond the classroom and graduation (Baldwin et al., 1997).

Group members often don't see eye to eye on every problem they face, but in their seminal work on the role of conflict and controversy in the learning process, Johnson & Johnson (1979) discuss how, far from hindering the group progress, such disagreements actually promote—and possibly are even necessary for—learning (R. T. Johnson & Johnson, 1994). As long as they do not focus on interpersonal issues, these disagreements cause students to feel a level of uncertainty, which leads to an increase in their problem-solving skills by causing them to consider alternative perspectives. A study by Badke-Schaub et al. (2010) corroborated this with the finding that groups that engaged in cognitive confrontations generated more new ideas and more creative solutions than those that tended toward agreement.

Often group members contribute not only diverse perspectives, but varying skill levels, resulting in a situation where one student grasps what another does not. Placement in groups strongly encourages students to peer teach and learn from one another. As a result, students help one another by elaborating, or fully explaining their thoughts (Barron, 2003; Blumenfeld, Marx, Soloway, & Krajcik, 1996; Oakley et al., 2004; Paulus, Kohn, & Dzindolet, 2011; Webb & Palincsar, 1996; Yager, Johnson, & Johnson, 1985), which provides thorough explanations for the recipient while causing the provider to think through his or her understanding. Building on the work of Crouch and Mazur (2001), Smith (2009) found that small group discussions facilitated understanding of course content even when none of the group members entered the conversation knowing the answer. Furthermore, studies have found that heterogeneous groups were more inventive and performed better than their homogenous counterparts with more novel combinations yielding successful innovations (Bercovitz & Feldman, 2011; Hoffman, 1959). This indicates that group work can be used to demonstrate the value of diversity.

Help-seekers also benefit from the timeliness of such assistance rather than relying upon an instructor who is responsible for meeting the needs of the entire class. Webb, Ender, and Lewis (1986) even found

that while students who asked the instructor did complete their task effectively, those who asked peers had a better understanding of the content at the conclusion of the task.

Students who are taught within effective small groups perform better on achievement tests, retain information longer, and exhibit higher levels of motivation (D. W. Johnson et al., 1990; Oakley et al., 2004; Peterson & Miller, 2004). Studies have also shown gains in higher-level reasoning and critical thinking (D. W. Johnson & Johnson, 1998; K. Smith, Johnson, & Johnson, 1981). While some of these studies investigated cooperative groups, the benefits were attributed to group processing, which is not specific to cooperative situations; it is therefore reasonable to believe that similar benefits accrue in collaborative situations.

Task Authenticity Benefits

Group work has long been used in the fields of medicine (Edmunds & Brown, 2010; Warne & McAndrew, 2011) and engineering (Mills & Treagust, 2003; Sahin, 2011), and the U.S. Army's Special Forces soldiers operate in cooperative teams (Brooks & Zazanis, 1997; Carpenter, Wisecarver, Deagle, & Mendini, 2005). In the business world, recent successes and gains in productivity are claimed to be the result of a trend toward group problem-solving instead of a top-down, rigid management style. This has resulted in an increase in group work in business education programs (Baldwin et al., 1997; Blumenfeld et al., 1996; Boud, Cohen, & Sampson, 2001; De Vita, 2001; Gardner & Korth, 1998; McEnery & Blanchard, 1999; Paulus et al., 2011). In light of these trends, group work and group projects in the classroom naturally provide an authentic context in which to hone these skills.

Furthermore, groups add manpower to enable instructors to assign larger projects than an individual working alone might have the possibility of completing (Goldfinch & Raeside, 1990). Projects that might have been dismissed as too large for an individual to tackle become reasonable when assigned to a group of students. As a result, collaborative group projects have the potential to be more challenging and reflective of the sort of work graduates of their classes might be expected to engage in.

Student Satisfaction Benefits

Students engaged in group work tend to feel liked and accepted by their peers according to Webb and Palincsar (1996). The students perceive a greater degree of control over their own success, are willing to take on difficult tasks, and will see those tasks through to completion (Cooper & Robinson, 1998; Haynes, 2012; D. W. Johnson & Johnson, 1998)—which Haynes (2012) characterizes as a silver lining to the phenomena of groupthink. Furthermore, Sharan (1990) points out that, in contrast with traditional, teacher-centered instruction, collaborative learning can offer an active role for all students, as well as some relief from the boredom of a single delivery style.

In a study of group work, it was found that students who worked in groups were more likely to perceive that they had met the learning objectives than those working individually (Oakley et al., 2007). There were also strong indications that instructor support for students and of group process is a key element of successful group work. This means that when the group work ran smoothly and was supported sufficiently by the instructor, students were more confident that they'd met the goals of the instruction.

Benefits to the Instructor

Instructors, too, benefit from collaborative group project assignments. A group project effectively reduces the number of projects that the instructor must evaluate (Hartley & Bostock, 2003; Parsons & Kasabova, 2002; Young & Henquinet, 2000). This benefit is often passed on to the student since the instructor is not as rushed or fatigued with grading, and it is likely this will result in more thorough evaluation and richer feedback. Naturally, this is particularly enticing in light of shrinking budgets and growing student bodies, creating increased pressure to achieve more with fewer resources (Freeman, 1995; Tucker & Reynolds, 2006; Tucker & Rollo, 2005). This can also free instructors to address more complex and challenging issues (Goldfinch & Raeside, 1990; Tucker & Reynolds, 2006; Young & Henquinet, 2000). Finally, removing the instructor as an ever-present source of answers and feedback can also result in increased reflection, exploration of ideas, and critique of and by the students' peers (Boud, Cohen, & Sampson, 1999).

BARRIERS TO COLLABORATIVE SUCCESS

While the benefits of group work are enticing and it may seem easy to implement them, the method is not without its challenges. Simply coordinating the actions of multiple individuals is a significant challenge, which can become especially difficult if groups are not provided sufficient time to perform their work during class time. Additionally, smooth group functioning relies upon high levels of trust and strong communication skills, but students often express concern that they will be taken advantage of by their peers (Modell, 2015; Ohland et al., 2012).

Arguably the most significant barrier to group work is the fact that collaborative skills do not occur naturally to most people (Davis & Miller, 1996; Goldfinch & Raeside, 1990). Because these skills must be learned, Gardner and Korth (1998) suggested the provision of academic courses aimed specifically at helping students learn to work together effectively. Compounding the issue, Benne and Sheats (1948) found that most people think they already know how to work in groups and, as a result, their efforts to train learners for working in collaborative groups amounted to re-training.

Trust is crucial to collaborative group work as team members must count on one another to be forthcoming, honest, and reliable at the risk of their own grade. It is a crucial foundation necessary for one to contribute their own efforts and accept those of their teammates. Such trust is built upon a free flow of information between members and opportunities to demonstrate reliability. In work environments, the radius of collaboration, beyond which little collaborative work traditionally occurred, is estimated at fifty feet (Olson & Olson, 2000; Wallace, 2004). This is attributed to the likelihood of individuals within such a radius interacting both formally and informally with one another, offering opportunities for peers to build rapport and to help one another out in a variety of contexts. This is more difficult in higher education because schedules differ with shared class time often consisting of only a few hours per week, reducing opportunities to establish interdependent, trusting relationships. This is exacerbated in distance learning environments as these interactions are computer-mediated, whereupon layers of body language and tone are filtered out. In such circumstances, trust is still possible, but it requires deliberate effort and is quite fragile (Jarvenpaa & Leidner, 1999).

Communication skills are integral to collaborative group success. It's not enough for students to know how to solve a problem—they must also be able to effectively communicate that solution to others. Mercer, Wegerif, and Wawes (1999) found that children who are taught to use "exploratory talk" made greater gains in tests of reasoning than those without such training. Barron (2003) reported two demonstrative examples of inability to communicate. In the first, a group of three boys competed within their group to convince their peers their solution was the best. One boy, having had his correct, but weakly stated, solution overruled early, let it pass, and the group settled on an incorrect solution. In another instance, two group members treated the third as an outcast, ignoring his attempts to volunteer what turned out to be the correct solution. These examples, both involving children, demonstrate how failed communications can lead to a poor result for the team.

Difficulties in communicating become more pronounced when differences between individuals enter the mix. For example, in Asian cultures, students are generally expected to be passive learners and their attitude is often perceived by non-Asian group members—and even instructors—as laziness (Pham Thi Hong, 2011). There are also strong indications that gender also plays a role in group dynamics. Webb (1984) found females in mixed-gender groups were more responsive than males to requests for help, while their contributions were more often ignored than the contributions of their male counterparts. While Falchikov and Magin (1997) were unable to detect gender bias in two cases while actively looking for it, their expertise and review of the literature left them undeterred in their search as they cautioned the reader not to view their results as proof against such bias. Layton and Ohland (2001) found, in a deliberate effort to mitigate the racial bias in group peer evaluations found in earlier efforts, that women rate other women significantly lower than men (men displayed no such effect towards either gender). Such cultural and gender-related biases can lead to discrepancies in group member perceptions of their peers' efforts and performance.

Dysfunctional Group Behaviors

As depicted in the scenario at the beginning of this chapter, many groups fall victim to dysfunctional group behaviors. These are patterns of behaviors exhibited by group members that take on meaning in a collaborative context. Similar to any challenging learning experience, those engaged in group projects are expected to feel some sense of frustration at times over the course of a group project (Coleman & Van Aken, 1991). Dysfunctional behaviors, on the other hand, are recognizable patterns unrelated to the subject matter that detract from one or more participants' learning experience.

While little effort has been dedicated to documenting and describing these behaviors (Salomon & Globerson, 1989), some information about these behaviors is available. Below is a description of documented dysfunctional group behaviors (summarized in Appendix). The behaviors are listed primarily by anecdotal frequency of reporting, with less frequently reported behaviors grouped by the relationship of their descriptions. Their names reflect the labels provided by the scholar(s) who initially documented the behavior and might benefit from further thought.

Group Domination

Group domination occurs when an individual attempts to assert authority through some combination of commanding other members and controlling the conversation. This is often achieved by talking a

lot, interrupting other members, and/or devaluing their contributions (Cohn, Ohlsen, & Proff, 1960). Sometimes this results in other members scaling back their own participation (Gillespie, Rosamond, & Thomas, 2006), but this is not always the case; groups being dominated may complete the specified task satisfactorily to all outward appearances. Furthermore, Woolley et al. (2010) linked low collective intelligence represented by *c factors* to groups in which conversations are dominated by one or a few members. High c factors correlate to high group performance.

Social Loafing

Students often express concern over "free-riding" or "social loafing" (Modell, 2015). This is the situation in which a member of the group under-contributes to group performance, effectively forcing the rest of the group to do the loafer's work (De Vita, 2001; Salomon & Globerson, 1989). Because the rest of the group puts in extra effort to make sure the expected product is rendered (Schippers, 2014), the dysfunction often is masked from an observer.

Bennett and Naumann (2005) make a distinction between social loafing and free-riding by explaining that the latter involves deriving unearned benefit from the group while the former focuses more on the circumstances that make it possible. This is a subtle distinction because it refers to the self-awareness and intent of the loafer/rider and the other group members, while in both cases the loafer/rider derives the benefits of the group's effort without contributing proportionately to it.

Personal Conflict

Intra-group conflict often yields an undesirable working environment and reduces student satisfaction, but it also correlates with higher performance (Baldwin et al., 1997; D. W. Johnson & Johnson, 1979, 1985). However, when these conflicts are of a personal nature rather than a conceptual one, they pose a threat to successful group work. Badke-Schaub, Goldschmidt, and Meijer (2010) showed that, while cognitive conflict tended to result in more creative solutions, conflict on a personal level interfered with group performance.

Groupthink

Groupthink results when group members opt for mutually agreeable decisions, rather than those they feel are correct, in an attempt to maintain harmony within the group. This is a particular danger when friendships with group-mates may be at stake (Falchikov, 1995).

While commonly perceived as a negative, Haynes (2012) provides an alternative perspective with the example of youth sports teams. Some organizations exhibit pressure to accept certain standards of behavior for membership. They may set lofty goals, such as high academic performance, for themselves and stifle objections as being counterproductive or an indication of insufficient commitment. In such situations of single-minded determination, the group's members often work harder to achieve these goals and maintain harmony within the group. While the student athletes may object to the goals and think they are unrealistic, peer pressure will cause them to work to meet the high standards, and the resulting improvement in academic performance is unlikely to be viewed as anything but positive.

The Farrago

Stohl and Schell (1991) identified a phenomena they dubbed "farrago" in which an individual manages, by various means (e.g., late arrival, disruptive comments, etc.), to focus attention on him- or herself. This lends the farrago a measure of indirect control over the group. However, this control is not explicit and does not contribute to the group's formal goals or productivity. Most interesting in their analysis was their view of the group as a system and recognition of farrago as a reciprocal relationship. While one member disrupts the activity, the rest of the group facilitates and perpetuates this control through their responses. Furthermore, it is not remedied by removal of the individual or imposition of rules, but rather it must be trained out. Keyton (1999) found that the presence of a farrago did not necessarily prevent the team from completing its tasks in spite of a negative impact on satisfaction.

Sucker Effect

One member of a group may prove to be better suited to the necessary tasks than their group mates. As a result, this individual may initially take on a disproportionate load. Eventually, the student may feel unfairly burdened and reduce his or her contribution to avoid being exploited (i.e., made a "sucker"). This often leads to an accompanying dip in morale as well as group performance (D. W. Johnson & Johnson, 1990; Salomon & Globerson, 1989).

Leave It to George

"Leave it to George" describes an alternative approach to the sucker effect. In it, it is the less able students' participation levels that drop off as they watch the more able member perform the necessary tasks (D. W. Johnson & Johnson, 1990). In contrast with group domination, this state of affairs appears by mutual assent.

Ganging Up on the Task

When only one member (or a small minority) of the group appreciates the assigned task and the rest choose instead to avoid it, *ganging up on the task* may occur. When it does, the enthusiastic student or students recognize that their efforts will not be matched by their peers, and their own efforts taper off. Ultimately, this leads to the group focusing on avoiding their responsibility (Salomon & Globerson, 1989). Modell (2015) found that the term caused some confusion on the part of participants in his study because the phrase *ganging up on* generally refers to a group's behavior towards an individual.

Rich Get Richer

Individuals will sometimes dominate the group's interactions as a result of their social status rather than their ability to perform. They may monopolize decision-making, help-seeking, and help-offering behaviors within a group (Dembo & McAuliffe, 1987; D. W. Johnson & Johnson, 1990). Similar to *leave it to George*, this behavior appears to be by mutual assent, but may be more similar to group domination because the assent is imposed by the social hierarchy.

Inappropriate Division of Labor

Sheingold, Hawkins, and Char (1984) documented a situation in which a group of two children imposed and enforced rigid roles for group members based upon perceptions of their respective strengths. One such arrangement was described by a participant as "I'm the thinkist (sic), you're the typist" (Sheingold et al., 1984, p. 59). While this approach may get the task completed efficiently, it also prevents members from developing new strengths. This example using children is offered because it is clear and documented, but one can imagine (and the reader may have experienced) similar situations with adults.

Inappropriate Dependence upon Authority

Simply assigning students to work in groups does not necessarily mean they will work with each other to build their understanding. A study (Webb et al., 1986) found that, while those groups that asked many questions of the instructor tended to complete the task, later measures indicated that their understanding of the task was low. On the other hand, those students who asked questions of each other and completed the task were better able to understand the content. This suggests that the former group depended too heavily on the instructor and did not internalize the concepts.

THE EFFECTS OF DYSFUNCTIONAL GROUP BEHAVIORS

Encountering barriers to collaboration can detract from the learning experience in a number of possible ways. The most readily apparent is that students are made to feel uncomfortable. In some cases they feel overburdened or exploited, while in other cases they might feel as though they are underutilized or even superfluous because they do little of consequence. In other cases, they may perceive an injustice as others take credit for their work or they are blamed for a result for which they do not feel responsible. Another possibility is that they might feel demeaned by the rest of the group.

In each of these cases, the student is likely to generalize the experience to other group situations—often expressing reluctance to engage in group projects in the future (Modell, 2015). While groups that encounter barriers do not always fail to produce a satisfactory product, Riggs and Knight (1994) used structural equation modeling to show that when students perceive their group project to be a failure, their future motivation suffers. The greater the disruption caused by group dysfunction, the more negative the students' attitudes towards future projects.

Many of the dysfunctional situations described above result in a distribution of effort unlikely to meet the intended goals of the project or the course it supports (Modell, 2015; Webb, 1995). For example, in the case of *leave it to George*, only "George" is getting sufficient opportunity to practice the skills the course is designed to foster. Conversely, where social loafing occurs, one student is avoiding practice while the others pick up the slack and get extra practice themselves. Similarly, in a *rich get richer* scenario, low-status group members not only miss out on the opportunity to exercise their skills, but they also have their low status reinforced and legitimized, making it all the more difficult for them to gain any form of power and opportunity to exercise their skills in the future (Ridgeway & Berger, 1986). Furthermore, Salomon and Globerson (1987) speculated that this mechanism reinforces a sense of helplessness as well as beliefs that certain tasks are gendered (e.g., females can come to believe themselves less able to take on certain "male-oriented" tasks).

At a higher level, when collaborative group dysfunction occurs, the community is misled as to the skills graduates have developed (Modell, 2015; Webb, 1993). When these problems are not resolved, students are deprived of the opportunity to develop the skills society expects them to have, but their evaluations do not reflect this fact. Not only are students not learning to be good group citizens, but they are learning to actively dislike and attempt to avoid collaborating with others—something they will increasingly have to do in the world into which they are graduating.

GROUPS ARE COMPLEX, OPAQUE SYSTEMS

Despite the significant benefits and a wealth of scholarly research on the topic, there is much as yet unknown about how groups work, and even small groups are incredibly complex. Each individual offers a unique perspective and skillset, and the members co-evolve throughout the project (Fuhriman, Drescher, & Burlingame, 1984; Sharan, 1990; Webb & Palincsar, 1996). The many changing elements serve as a significant barrier to decrypting the internal dynamics of collaborative groups.

Our existing mechanisms are inadequate to pierce the black box of collaborative learning contexts (Hak & Maguire, 2000; Peterson & Miller, 2004; Subramanian, 2007). While evaluation of the group's product is likely necessary, it is not sufficient to evaluate the group's health. Observation of group meetings directly is likely to be both disruptive and expensive in terms of staff time. Asking students to submit portions of a project individually imposes restrictions on the sorts of projects that can be assigned.

It seems that asking students to report, in some fashion, how they perceive the group's function is likely necessary to form a complete picture (Ellis & Hafner, 2005; Sharan, 1990), but requesting a summary of the work, even if deemed reliable, is likely to disrupt and detract from the exercise (Goldfinch & Raeside, 1990). Self- and peer-assessment offers instructors potentially valuable data, but further work is necessary to refine such methods for this purpose (Modell, 2013). Furthermore, Modell (2015) found that instructors do not reliably diagnose dysfunction when faced with qualitative accounts of group activities. He attributed this to a number of factors, including lack of clarity on the purpose collaboration served within the course, lack of familiarity with and consistent understanding of dysfunction terminology, and insufficient training and support forums for those choosing to employ this method. He also suggests that instructors in higher education may carry biases that make it difficult to recognize some behaviors as problematic. Specifically, those motivated individuals who successfully earn an advanced degree may identify with group members who drive groups to realize their own vision of success—effectively dominating the group.

WHAT CAN BE DONE?

While further scholarship is clearly necessary, there are some important steps that can be taken today. Most important is to acknowledging that collaborative group dysfunction cannot be completely avoided and that it can work against the goals of the course. Fermelis, Tucker, and Palmer (2008) report that a highly cohesive group of researchers who were familiar with the concept of groupthink nevertheless fell victim to it themselves. Instructors must learn more about facilitating group work and recognize when they ought to seek the perspectives of others in their efforts to make sense of what they perceive and to address those problems that emerge. They must also be deliberate in the design of courses incorporat-

ing this method to insure that it supports the objectives of the course. Finally, as a companion to solid course design, instructors must include a thoughtful evaluation strategy which will gain them insight into group health with a reasonable expenditure of effort.

Professional Development

Instructors who use collaboration should familiarize themselves with the set of known dysfunctions (see Appendix). As demonstrated by the language above (especially *Ganging up on the task*), the terms currently applied are often colloquial and insufficiently descriptive to make their meaning clear. Additionally, many of these dysfunctions appear to be shades or alternative perspectives on one another (e.g., *Leave it to George* and *Group Domination*) or possible evolutions of other dysfunctions (e.g., *Leave it to George* might lead to *Sucker Effect*). Modell (2015) found that instructors were uncomfortable applying pejorative terms to developing students and this reluctance seemed to hinder their ability to diagnose. Researchers could improve the language by deliberately applying more objectively descriptive, less judgmental, and less colloquial terminology that acknowledges the relationships between behaviors.

Disseminating a common vocabulary would enable instructors to discuss the problems they see with their peers. Conversation would lead to a deeper understanding by way of an alternative perspective and/or approaches to overcoming some of these barriers, benefitting both educators and students. At the same time, it would begin to develop a foundation of shared knowledge and a mechanism and a medium for communicating it–even if that medium might later benefit from refinement through research.

Fostering communities of practice would help support educators employing group work. This might be achieved by creating forums that encourage discussion of the challenges instructors face managing collaborative groups. These might take the form of periodic workshops, online forums or even regular support group meetings. In these conversations, educators might establish, compare and refine consistent group policies for their classrooms and then compare notes on their experiences. Discussing observations with instructor peers is likely to reveal alternative perspectives on events, reinforcing the fact that students may experience the same events differently, and one member may perceive a dysfunctional situation while others legitimately do not.

Facilitators and moderators of these discussions should promote a focus on the student groups as wholes rather than individuals as much to protect the privacy of the students as to apply the lesson of farrago (Keyton, 1999) and the idea that resolving dysfunction is not about individuals but their relationships with each other. While dysfunction may appear to manifest itself in an individual, the entire group plays a part in it. It may not be sufficient to impose a solution (like reconfiguring the group or removing a member). Instead, when dysfunction is identified, it is necessary to help the group recognize the problem and the part that each of them plays in resolving it.

Course Design

It is also necessary to evaluate course designs to make sure the collaborative activities are adequately supported by the structure of the course itself. Is collaborative group work necessary or even conducive to conveying the content of the course? Does the work center on an ill-defined problem wherein the group might draw upon different viewpoints for an innovative approach? Or maybe the task itself is well defined but simply too large for an individual and the group structure is there to increase manpower and enable a divide-and-conquer approach? Possibly there is a debate at the heart of the subject mat-

ter and the students will learn through hearing from diverse points of view and, perhaps, experiencing cognitive conflict? Is the instructor overwhelmed by the prospect of providing meaningful feedback to a large number of individuals and using group work to reduce the grading load? Expectations around group work to facilitate a divide-and-conquer approach would likely center on raw contributions while some of the other scenarios might instead focus on quality and quantity of ideas. However, it is usually not this simple as there are often a combination of reasons driving the decision. Clearly, in addition to focusing their efforts on their area of expertise, instructors should also pay attention to their reasons for selecting group work and communicating those reasons.

Specifically, the course's learning and performance objectives should reflect the chosen methods. Including objectives around model group citizenship will set more comprehensive expectations for students. One common and effective mechanism is the incorporation of group contracts whereby group members' first responsibility upon embarking on their group's work is to formalize and gain consensus on their expectations for one another as well as some measure of consequences for violations of those expectations. Instructors ought to scaffold this process by providing the structure as well as some starter items, such as:

- Members are expected to attend all meetings.
- All members are expected to contribute to each deliverable.
- An individual who must miss a meeting or assignment must communicate this to all other group members as soon as possible.
- Criticize ideas and not people.

Setting aside time at the outset of the course for members of forming teams' members to contribute their own items and make modifications will enhance their commitment to group norms and, ultimately, the group's success. These contracts provide an important mechanism for driving individual accountability both on the part of the team and the instructor by making the often implicit rules of good citizenship explicit and establishing a foundation upon which trust can be built.

Such contracts should be supported by a group policy that is clearly communicated by the instructor and sets out the actions the instructor will take to resolve problems that threaten the achievement of course objectives. Naturally, and particularly given how little is currently known about dealing with group dysfunction, it is recommended that any policy maintain sufficient flexibility to allow instructors to adapt to needs of their unique classroom (more on such actions in "Handling Group Problems" below).

While many group projects culminate in a final deliverable product at the end of the semester, it is recommended that such projects incorporate regular incremental installments. In addition to providing the instructor insight into students' understanding of the material, this will push teams to work together and communicate early on. It also serves as a practice opportunity for team members, driving them to address differing conceptions of group norms while there is sufficient time in the semester to address them. This approach may also reduce the stress induced by an overwhelming workload brought on by procrastination (or even ganging up on the task). Some instructors structure these milestones such that they gradually ease students into the shared responsibility of teamwork by beginning with individual deliverables based upon collaborative activities and ending with shared deliverables and grades. A grading strategy that increases the value of successive installments will further support such a formative approach.

Instructors experienced in group work recommend setting aside time during class for working with one's group (Modell, 2015). Scheduling is never simple, but class schedules often offer inconsistent blocks

of availability and many students are also balancing jobs to support themselves during their education. While it may be difficult to give up time which would be devoted to important content, the tradeoff will contribute to student success in engaging with the goals of the project.

Distance learning environments with virtual groups complicate the group's ability to build and maintain trust in one another, but the instructor has a number of options to mitigate the situation. If an instructor has the luxury, the effects of distance can be reduced by establishing prior social ties (Bercovitz & Feldman, 2011) or by incorporating even occasional live sessions (Wallace, 2004). Additionally, while there is yet no substitute for a face-to-face meeting, if the technology infrastructure permits cost-effective use of voice or video conferencing, promoting the use of these tools increases the richness of the communications. Olson and Olson (2000) speculated that as our bandwidth increases, these tools will evolve into ever-closer approximations of face-to-face experiences and subsequent studies seem to corroborate ongoing evolution (see Microsoft Research, 2016; Nguyen & Canny, 2007). Further, Lockwood and Massey's (2011) work suggests that, with prolonged use, video offers benefits over audio with respect to trust development.

Many software packages are incorporating collaborative features that enable shared and even simultaneous access. These packages are often not exclusive to distance work and sometimes offer significant benefits regardless of the context. Instructors should familiarize themselves with these features and require or, at least, strongly recommend that students use a set which meets students' collaborative needs. Students may be wary of features such as simultaneous editing and demonstrations and/or incorporation into minor milestones is recommended.

Diagnostic Strategy

Thinking through and communicating your group-work-related objectives serves to lay the groundwork for incorporating assessments appropriate to supporting those expectations. As indicated earlier in this chapter, developing such a strategy is no simple task based on the tools available today, but some guidance is possible. Most important is that instructors draw upon multiple sources of data and recognize that each student maintains a unique perspective.

While direct observation either in real-time, or through reviewing videos, recordings or transcripts might offer valuable insight, such an approach is expensive and likely insufficient. Observing everything that goes on with every group (so as not to avoid missing the perceived sleight that might have led a member to stop participating) will take a great deal of resources (either additional observers in the classroom or time in reviewing the activities afterwards). This is compounded by the likelihood that influential interactions will occur outside of the classroom itself. The reviewer must also take into account the limited perspective of such methods and spend a good deal of time considering and evaluating possible interpretations and following up with individuals to gain deeper insight into their perceptions.

Similarly, reflection papers can offer value but may not offer instructors what they expect. Reflection exercises can help a student to identify their own biases and develop metacognitive skills (Schön, 1987; Tolman, 2011). However, such student papers are not always concise and present a challenge to instructors who must read them, distill the message (assuming one was embedded) and then triangulate with the responses of other group members. This is no simple task and, in a large class, this can be time-consuming.

Some form of self- and peer-assessment may offer an instructor valuable insight, and using it sends a clear signal to the students that the instructor is interested in their success. Collection of self- and peer-

assessment data might be modeled after the work of Modell (2013) or the Radar and Reflector pieces employed by Phielix (2012). Alternatively, an instructor might use a packaged service like CATME Smarter Teamwork (https://www.catme.org). These assessments would ideally result in some measure of both formative and summative feedback directly from the students themselves. These feedback measures ought to include, but not be limited to, impact on student grades to encourage adherence to expectations. Kirschner, Kreijns, Phielix, & Fransen (2015) found that offering feedback grounded in the use of such tools enable student self-regulation and awareness. This is crucial to helping students develop the skills they will need to succeed beyond the classroom.

Distance learning may actually turn out to be a boon for instructors conducting group work–or, rather, the collaboration tools which support them might be. These tools must store records of student activities to properly function and these records can later be mined for clues to student activity. For example, when a student posts to a forum, at a minimum, the system must record who posted, when the post was entered, and the content of the post or it will be unable to meaningfully present the conversation to the next user. Researchers are mining this data and developing dashboards (Park & Jo, 2015; Yen, Chen, Lai, & Chuang, 2015) which synthesize it into visualizations that are meaningful to instructors in addition to versions that may offer valuable insight to students. While this field of learning analytics is an emerging one, it shows great potential and should be watched. Reviewing these logs may clue an instructor in to possible dysfunction. For example, if the vast majority of changes are attributed to a single team member, it may be that the group is experiencing an inappropriate division of labor. However, these can be misleading as students will frequently share a computer that is logged in under a single account.

Handling Group Problems

When dysfunction is identified, instructors have a variety of options ranging from a laissez faire approach to taking direct control. Some instructors refuse to get involved and make it clear to the students that it is their responsibility to work it out themselves. This may be an appropriate approach if successful group work was an explicit prerequisite for the course, but otherwise the instructor should take some responsibility for the method they have selected. However, some of these instructors, while pushing the issue back to their students, will take this as a cue to step up their own monitoring efforts and will engage the group upon a successive request. Some instructors will immediately engage with the task of resolving those issues brought to them. Still others may have the opportunity to proactively engage because their combination of diagnostic strategies has provided advance warning of an emerging problem.

Regardless of how the instructor decided to act, their next step is to investigate using any data collected via their diagnostic strategies and information they can collect from the team. The initial complaint cannot be considered the entire story, but getting more of it can be a challenge. Some instructors will reach out individually to team members for their perspective and then attempt to triangulate some semblance of objective truth. This has the advantage of allowing students to communicate openly and without interruption from their teammates. Students will likely present vastly different stories as they each have their own perspectives and set of salient events. However, this may also mean numerous rounds of follow-up communications to sort out contradictions and fill in gaps.

Alternatively, instructors report agreeing to meet only with the entire group. While this approach does not offer the same sort of safe space as the individual approach, it does achieve three other goals: it allows for immediate follow-up to reduce inconsistencies, the meeting can be presented as evidence

that the membership is putting forth positive effort to resolve their difficulties, and the instructor might go beyond information gathering and begin to explore possible resolutions.

The instructor might use this exercise to help the teammates empathize with one another by asking questions that elicit and validate each member's perspective on events without passing judgement. The instructor should attempt to model an open mind even when their own observations are at odds with the story being told and seek to effect an air of genuine curiosity rather than challenge. Once everyone has had an opportunity to discuss the past, the instructor should insure that the individuals are clear that they are all responsible for the success or failure of the project and then facilitate a discussion around individuals' specific needs to be able to achieve the objectives. These actionable needs should be documented in a group contract (or in amendments to their existing contract) and members should re-commit to adherence. Through these actions, the instructor models empathy and an openness to alternative perspectives while reinforcing individual responsibility. It should also be noted that if this approach should fail or prove too time-consuming, more directive options remain open.

In some cases, an instructor faced with challenging group problems might find that the best approach is to select and impose a solution themselves. This might be dividing up the tasks among team members and holding each individually accountable or even disbanding the group in severe cases. However, while students may derive useful insight, these options will only be directly transferrable to future experiences in which they find themselves imbued with authority similar to that of the instructor in the classroom.

CONCLUSION

Collaborative group projects are increasingly being used to support learning goals. They offer many powerful benefits—in particular, collaboration provides authenticity to the environment in which students are likely to find themselves in the future. When the method works well, student satisfaction is high, performance improves, and they both engage deeply with the subject matter and develop important life skills beyond the content itself. However, just as with any powerful tool, instructors must take care in its use to avoid unintended consequences.

When a group runs into problems, the effects go beyond low satisfaction and poor performance. Students in dysfunctional groups often learn to dislike or even dread collaboration, and they seem to carry this with them to future efforts. This makes it even more important that instructors preparing students for the future help students learn to embrace the experience. Today, researchers are still learning how to help the student reporting group dysfunction, as depicted in the opening scenario. Being well informed about the possible problems with collaboration and their effects is an important start. This knowledge must be leveraged in the development of course objectives, collaboration goals and putting in place mechanisms to support the group's progress and to enable the instructor to effectively collect manageable data and monitor group health. When problems do arise, a deliberate approach on the part of the instructor can turn a students' discomfort into a powerful and lasting learning experience.

Finally, grades serve as a certification of sorts. Instructors, students, colleagues, and employers alike rely upon these communications to gauge the capabilities of those with whom they work. If an instructor awards a shared grade to a group and one member of the group either carried the entire load or shirked responsibilities, it sets incorrect expectations regarding the performance and is likely to lead to problems. It is not possible to detect and identify all possible problems, but it is unethical not to try.

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APPENDIX

Summary explanation of dysfunctional group behaviors in alphabetical order used by Modell (2015):

- **Farrago:** One member becomes the focus of group attention for non-productive reasons while the group response inadvertently reinforces the bad behavior.
- **Ganging Up on the Task:** When the enthusiasm of the minority is dampened by concern for being the only contributors. Efforts turn to task avoidance.
- **Group Domination:** When an individual asserts his or her authority through some combination of commanding other members and controlling conversation. This often involves the individual interrupting and otherwise devaluing the contributions of others.
- **Groupthink:** The group pursues a course of action because it is perceived to be mutually agreeable even if some members have significant doubts.
- **Inappropriate Dependence upon Authority:** Members rely upon the instructor for help rather than group mates, thereby missing out on opportunities to develop and practice desired skills.
- **Inappropriate Division of Labor:** Members strictly distribute tasks based on task type and playing to existing strengths and hindering development of new ones.
- **Leave it to George:** A skilled group member is asked to do more than his fair share and group mates contribute (and learn) little as a result.
- **Personal Conflict:** Disagreements between group members that do not relate to the group tasks are disruptive to group work and offer no compensating benefit.
- **Rich Get Richer:** High status individuals dominate group activities resulting in increased opportunities for them and decreased benefits for others.
- **Social Loafing:** One member of the group does not contribute his effort, forcing the other group members to do more than their fair share.
- **Sucker Effect:** A skilled group member perceives herself to be unfairly burdened and stops participating to avoid being exploited.

Chapter 11
Fostering Diverse Praxis: Pre-service Teachers' Perceptions of Efficacy

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ABSTRACT

The aim of this chapter is to describe a partnership between a local university and a summer academy that provided a space for pre-service teachers (teacher candidates) to work with students from diverse backgrounds. Teacher candidates in a literacy assessment course assessed and tutored students in this summer academy. The chapter describes the tutoring program and the pre-service teachers' response to a teaching efficacy survey based on the work with students. Findings indicate that after the tutoring experience, teacher candidates felt more competent to engage students and to use literacy strategies with the students.

The world as we have created it is a process of our thinking. It cannot be changed without changing our thinking. --Albert Einstein

BACKGROUND

Preparing educators to meet the needs of all students has been receiving attention in the media for good reason (Darling-Hammond, 2010; NCATE, 2010). According to multiple census projections, the number of culturally and linguistically diverse students in public schools is going to increase exponentially in some states over the next decade. For example, in the southeastern United States, the number of students

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projected to be from families whose primary language is not English and who will be free and reduced lunch eligible is going to quadruple by the year 2020 (www.census.gov). There has been well-documented concern that teacher education programs are not adequately preparing pre-service teachers to meet the needs of diverse students (Darling-Hammond, 2010; Delpit, 2006, 2013). In response to these needs, many teacher educators are working to ensure that pre-service teachers are able to support students with diverse learning needs.

Meaningful field experiences are fundamental in enhancing teaching practice for pre-service teachers (Villegas & Lucas, 2002). With the student population becoming more diverse, one major challenge teacher preparation programs are facing is adequately preparing pre-service teachers to meet the learning needs of students from diverse populations, particularly issues related to racial, ethnic, and socio-economic diversity. Hart (2004) suggested that teacher beliefs are a critical tool in teacher preparation and failure to attend to teacher beliefs may hinder the acquisition of professional knowledge necessary for becoming an effective teacher. Research suggests a teacher's belief in his or her ability to work with students from diverse populations predicts his or her attitude and willingness to work in a diverse setting (Lifshitz, Glaubman, & Issawi, 2004). When a teacher has a stronger sense of personal efficacy it is an indicator of a more positive attitude towards students from diverse backgrounds (Villegas & Lucas, 2002). Therefore, it is essential that teacher preparation programs create meaningful field experiences that allow pre-service teachers to work with diverse student populations and apply content knowledge and instructional strategies to meet their needs.

Additionally, the researchers understand the importance of cultivating social justice teaching in today's teaching climate. Ritchie (2012) posits that "rather than being a vehicle that leads to democratic citizenry, fostering community participation and preparing students for rich and rewarding personal lives and high levels of understanding, education has increasingly become more technical and instrumental" (p. 120). The researchers felt strongly that placing pre-service teachers in an environment where they could engage in mentoring students from low socio-economic backgrounds and partnering with an organization focused on social work and community engagement would contribute to their understanding of the needs of children (Ritchie, 2012; Cochran-Smith, 2004). The "varying modes of teacher preparation" described by Ritchie are precisely the type of preparation this field experience was designed to provide (p. 120). The sense of efficacy, improved after the field experience, allowed our candidates to feel increased confidence in their abilities to work with diverse populations; we hope that they will also practice more critically and with a social justice lens after working with students from the Fast Start Academy (Sleeter, 2009).

In our institution, a great deal of emphasis has been placed on pre-service co-teaching (Strieker et. al., 2015). The focus on clinical experience is critical; yet we wonder if as much emphasis is being placed on initial field experiences occurring prior to student teaching. We want our candidates to enter the teaching field prepared to do the work necessary to transform students' lives (Ritchie, 2012). We asked ourselves, what do those field experiences need to look like? We designed this field experience and the accompanying study hoping to answer some of those questions.

Definitions

While the literature reviewed for this article and the knowledge base of the researchers is most closely aligned to culturally relevant pedagogy (Sleeter, 2001; Su, 1996; Su, 1997; McIntyre, 1997; King, 1991),

the term "culturally sustaining pedagogy" (Paris, 2012) resonated with us. Additionally, Paris' (2012) work highlights the importance of being clear about terms we are using and the way we intend them in this study. Pre-service teachers often bring definitions with them that the researchers disagree with. For example, even in a racially homogeneous classroom, the researchers' experiences as teachers have been that there is still diversity in the group; the cultural and linguistic backgrounds of those students may be what define the variety.

- **Diverse:** Showing a great deal of variety
- **Efficacy:** Teacher confidence in their ability to promote students' learning
- **Socio-Economic Status:** Indicator of level of income in the household where the student resides
- **Student:** Child in grades K-12
- **Teacher Candidate:** Pre-service teacher enrolled in a teacher preparatory undergraduate/initial certification program

Purpose of Study

This chapter explains a study conducted on a field experience involving candidates working with students from low socio-economic backgrounds in a suburban area. The field experience was made possible by a partnership facilitated in a Center for Literacy and Learning at a southern, regional university. The partnership was executed by a course in the department of Elementary and Early Childhood Education on assessment and the Fast Start Academy, an established summer bridge program held on the university campus each summer for eighteen years. The pre-service candidates involved in the project were given the opportunity to participate in a study measuring their senses of efficacy after working with students from low socio-economic environments who were identified as struggling in reading. The research questions driving the study were:

1. Would working with students from low-socioeconomic conditions who were performing below grade level in reading increase our candidates' senses of efficacy in working with struggling readers?
2. Would shifts in instruction while monitoring candidates' work with diverse students assist them in increasing their senses of efficacy?
3. Would candidates' indicate satisfaction with learning after working with a structured, diverse, extant summer program partnered with their course?

The instrument, a survey developed with the Fast Start Academy, was analyzed quantitatively. The results of that survey are described in the chapter. The survey allowed the use what Creswell and Plano Clark (2011) call an embedded study design. The results of the survey created the questions and methods that guided shifts in instruction during the course. The study sought to determine if pre-service candidates' senses of efficacy improved after working with students from low socio-economic backgrounds and what changes in instruction were necessary to assist candidates as they learned to improve their senses of efficacy and use students' funds of knowledge in their instructional planning. As the study is using Creswell and Plano Clark's embedded design model (2011) and was meant to influence instruction in only one course, the numbers are lower than they would be in a traditional, stand-alone quantitative study.

The Partnership

In an early meeting, it became clear that neither the Center for Literacy and Learning (CLL) nor the Fast Start Academy had enough visibility across the community. This became clear when none of the participants knew anything about the work of the other group. The Fast Start Academy has done a fantastic job of working with children on free and reduced lunch in our area for over fifteen years. The CLL opened in 2008 and was advertised regionally as a place for students to receive reading help, particularly diagnostic assessment and reporting. Yet neither group worked together previously, and the CLL had never been home to any field experiences for pre-service teachers. The Fast Start Academy's work with rising third and fourth grade students, behind at least two grade levels in reading, seemed a perfect partnership for a course in Elementary and Early Childhood Education department.

History of the Center for Literacy and Learning

The Center for Literacy and Learning (CLL) has a mission to "serve as a collaborative model for preparing . . . teachers to effectively assist P-12 learners in the improvement of their literacy through the use of research-based best practices" (CLL Handbook, 2014, p. 1). The handbook describes courses for practicing teachers so that they may are able to "enhance literacy development of P-12 learners through the implementation of research-based literacy practices" (p. 3). The goals of the CLL are still important in helping develop the practices of P-12 teachers. However, the focus on only practicing teachers seemed problematic to the group discussing this partnership. What about the needs of our pre-service teachers? Literature on the needs of (particularly white) pre-service teachers to work with culturally and linguistically diverse students (and we argue socio-economically diverse students) is well documented in literature on culturally relevant pedagogy (Sleeter, 2001; Su, 1996; Su, 1997; McIntyre, 1997; King, 1991). The need to foster growth in our candidates with a focus on culturally relevant pedagogy was agreed upon by all parties involved. The question became, "is the Fast Start Academy a program that will give candidates a field experience where they can grow safely and without risking any harm to the elementary students?"

The conversations began across the college; the researchers are members of three different departments within the College of Education. The input of various stakeholders was sought before a decision was made to allow pre-service candidates to work with students. There seemed to be a need to delineate between services. While the CLL was charging $600 for twenty sessions over the course of the school year in its early years, the product produced was very specific. The CLL brought students in for diagnostic testing and interventions; the system looked very similar to what is offered by Kaplan (2015) and other tutoring companies. While it was agreed there was still a need for that service, what was noticed in our area that was most needed was a less expensive tutoring option. In the summer, when the Fast Start Academy was operating free of charge to students receiving free or reduced lunch, our candidates would work with the students in the CLL free of charge as well. The "product" would benefit our candidates as well as the students if it went well; the candidates would improve their senses of efficacy in working with diverse populations and the elementary students would receive targeted instruction on concepts like matching students to texts.

This led directly to a conversation on how the CLL might continue to offer tutoring services, run by pre-service teachers, throughout the school year. There has been an additional course offered through the CLL for students who previously attended the Fast Start Academy with another planned; an agree-

ment has been reached by faculty members that tutoring services may now be offered for a minimal fee during the school year moving forward. This field experience was not traditional; there were certainly faculty members who resisted the idea of offering a course with a focus on critical literacy and far less emphasis on diagnostics. However, based upon our results and the ongoing work of discussing with the participants how the program might be improved, the researchers feel that the project has widened the scope of the CLL and provided a positive environment that is inclusive of all students.

History of Fast Start Academy

Fast Start Academy is part of the Federal Work Study Program at our University. The program is a part of the America Reads Program, and it was established by President Bill Clinton in 1997 with the goal of helping children learn to read. The program gives work study eligible students an opportunity to work as tutors in the summer and during the school year. In the summer, Fast Start Academy hires two lead teachers from the early childhood teacher education program. These lead teachers are students who will complete their student teaching the following semester. According to Inman, who founded the program, the goal is to reinforce concepts taught during the school year (Pascual, 2010). The bridge program used allows students to continue to develop as they work with college students; the additional goal of exposing children from low-income households to college life is achieved by allowing the students to work across the college campus. The program accommodates 30 students who have fallen behind in reading; they are identified by their teachers. In the past several years, the current director of the program says that over 100 applications have been received for those 30 spaces (Pascual, 2010; Hafer, 2011).

The Experience

Pre-service teachers taking a Literacy Assessment course as a part of their early childhood education P-5 program completed their field experience part of the course at the Fast Start Academy. The pre-service teachers in this course are required to complete a 20-hour field experience in which they tutor one student. Part of this tutoring experience includes pre-service teachers conducting assessments such as the Qualitative Reading Inventory (QRI-5), Words Their Way spelling inventory (Bear, Invernizzi, Templeton, & Johnson, 2012) and other assessments such as the Burke Reading Survey (Goodman, Watson, & Burke, 1987) to get to know the young students as readers. Pre-service teachers also assessed students' word knowledge by using a word list provided by the program director. Students were encouraged to take an asset based approach to instruction and to begin with what the student knew, build on that knowledge, and create some next steps for students. Pre-service teachers in course learned about assessment, but also engaged in learning about funds of knowledge (Moll, Amanti, Neff, & Gonzalez, 1992) and how they can capitalize on students' home and community assets. Students completed the assessments, thought about strengths and next steps for each assessment, set goals for students, and completed lesson plans for each tutoring session. Seeing students from an asset perspective instead of a deficit perspective was stressed in the course. At the end of the tutoring, students administered the post-assessments. From this information, the pre-service teachers were able to determine some recommendations for the parents to work on at home. Additionally, they created a weebly that included activities, games, and books for their students. The goal was to have a place that parents go to and continue the work that the pre-service teachers had done with the students.

For students taking part in the Fast Start Academy, their day began at 8:30 AM. Parents dropped off students and the program director and other college students working for the program were there to greet them. Students engaged in learning about math, reading, and writing. The program director thought it was important for the arts to be incorporated each day. The lead teachers designed the curriculum for the summer program. These two teachers were pre-service teachers who had just finished their last field placement before student teaching. The course instructor, Sanjuana, was able to serve as a resource as students developed the curriculum for the program. The pre-service teachers chose to design all curriculum around the theme of fairy tales. One of the lead teachers chose to implement critical literacy (Lewison, Flint, & Van Sluys, 2002) lessons that invited students to view stories from different perspectives.

Pre-service teachers in the literacy assessment course met with students for 2 hours on Mondays, Wednesdays, and Fridays. Due to the fast pace of the program, students administered assessments the first two days that they met the students. After administering and analyzing assessments, pre-service teachers then set goals for the student. Each teacher candidate also had to plan and teach a total of 10 tutoring lessons based on the goals set from the assessments. Students were discouraged from using worksheets. A certain number of the lessons were based on the Words Their Way instructional suggestions based on the student's spelling stage. At the end of the program, the pre-service teachers attended the Fast Start Academy graduation where they were recognized for their work with students.

Literature Supporting the Experience

Pre-Service Field Experiences

Field experiences, including service learning experiences, are a critical element in preparing pre-service teachers (Coffey & Lavery, 2015; Cochran-Smith, 2004). One thing the researchers have noticed in teaching undergraduate students is their assumption that they won't teach what Delpit calls "other people's children" (2006). Our candidates often resist changing their worldview, and creating a field experience allowing them to work with children from varied cultural and linguistic backgrounds and from low socioeconomic backgrounds allows them to use the practicum to expand their repertoire (Sonmez, 2015; Cam, 2015; Delpit, 2006). This led us to formulating our three research questions, and this literature indicated that research question number 3, candidates' satisfaction with their learning, would be met if we implemented this structured field experience surrounding the partnership with Fast Start.

Self-Efficacy In Pre-Service Teachers

Self-efficacy refers to personal beliefs about the individual's abilities. Bandura (1997) defines the concept of self-efficacy as "beliefs in one's capabilities to organize and execute the course of action required to produce given attainments" (p. 3) Self-efficacy is a person's belief about his/her abilities implement a certain task. In the case of this study, the self-efficacy of pre-service teachers' perceptions of and attitudes towards literacy in the areas of instructional strategies, classroom management, and student engagement were studied. Several studies have found that there is a positive correlation between positive self-efficacy and positive classroom practices and outcomes (Allinder, 1995; Gibson & Dembo, 1984; Wolters & Daugherty, 2007). In their study of the difference of self-efficacy between pre-service and in-service teachers, Tschannen-Moran and Hoy (2007) found that in-service teachers showed more

positive outcomes as it relates to maintaining students' attention in classroom tasks. The researchers used the Teacher Sense of Efficacy Scale (TSES). Pre-service teachers scores were lower in the areas of classroom management and instructional practices. In contrast to these findings that show higher self-efficacy scores for in-service teachers, De la Torre Cruz and Cassanova Arias (2007) found that pre-service teachers showed higher scores than in-service teachers when it came to overcoming negative family factors in students' lives.

Field Experiences with Diverse Populations

Literature indicated that in order for our candidates' to experience an increase in efficacy, we needed to provide them with literature in the course that supported this experience. There would also need to be a shift in instruction in order to support them as they worked on changing their instructional decisions to meet the students where they were (Delpit, 2006; Cam, 2015). Researchers have explained at length that while courses on culturally relevant pedagogy are a step in the right direction, programs across the United States typically leave teachers unprepared to meet the needs of diverse learners (Sleeter, 2001; Goggins II & Dowcett, 2011; Coffey, 2010). In an effort to meet those needs, programs have slowly begun to structure what one research team calls "radical field experiences" (Miller & Mikulec, 2014). Field experiences working with diverse populations are critical to the success of our future teachers (Sleeter, 2001). The awareness of cultural capital may begin in courses on culturally relevant pedagogy; however, working with students from diverse backgrounds is critical in what is still a largely white field (Miller & Mikulec, 2014). The awareness needed is afforded in a field experience like the one described in this paper, and looking at cultural capital and culturally relevant pedagogy in the course furthered the work being done. According to Miller & Mikulec (2014), the

Lack of awareness [of pre-service teachers about needs of diverse students] is at least in part due to the advantages that go unnoticed by members of the dominant group, when there is congruence between cultural backgrounds . . . [which] affords its members privileges, shared by the members of the dominant culture, that are valued in the school setting (p. 18).

DATA COLLECTION

Procedures

A member of the research team provided an overview of the study to pre-service teachers. Once the participants gave consent, they were asked to fill out a survey on their perceptions about literacy. Fifteen students completed the online survey. The low number of responses was due to the authors focusing on one course during the summer months. The survey contained no identifiable information and the instructor of record did not have access to any of the data until after final grades of the course were submitted. All students enrolled in the course were participants in the instructor's self-study; the qualitative component of the study was how to shift instruction to meet the needs of the candidates after observing their work with students and examining the quantitative data provided by a sample of students in the course.

Measure

After pre-service teachers completed their coursework and field experience, their perceptions of self-efficacy beliefs about literacy were collected using Oh's (2011) modified version of the Teacher Sense of Efficacy Scale (TSES) (Tschannen & Hoy, 2001). The TSES survey was revised by Oh to include pre-service teachers' perceptions of and attitudes towards literacy in the areas of instructional strategies, classroom management, and student engagement. The survey used a 5-point Likert scale ranging from 1 to 5 (1 = not confident/could not complete task, 2 = minimum confidence, 3 = moderate confidence, 4 = confident that task could be accomplished and/or in yourself as a teacher, 5 = expert- could teach others how to accomplish task).

The surveys were administered online during the last week of course work. The modified survey contained 24 statements focusing on the following three themes:

1. Instructional strategies;
2. Classroom management; and
3. Student engagement.

Details regarding the number of items per theme as well as sample statements within each theme are provided in Table 1.

FINDINGS

Qualitative Findings

The instructor was part of the research team; she used observations of pre-service candidates' work with students during their field experience, reflective inquiry during class and observations of candidates' responses about their instructional choices, and survey data in order to make shifts in instruction.

Table 1. Number of items and sample statements per theme

Theme	Number of Items	Sample Statement
Teacher candidates perception of:		
Efficacy of instructional strategies	8	• To what extend can you use a variety of assessment strategies in your reading and writing lesson? • How well can you provide appropriate challenges for very capable students in reading and writing lessons?
Efficacy for classroom management	8	• How much can you do to control disruptive behavior in the classroom during your reading and writing lessons? • How well can you establish routines to keep activities running smoothly in your reading and writing lessons?
Efficacy for student engagement	8	• How much can you do to get students to believe they can do well in their reading and writing schoolwork? • How much can you do to get through the most difficult students in your reading and writing lesson?

Shifts in Instruction

The field component part of the course occurred during the three weeks the Fast Start Academy was in session. The pre-service teachers had about two weeks to learn about the assessments that they would be administering at the beginning of their tutoring lessons. One of the shifts in instruction occurred at beginning of the field experience. As a part of the course, each week the pre-service teachers had to post in a discussion called a 3-2-1 discussion:

- 3 summarizing points about their readings,
- 2 questions, and
- 1 connection to other readings/field experience/personal experience.

This allowed the instructor to gauge the status of the class. At the beginning of the experience, many of the questions that were asked were related to the tutoring component. The pre-service teachers expressed concerns about the short amount of time that they were going to spend working with students. One student stated, "In 3320, it was so neat to see how my students assessments changed over the course of the field experience. They grew tremendously and I cannot wait to see how my student at Fast Start will also grow through tutoring" (3-2-1 Discussion, June 9). The instructor had to make sure that pre-service teachers understood that they might not see major shifts. Through observation during the tutoring, the instructor discovered that this misconception was partly due to the fact that the pre-service teachers had to administer the QRI-5 pre and post field experience. This misconception was addressed with students and this helped the pre-service teachers to see that they were there to support the students' literacy develop and that they may or may not see growth as measured by assessments. Another change that was implement early on was the requirement in the number of official lessons that the pre-service teachers developed. Initially, they were asked to develop 2 lesson plans per day. This became cumbersome both for the pre-service teachers and the students since the lessons were 45 minutes long. Instead, after observations and working with the candidates during the field experience, the instructor determined that the pre-service teachers would teach one formal lesson and spend the rest of the time reading books that were chosen by the student.

Quantitative Findings

Descriptive statistics and statistical analyses were used to determine pre-service teachers' perceptions of self-efficacy in the context of literacy. Overall reliability was calculated at .941 for the survey using Cronbach's alpha demonstrating satisfactory levels of reliability and high levels of internal consistency among the survey items. To assess reliability of the survey domains, the authors calculated the alphas for the three domains. Results ranged from .88-.90, indicating that responses to all three domains exhibited strong reliability.

DESCRIPTIVE DATA ANALYSIS

Fifteen pre-service teachers completed the modified TSES survey following their coursework and field experience. The average mean of each item was calculated to get a better representation of the overall

self-efficacy that the pre-service teachers had. The mean TSES scores for the survey are presented in Table 2. Furthermore, Table 3. breaks down the percentage of responses according how pre-service teachers answered each item.

Table 2. Mean scores on survey (N= X) pre-service teachers' ratings on TSES

Item	Mean
Efficacy for instructional strategies	
To what extend can you use a variety of assessment strategies in your reading and writing lessons?	3.83
To what extend can you provide an alternative explanation or example when students are confused about your reading and writing lessons?	3.75
To what extend can you craft good questions about teaching reading and writing for your students?	3.75
How well can you implement alternative strategies for your reading and writing lessons?	3.75
How well can you respond to difficult questions about your reading and writing lessons from your students?	3.50
How much can you do to adjust your reading and writing lessons to the proper level for individual students?	3.58
To what extent can you gauge student comprehension of what you have taught about reading and writing?	3.75
How well can you provide appropriate challenges for very capable student in reading and writing lessons?	3.58
Efficacy for classroom management	
How much can you do to control disruptive behavior in the classroom during your reading and writing lessons?	3.58
How much can you do to get children to follow classroom rules during your reading and writing lessons?	3.67
How much can you do to calm a student who is disruptive or noisy during your reading and writing lessons?	3.33
How well can you establish a classroom management system with each group of students for your reading and writing lessons?	3.75
How well can you keep a few problem students from ruining an entire reading and writing lesson?	3.42
How well can you respond to defiant students in reading and writing lessons?	3.25
To what extent can you make your expectation clear about student behavior during your reading and writing lessons?	3.83
How well can you establish routines to keep activities running smoothly in your reading and writing lessons?	3.67
Efficacy for student engagement	
How much can you do to get students to believe they can do well in their reading and writing schoolwork?	3.92
How much can you do to help your students value learning about reading and writing?	3.83
How much can you do to motivate students who show low interest in their reading and writing schoolwork?	3.50
How much can you assist families in helping their children do well in reading and writing?	3.58
How much can you do to improve the understanding of reading and writing of a student who is failing?	3.42
How much can you do to help your students think critically about reading and writing?	3.42
How much can you do to foster student creativity in reading and writing?	3.58
How much can you do to get through to the most difficult students in your students in your reading and writing lessons?	3.50

Table 3. Percentage of responses

Item	1 Not Confident	2 Minimal Confidence	3 Moderate Confidence	4 Confident	5 Expert
Efficacy for Instructional Strategies					
To what extend can you use a variety of assessment strategies in your reading and writing lessons?	0%	8.3%	8.3%	75%	8.3%
To what extend can you provide an alternative explanation or example when students are confused about your reading and writing lessons?	0%	0%	25%	75%	0%
To what extend can you craft good questions about teaching reading and writing for your students?	0%	0%	25%	75%	0%
How well can you implement alternative strategies for your reading and writing lessons?	0%	0%	33.3%	58.3%	8.3%
How well can you respond to difficult questions about your reading and writing lessons from your students?	0%	0%	50%	50%	0%
How much can you do to adjust your reading and writing lessons to the proper level for individual students?	0%	8.3%	33.3%	50%	8.3%
To what extent can you gauge student comprehension of what you have taught about reading and writing?	0%	0%	33.3%	58.3%	0%
How well can you provide appropriate challenges for very capable student in reading and writing lessons?	0%	0%	41.7%	58.3%	0%
Efficacy for Classroom Management					
How much can you do to control disruptive behavior in the classroom during your reading and writing lessons?	0%	0%	41.7%	58.3%	0%
How much can you do to get children to follow classroom rules during your reading and writing lessons?	0%	0%	33.3%	66.7%	0%
How much can you do to calm a student who is disruptive or noisy during your reading and writing lessons?	0%	8.3%	50%	41.7%	0%
How well can you establish a classroom management system with each group of students for your reading and writing lessons?	0%	0%	33.3%	58.3%	8.3%
How well can you keep a few problem students from ruining an entire reading and writing lesson?	0%	8.3%	41.7%	50%	0%
How well can you respond to defiant students in reading and writing lessons?	0%	16.7%	41.7%	41.7%	0%
To what extent can you make your expectation clear about student behavior during your reading and writing lessons?	0%	0%	25%	66.7%	8.3%
How well can you establish routines to keep activities running smoothly in your reading and writing lessons?	0%	0%	33.3%	66.7%	0%
Efficacy for Student Engagement					
How much can you do to get students to believe they can do well in their reading and writing schoolwork?	0%	0%	25%	58.3%	16.7%
How much can you do to help your students value learning about reading and writing?	0%	0%	25%	66.7%	8.3%
How much can you do to motivate students who show low interest in their reading and writing schoolwork?	0%	0%	58.3%	33.3%	8.3%
How much can you assist families in helping their children do well in reading and writing?	0%	0%	50%	41.7%	8.3%

continued on following page

Table 3. Continued

Item	1 Not Confident	2 Minimal Confidence	3 Moderate Confidence	4 Confident	5 Expert
How much can you do to improve the understanding of reading and writing of a student who is failing?	0%	8.3%	41.7%	50%	0%
How much can you do to help your students think critically about reading and writing?	0%	8.3%	41.7%	50%	0%
How much can you do to foster student creativity in reading and writing?	0%	8.3%	25%	66.7%	0%
How much can you do to get through to the most difficult students in your students in your reading and writing lessons?	0%	0%	50%	50%	0%

Theme 1: Efficacy for Instructional Strategies

At the end of the semester, pre-service teachers scored an average mean of 3.68 in their efficacy for instructional strategies; the highest mean average of all the themes. The item scoring the highest mean (M= 3.83) in this theme was an item focusing on pre-service teachers' beliefs in assessment strategies. The majority of pre-service teachers (83%) were confident or believed that they were experts in their use of a variety of assessment strategies in their reading and writing lessons; while only 17% of students had minimal or moderate confidence in their use of assessment strategies. The lowest mean item (M=3.50) was on how well pre-service teachers thought they could respond to difficult questions from students during a reading/writing lesson. Fifty percent of students were only moderately confident, while the other half of students were confident in how they would respond.

Theme 2: Efficacy for Classroom Management

The average mean for self-efficacy for classroom management was the lowest of all the themes (M=3.56). All pre-service teachers were either moderately confident or confident that they could control disruptive behavior; get children to follow classroom rules; and establish routines to keep activities running smoothly during a lesson. More than half of the pre-service teacher (58.3%) had minimal or moderate confidence in their ability to calm a student who is disruptive or noisy during a reading/writing lesson, while only 41.7% were confident in their ability. Concerns regarding how well they could respond to a defiant student, 16.7% of pre-service teachers said they had minimal confidence, 41.7% had moderate confidence, and 41.7% said they were confident. Perceptions of how well pre-service teachers could keep a few problem students from ruining an entire reading/writing lesson had the lowest mean (M=3.42); 8.3% had minimal confidence, 41.7% moderate confidence, and 50% were confident in their ability.

Theme 3: Efficacy for Student Engagement

This theme specially addressed how pre-service teachers felt about their ability to engage students. The average mean for this theme was 3.59. The majority of pre-service teachers (75%) were confident or believed they were experts in their ability to get students to believe they can do well in their reading and writing schoolwork; thus, calculating this item at the highest mean average (M=3.92). Two items that

had the lowest mean (M= 3.42 respectively) were pre-service teachers beliefs in: how to improve their understanding of reading and writing in a student who is failing and how to help students think critically in reading and writing.

CONCLUSION

Confidence

We expected teachers to feel an increased sense of efficacy after working with a group of students for several weeks. We knew from anecdotal evidence that many of the teaching candidates had little experience working with students from low-income families who were performing below grade level in reading (both criteria to participate in the Fast Start Academy); we suspected that they would grow more confident after time working with the third and fourth grade children. The quantitative findings do show that in all four categories, approximately 50 percent of the candidates feel confident in their ability to use varied assessment, answer challenging questions while teaching lessons, manage a variety of classroom management and behavior issues, and engage students. However, what happened to the other 50 percent? Why are they feeling trepidation in some areas? Are those the same respondents? Do some feel confident across the board or unconfident across the board? Are the answers mixed? These questions, derived from the survey responses, drive the second phase of our study. When interviewing students and conducting focus groups, we want to know the answers to these questions.

Experience Working with Diverse Students

The experience that pre-service teacherss had in working with Fast Start Academy has provided us with several insights. Fast Start Academy provided pre-service teacherss the opportunity to work with students with diverse backgrounds. As teacher educators, we understand that we must continue to provide these opportunities for student as well embrace new ways of teaching to prepare pre-service teachers to work with diverse populations. Candidates in our teacher education program have the opportunity to choose the area in which they will complete their field placements. Many times students choose these placements based on proximity. It is possible for pre-service teachers to complete their program without having had the opportunity to work with students that are culturally and linguistically diverse. Fast Start Academy provided the pre-service teachers with the opportunity to work with diverse students without transportation or distance being an issue. We believe that these experiences are imperative considering the growing number culturally and linguistically diverse students in US schools.

Responses from Participants

Overall, the candidates indicated both on the survey and to the course instructor that they felt that the field experience was valuable. The survey captures the pre-service teachers' sense of efficacy and shows that overall students felt capable of using instructional strategies. Students in the class learned about

different strategies that they could implement with the students. The survey results also indicate that the pre-service teachers felt a sense of efficacy in engaging students. For example, one of the questions asked students to rate their sense of efficacy in how much they could do to help students value learning about reading and writing. Pre-service teachers rated themselves high for this question and believed that they could help the student that they were tutoring to value reading and writing.

An area of interest was found in the behavior management theme. Pre-service teachers' beliefs in his or her ability were lowest in this theme. The fact only 41% of candidates indicated that they are confident they know what to do to calm a student who is disruptive or noisy during a reading/writing lessons may speak to the continued challenges pre-service teachers have on knowing effective strategies to use when dealing with problem behaviors. This lack of self efficacy in behavior management is similar to what is found in the literature. Teachers in the field continue to report they do not feel adequately prepared to properly deal with challenging student behaviors (Allday et al., 2012).

Pre-service teachers' feedback obtained by the course instructor also indicates that students had a positive experience. At the end of the tutoring experience, pre-service teachers were required to write a reflection letter to the parents of the student that they were tutoring. Pre-service teachers expressed to parents how much they had learned through the experience and made some recommendations for ways that the parents could support the students in reading and writing.

FUTURE RESEARCH DIRECTIONS

This study allowed us to think about how our programs are impacting teacher efficacy. The findings allowed for adjustments to be made in class; this could have been a self-study or formative experiment design if we wanted to look at how those changes impacted the professor as researcher. In future, we may follow that line of inquiry to add to the literature on impacting students in pre-service education. The immediate future inquiry will be a different type of qualitative study, asking our candidates about their experiences in individual interviews and focus groups. We want to conduct another embedded design study, however, in the future study we will begin with the survey used in this study in order to prepare qualitative interview and observation protocols for our pre-service teachers. In that phase of the study, we hope to elaborate upon why candidates felt an increase in efficacy (for those who did) or why not.

Additionally, there were several areas outside of the areas of efficacy that indicate future inquiry. The modified TSES survey used deficit-based language (i.e., "problem students", "defiant students") when discussing diverse students. Use of such language indicates the need to explore how deficit-based discourse influences pre-service teachers' perceptions of their own abilities and their students. Future use of this survey should use a strength-based approach because the discourse associated with disabilities and/or students of diverse backgrounds is sometimes problematic as consumers of this deficit-based language tend to be indicative of particular stereotypical views. Another possible area of inquiry is to have the candidates' conduct research; undergraduate research is a focus of our college mission and is something we think makes strong teachers. Our candidates could design studies on specific activities or assessments to determine their effectiveness with various students; they could then talk about strength-based assessments and design new tools that work best with their student population.

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KEY TERMS AND DEFINITIONS

Asset Perspective: Seeing the strengths in a child, their family, and community instead of seeing what they lack, don't have, or are not doing.

Classroom Management: Procedures that the teacher puts in place to make sure that things run smoothly in the classroom.

Efficacy: The ability to produce a desired or intended result.

Field Experiences: A range of formal, required school and community activities participated in by students who are enrolled in teacher preparation programs.

Funds of Knowledge: Defined by Moll, Amanti, Neff, & Gonzalez (2001) as "the historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and well-being" (p. 133).

Student Engagement: The degree of attention and interest that students show.

Tutoring: Acting as a tutor to one individual or a small group.

Chapter 12
Preparing Teacher–Scholars to Inquire:
Constructing the Inquiry Processing Cycle

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ABSTRACT

Whether it is in the sciences or humanities, inquiry is a valued pedagogy for teaching and learning. Teacher candidates often enter into their teacher preparations programs with limited experience and understanding of the process of inquiry. The chapter's purpose is to introduce and discuss the Inquiry Processing Cycle, which is a theoretical model for engaging in inquiry. The chapter explains how the Inquiry Processing Cycle emerged from Grounded Theory (Glaser & Strauss, 1967) from an on-going qualitative study of first-year undergraduate students (n=110) in a College of Education first-year class called Prepared for Success. The study found that the participants perceived that the process of inquiry was a fundamental part of being a successful college student as well as being an effective teacher. Yet, the participants were unclear about how to actually proceed with an inquiry. From these findings, the chapter illustrates how to engage in the inquiry process using the Inquiry Processing Cycle.

INTRODUCTION

Undergraduate students who desire to enter into the profession of teaching often have a number of altruistic reasons for their choice to teach (Brookhart & Freeman, 1992; Cochran–Smith & Lytle, 1999; Lortie, 1975). Many are motivated by a love for children or by the aspiration to make a difference. Some undergraduate students enter into the teaching profession as a response to a calling to teach (Bullough

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& Hall-Kenyon, 2011). Very few undergraduate students choose the profession of teaching in order to become scholars who are deft at inquiry (Mule, 2006). This is true despite the fact that inquiry is a championed pedagogy among teacher education programs (Nelson, 2015). Teacher educators regularly argue for the integration of inquiry into all components of a teacher education program in order to develop teachers who are also scholars (Cochran–Smith & Lytle, 1999; Nelsen, 2015). The goal is to produce teachers who are in the habit of questioning and thinking critically. The paradox of inquiry in teacher education is that as popular as inquiry is as a philosophy, very few beginning teacher candidates are even aware of what inquiry entails (Mule, 2006). The purpose of this chapter is to describe and report on a theoretical model, called the Inquiry Processing Cycle, which provides a conceptual framework for the process of inquiry.

The chapter has four main objectives. First, the chapter provides background and contextual information related to inquiry in the field of higher education. Next, the chapter introduces Knowledge Building Theory (Scardamalia & Bereiter, 2006) and describes how that theory frames an on-going qualitative study of first-year undergraduate students who are aspiring to be future teachers (n= 110). The study's participants had one commonality; they were all enrolled in a first-year College of Education course, which is referred to by the pseudonym Prepared for Success. Then, the chapter discusses the study's data and findings as the empirical grounding (Glaser &Strauss, 1967) for the Inquiry Processing Cycle. Finally, the chapter concludes with a discussion of the implications of the Inquiry Processing Cycle as it relates to teacher education programs. The chapter also wraps up by offering future research directions related to the Inquiry Processing Cycle.

BACKGROUND

Inquiry, as a strategy for the development of critical thinking skills and research skills, goes beyond just teacher education. Inquiry is a much-emphasized pedagogy and popular terminology among the current academe. Two decades ago, the Carnegie Foundation for the Advancement of Teaching convened a commission to develop guidelines for improving undergraduate education at research universities. The Boyer Commission (1999), as the commission came to be known, issued a report featuring ten recommendations for research universities to transform their baccalaureate programs for the 21st century. The Boyer Commission underscored the role of inquiry in developing undergraduates who are critically engaged with content.

The first two recommendations from the Boyer Commission dealt explicitly with inquiry. The commission's recommendations stated that:

1. Research-based learning should be the standard throughout the undergraduate program, and
2. That the first-year curriculum should be constructed and centered on the use of inquiry-based pedagogies.

Using a democratic metaphor, the Boyer Commission (1999) also asserted that all university students are entitled to an Academic Bill of Rights (p. 12). The university student's Academic Bill of Rights rests on four pillars:

1. Inquiry-based learning;
2. The development of coherent and reasoned communication;
3. The appreciation of the arts, humanities, and sciences; and
4. A comprehensive preparation for the future (Boyer Commission, 1999, p. 12).

The commission held that the execution of these rights would result in university undergraduate students who are much more engaged with what it means to be students. The outcomes of the Academic Bill of Rights would also include university students who are clear thinkers, problem solvers, and future leaders in their respective fields and careers (Boyer Commission, 1999). By listing inquiry as the first of four rights, the commission clearly prioritized inquiry as essential to undergraduate success.

The Boyer Commission also positioned inquiry pedagogies as an instrument of educational justice, in contrast to the lecture-based approach that often reproduces non-engagement in the learning process and limited opportunities for problem-solving. Since the publication of the Boyer Commission, inquiry-based learning (IBL) strategies have become more common in universities across the United States. IBL is a student centered instructional method that fosters the development of logical thinking and coherent writing (Levy & Petrulis, 2012). Researchers have found that undergraduates who engage with IBL practices are more likely to stay in the university and achieve higher grades (Hugerat & Kortam, 2014) as well as experience greater overall success at the university (Laursen, Hassi, Kogan, & Weston, 2014).

MAIN FOCUS OF THE ARTICLE

Taking the Boyer Commission's recommendations to heart, a large public university in the southeastern region of the United States—which is also where this study was situated—developed an initiative program that the chapter will refer to by the pseudonym, *Prepared for Success* (PFS).The goal of PFS is to support first-year undergraduate students at the university in their transition to understanding the university's culture and academic expectations. The vision of PFS is to enrich the level of first-year undergraduate students' engagement with the university by augmenting their opportunities to immerse themselves in goals for a high-quality education.

In particular, the PFS program is grounded in three central goals for first-year students. The first goal, *Intentionality*, helps students identify and create meaningful career goals. The PFS program then supports students in developing strategies to achieve their goals. The second goal, *Curiosity*, is predicated on the idea that asking meaningful questions is the first step in the inquiry process. The goal of curiosity includes the rationale that students who actively participate in their educational experience— by being curious—will be more invested in their education as the deepen their understanding of the inquiry process throughout their university experience. The third goal is *Awareness*. Students who are aware understand how preconceived notions, cultural understanding, and experience contribute to their sense of self and others. The third goal also focuses on cultural diversity as well as the intersectionality of gender, race, and socioeconomic class. For purposes of this chapter, the chapter's authors focus on the second goal of curiosity and its relationship to inquiry.

The chapter examines one of the PFS artifacts, called the Inquiry Project. The project guides first-year students in connecting an inquiry process with issues or questions that the students find curious. For the Inquiry Project, the PFS students critically reflect on a topic within the field of education that interests or concerns them. The project includes an examination into what inquiry actually entails and

how the inquiry process is different from just a research project. The Inquiry Project provides opportunity for the PFS students to collaborate as they engage in writing workshops and peer-editing conferences. Workshops also include topics related:

1. To narrowing down research questions;
2. Identifying and collecting trustworthy resources;
3. Navigating the resources in the campus library; and
4. Avoiding plagiarism.

As the PFS students complete their Inquiry Projects they also get additional guidance about the university's academic resources and writing services.

Knowledge Building Theory

The chapter is framed around Knowledge Building Theory (Scardamalia & Bereiter, 2006). The PFS Inquiry Project reflects the process of knowledge building in a number of ways. For instance, the Inquiry Project is designed to tap into students' curiosity about issues in education. The Inquiry Project also guides students in the development of lifelong learning skills related to research and drawing conclusions. The Inquiry Project, as another example, reframes the learner-instructor relationship as a partnership of knowledge construction. Scardamalia and Bereiter (2006) developed Knowledge Building Theory from their research on how young learners construct meaning and build knowledge in the school classroom. The theory goes beyond just the transmission of information to investigating the process by how knowledge is constructed and created (Bereiter, 2002; Paavola & Hakkarainen, 2005).

Knowledge Building Theory is situated in the constructivist belief that people create meaning from their learning tasks and activities (Bereiter, 2002). First, knowledge building is grounded in inquiry-type questions about problems or issues. The inquiry-type questions should be challenging and push a learner's existing knowledge. Questions should also be authentic. Knowledge building is authentic when it is about actual knowledge construction rather than the busy work of knowledge facsimile. Scardamalia and Bereiter (2006) explain the importance of authenticity when it comes to the knowledge-building question, "When knowledge building fails, it is usually because of a failure to deal with problems and questions that are authentic for students and that elicit real ideas from them" (p. 117).

Second, knowledge building is supported by artifact creation. Knowledge building is an intentional act when learners see themselves as fully part of the knowledge creation process. Artifacts provide the evidence to further advance existing knowledge. Scardamalia and Bereiter (2006) assert that artifacts should reflect an intentional design process that involves the learner from the start. A knowledge building artifact should also have an epistemic quality whereby the artifact poses additional questions for the creation of further knowledge (Scardamalia & Bereiter, 2006). Consequently, epistemic artifacts—according to Knowledge Building Theory—have a multiplier effect and accelerate the pace of knowledge creation.

Third, knowledge building includes community. There is collective quality to knowledge building and the understanding that knowledge is a public good for the community to share. Knowledge building is supported through an intentional learning community that focuses on extending the limits of existing knowledge through discourse.

Method

The chapter's authors report on an ongoing study of PFS first-year students, who are aspiring to become future teachers (n=110). The participants' the Inquiry Project artifacts and their perceptions of the Inquiry Project form the study's two sources of data. The study has two research questions:

1. What are the participants' perceptions of the inquiry process as reflected in their Inquiry Projects?
2. How do the participants define the inquiry process as represented by their Inquiry Projects?

To investigate these questions, the study employs case study research design. Robert Yin (2008) defines case study research as an empirical investigation of complex phenomena. The case study for this ongoing research is comprised of the first-year PFS students who enrolled in the PFS sections for those who want to become future teachers. The study's data were collected from September 2014 until December 2015. Data collection included artifact analysis and focus group interviews. The participants' Inquiry Projects provided the data for the artifact analysis. Focus group interviews were conducted with eight small groups of participants. There were three or four participants in each of the small groups. Each focus group interviews were conducted with a semi-structured interview approach. The interview protocol included questions related to the type of skills the participants developed because of PFS as well as about the PFS course's benefits and limitations.

The data were analyzed with Miles and Huberman's (1994) three-step interpretive approach. First, the process of data reduction happened as the data were read, re-read, and then coded in order to identify patterns in the data. Second, to further analyze the patterns and synthesize categories in the data, the chapter's authors created visual data displays. Third, the chapter's authors used the constant-comparative method (Glaser & Strauss, 1967) to narrow in on themes in the data as well as draw conclusions.

Findings

There were a number of themes that emerged from the case study's findings. For the purposes of this chapter, the authors focus on two themes in particular. First, the participants found their inquiry projects to be meaningful. In particular, the participants identified meaningfulness as connected to challenges and commitment. Second, while the participants found meaning in their inquiry project, their understanding of the inquiry process was muddled. The chapter will now go into greater detail about these findings.

The participants perceived that their inquiry projects were meaningful in two distinct ways. One way that the projects were meaningful was through the deeper insights into the issues and challenges that are part of education. One of the participants explained how the project left her "with more questions and more things to think about." Another participant shared the meaningfulness of the inquiry project by stating, "I thought the inquiry project was meaningful because you could choose your topic. The inquiry project allowed me to focus on special education which is what I'm going to do. I got more out of the project because of it." For this student, it was meaningful to have choice in the topic selection. Likewise, it was also meaningful to pick a topic that was relevant to a possible future career as a special education teacher. This participant's response reflects a second way that many of participants perceived of their inquiry projects as meaningful.

The project deepened their commitment to teaching. For many of the participants, an outcome of the inquiry project was that it helped to solidify their choice to be a future teacher. One participant put

it like this, "Teaching is a something that you need to want to do it because you love it, not because it is a job." Many of the participants reported that their inquiry projects helped them to better understand the depth of commitment that embodies the teaching life. One participant, for instance, explained how her inquiry project, along with the PFS class, was instrumental in helping her to figure out if she really wanted to continue in education. The participant shared, "This class gives a pretty good idea if teaching is something you are passionate about or maybe you want to try something else. That's important." Indeed, that is important because teaching is a multidimensional vocation that requires commitment.

Although the participants gained a deeper appreciation for the inquiry process, almost all the participants were muddled about what the inquiry process entailed. Participants explained and largely associate the inquiry process with the development of research habits like going to the library, searching databases to find resources, writing, and presenting research conclusions. One participant, as an example, equated inquiry with searching for resources at the library. This participant shared, "I would have to say the library research is most important. That's my number one thing that I think will allow me to be successful in college . . . and to do more inquiry type projects." So for a large majority of the participants, an outcome of the inquiry project was to become familiar with the library resources.

Of course, becoming familiar with library resources is one of the benefits of the inquiry process, but it should not define the entire process of inquiry. As the study's participants were focused on the library resources, they were missing many key features of inquiry-based learning. Among those features are the importance of questioning and the role of reflective application. Both these features are critical components of the construction of knowledge through an inquiry process. Yet, both were largely neglected by the study's participants.

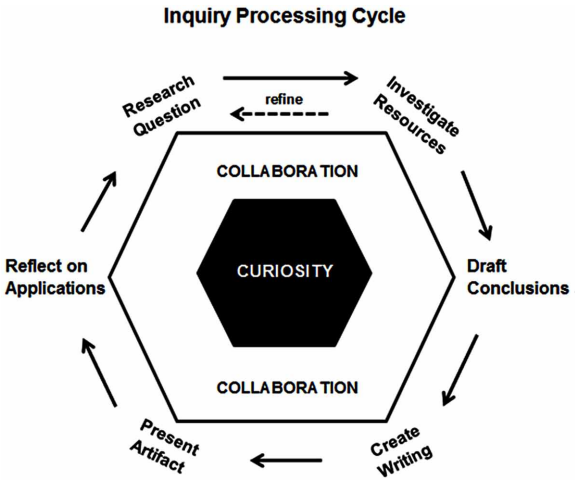
SOLUTIONS AND RECOMMENDATIONS

The chapter's authors were increasingly concerned about how the participants were muddled about the inquiry process. Thus, the findings from this ongoing research study led to the development of a conceptual inquiry-based learning model called the Inquiry Processing Cycle, which represents the inquiry process as a cycle of learning. It is a model that helps to convey the inquiry process both in a descriptive and a graphic form (see Figure 1). Curiosity is at the core of the Inquiry Processing Cycle. Curiosity is at the core of how inquiry is birthed in the ideas, issues, or problems that spark the knowledge construction of learners (Dewey, 1944; Root-Bernstein & Root-Bernstein, 2012). Curiosity and inquiry need not be solitary activities. The Inquiry Processing Cycle illustrates how collaboration is a key component in encouraging and fostering inquiry. Collaborating with others is a way to cultivate more ideas, develop deeper questions, and create artifacts that represent products of an inquiry.

Curiosity and collaboration are the mechanisms for an inquiry's momentum. Girded by these mechanisms, the following six actions make up the Inquiry Processing Cycle:

1. Research questions;
2. Investigate resources;
3. Draft conclusions;
4. Create writing;
5. Present artifact; and
6. Reflect on applications.

Figure 1. Graphic representation of the inquiry processing cycle



The chapter will move to a short description of each action in the Inquiry Processing Cycle.

Action Components of the Inquiry Processing Cycle

1. **Research Questions:** Questioning is the way to hone in on one's curiosity. In the Inquiry Processing Cycle, questioning is the starting action component of the model. Developing strong questions is an active process of research and refinement. Scardamalia and Bereiter (2006) assert that strong questions are developed and redeveloped to "elicit real ideas" (p.117). As Figure 1 shows, questioning involves research in the verb sense of that word rather than research as just a noun or adjective. To research a question is to identify if one's question has enough definition that a person can begin to inquire about it. Thus, refining is also part of the process of researching a question. Refining means that the learner narrows in on the topic and idea of the question. The question refinement process is an investment in time, but it is an essential part of the construction of knowledge through inquiry-based learning.
2. **Investigate Resources:** Investigate resources is another component of the Inquiry Processing Cycle. This component is related to researching and refining questions as learners begin to narrow down the topic of their inquiry. Yet, to investigate resources also includes the process of identifying reliable and credible sources. Investigate resources means going to the library to find books and journal articles related to the inquiry question. It goes beyond just finding resources to address the inquiry question, investigate resources means interrogating the resources. This is especially important with digital resources, like websites and databases, in order to distinguish whether the resource is accurate, reliable, and trustworthy. Questions that learners should ask to determine if a source is credible include:
    a. Who is the author and does she or he cite their sources?
    b. When was the resource published? How current is the source?
    c. What is the author's purpose for writing?
    d. Is the author and resource affiliated with a valid and reputable institution?

The final part of investigating resources is to closely read and examine what the resources have to say about the inquiry question. In this way, the investigate resources action of the Inquiry Processing Cycle is akin to data collection.

3. **Draft Conclusions:** After the resources are collected, interrogated, and examined, the next action component is to draft conclusions. To draft conclusions means that the learner moves to synthesizing and summarizing the findings from the resources that were investigated. Drafting conclusion also involves a critical analysis of the findings. The process of drafting means that preliminary conclusions are drawn from the resources. The conclusions provide a rough sketch of the discoveries that the learner made from investigating resources.
4. **Create Writing:** Another action component of the Inquiry Processing Cycle is to create writing. The draft conclusions and create writing are closely linked together and are the two components that often require the largest investment of time when it comes to inquiry. They are also the two components that reflect the collaborative process of inquiry as the learner mulls over and shares with others. To create writing does not necessarily mean writing a traditional research paper. There are a variety of ways to create a product that explains the findings and conclusions from an inquiry. Yet, almost all these products incorporate writing in some way. Writing is thinking on paper. It is a creative endeavor, which captures what a learner gained or discovered as the learner engaged with the inquiry question.
5. **Present Artifact:** Once the writing is finished and encapsulated into an artifact, there should be a space for the learner to present the artifact of inquiry. Presenting the artifact is an important action component of the Inquiry Processing Cycle. It is another form of communicating—often in a verbal way—what the learner has discovered and constructed related to the original inquiry question. Present artifact is also a space in which a learner has the opportunity to answer questions about his or her inquiry journey. Thus, it is best that the present artifact action component include an audience of some sort.
6. **Reflect on Applications:** The Inquiry Processing Cycle would not be complete without a space for reflection. Reflect on applications is the last action component of the cycle, but it does not mean the inquiry process stops after the learner reflection. Rather, reflection can often help to inform future inquiry questions. In the field of education, it is important that applications are linked to the reflection. Learners, who are preparing to become teacher, benefit from engaging in reflection that applies to the future teaching practice. The evolving nature of inquiry based learned is often frustrating to young learners because it keeps leading to more questions (Junisbai, 2014). Reflecting on applications can help to mediate that frustration as learners identify the applicability of their inquiry journey as well as discover further pursuits of inquiry related to their initial question.

The Inquiry Processing Cycle is an instructive model for teaching about the inquiry process. The model captures the action components that make up inquiry process. Likewise, it also shows how curiosity and collaboration are at the core of the cycle. The chapter's authors recommend that teacher educators and practicing teacher use this cycle when discussing the contours of the inquiry process with their students.

In the absence of a course dedicated to inquiry in the education program, colleges and universities could embed the Inquiry Processing Cycle in any content area course. For example, in an undergraduate First Year Writing course, students could be challenged to select a topic at the beginning of the semester and

engage in research in both the formal and informal sense over the course of the semester. Undergraduates participating in such a project might conduct a formal search of the literature on the topic and develop an annotated bibliography of the most recent studies or even create a chronology of the research on the topic. Then, students might follow the conversations on the topic in the various social media outlets. This type of inquiry would engage them in a reflection on the differences between the formal and informal domains of conversations on their topic of interest. Students could develop a presentation around their findings to be disseminated to their class. The Inquiry Processing Cycle can also be applied in similar ways to upper level courses. Instructors can introduce the Inquiry Processing Cycle figure and explain that as students prepare for whatever projects are included in the course they use the cycle to guide their planning and implementation for the project. The Inquiry Processing Cycle is adaptable to any course where there is a research or project related component embedded into the course structure.

FUTURE RESEARCH DIRECTIONS

The Inquiry Processing Cycle emerged in a Grounded Theory way (Glaser & Strauss, 1967) in order to guide future teacher candidates understanding about the inquiry process. The Inquiry Processing Cycle will help to infuse a stronger connection between teaching and scholarship. Now with all being stated, the method for the study presented in this chapter was largely based on self-report and perceptions. Future research in this area should take into account other methodologies, including more quasi-experimental design type studies of the Inquiry Processing Cycle. The case study examined in this chapter was focused on first-year undergraduate students who were aspiring to teach. A future research agenda would broaden the age range under study. For example, a future research agenda could include sample populations of elementary school students as well as students who are in middle and secondary schools. Correlating the action components of the Inquiry Processing Cycle with developmental stages and age range may prove to be a fruitful area of future study. Additional research is also needed into the perceptions of practicing teachers when it comes to the process of inquiry. Such research could lead to the development of a professional development curriculum centered on the Inquiry Processing Model.

CONCLUSION

The Inquiry Processing Cycle provides a model for capturing the process of inquiry based learning. In teacher education, the cycle helps to guide undergraduate students, who are interested in a teaching career, to bridge the gap between teacher and scholar. Cochran–Smith and Lytle (1999) discuss the importance of inquiry becoming a stance that defines teachers, teacher candidates, and educators. They warn that such a stance cannot be acquired through a single activity or lone inquiry type project. Rather, inquiry needs to be practiced and it needs to be examined as a cohesive process that is both fluid and dynamic. The process of inquiry is paramount for those who are entering into teacher preparation programs. It is a process that connects with students' curiosity and develops the dispositions of problem solving and constructivist learning practices. The Inquiry Processing Cycle is an instructive model for understanding and adopting an inquiry stance in one's teaching practice.

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KEY TERMS AND DEFINITIONS

Academic Bill of Rights: The four rights that the Boyer Commission stated that every university student is entitled to receiving at the university. These rights include: (1) Inquiry-based learning; (2) The development of coherent and reasoned communication; (3) Appreciation of the arts, humanities, and sciences; and (4) A comprehensive preparation for the future.

Action Component: One of six features in the Inquiry Processing Cycle. It requires the learner to take action in order to complete that part of the cycle.

Boyer Commission: A special commission that was convened by the Carnegie Foundation for the Advancement of Teaching with the mission to make recommendations to improve undergraduate education in the United States.

Constructivist: The belief that knowledge is constructed and given meaning to by people.

Collaboration: The act of sharing ideas with another person or group of people.

Curiosity: The free expression of interest and intrigue in something. It is at the core of inquiry.

Inquiry: A knowledge quest that is centered on deep questions.

Inquiry Processing Cycle: The cyclical process of conducting an inquiry.

Chapter 13
Developing Academic Writing Skills of In-Service and Pre-Service Teachers:
Approaches, Outcomes, and Challenges

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ABSTRACT

This chapter reports on services created and implemented by a writing center in a large public university in the USA to assist to pre-service teachers and in-service teachers with academic writing as professional development activities while they are pursuing their degrees. Academic writing is a style of written communication that has become acceptable in institutions of higher education (Craswell, 2005). The services include: 1) a series of workshops to teach the requirements of the Publication Manual of the American Psychological Association (American Psychological Association [APA], 2010), 2) a series of workshops around conceptualizing a research project and submitting a paper to a conference, 3) writing support circles, and 4) individual consultations. The chapter provides a description of each of this service, including the purpose and the design, highlights outcomes of these professional development services, and discusses challenges in its design and implementation.

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Writing can be a miserable chore, a difficult undertaking, and a challenge that produces growth and satisfaction – all at the same time. (Rocco, 2011, p. 3)

INTRODUCTION

A professional is a person who has extensive knowledge base and training in the subject area and also seeks for opportunities to continue developing new knowledge, attitudes, and skills in the area (DuFour & Eaker, 1998). In addition to people's motivation for and interest in continuous learning, new technologies, innovation, competition, career progression, or a salary increase are just a few factors that might prompt people to improve their knowledgebase. Professional development refers to a number of activities that foster the development of additional skills and experiences that could lead to a career progress. Professional development is a form of activity in an organization directed to introducing and teaching the staff newly designed programs, changes in the company policies, or new competencies to ensure effectiveness and productivity of employees and ultimately the organization (Gilley, Eggland, & Gilley, 2002). Employees could also seek for professional development opportunities on their own, for example by reading, attending webinars or seminars, joining professional communities, or learning a software by trial and error. Professional development activities could be narrowly focused and target gaps in knowledge or skills that demand immediate improvement (e.g., skills training, literacy training, or retraining; Desimone, Werner, & Harris, 2002). They could also be long-term oriented and focus on present and future needs of employees (e.g., coaching, mentoring, or counseling).

Professional development has become "an integral part of the life of schools and teachers" that promotes implementation of educational reforms and improvement in schools (Webster-Wright, 2009, p. 702). Professional development initiatives foster development and improvement in pedagogical knowledge and skills, understanding of new standards, policies, or reforms, understanding of new generations of children and their parents and of the demands of the global environment where the students live and will work in the future. Professional development activities have also become tools for providing graduates of teacher education programs effective transition into the classroom (Darling-Hammond, 1998). For more than two decades, researchers have been investigating different aspects of the concept of professional development, including the history of teacher professional development (Desimone, 2009, 2011; Grimmett, 2014; Guskey, 2003), its content (Bausmith & Barry, 2011; Ost, 1976), or its relation to teacher change (Little, 1989) and to school reform (Borko & Putnam, 1995; Little, 1993; Thompson & Zeuli, 1999), to name a few.

Professional development opportunities for teachers are provided by different entities, including schools, state and local governmental agencies, libraries, and universities. This chapter reports on services created and implemented by a writing center at a large public university in the USA to assist pre-service and in-service teachers with academic writing as professional development activities while they are pursuing their degrees. Academic writing is a style of written communication that has become acceptable in institutions of higher education (Craswell, 2005). This writing has specific expectations for the audience, mechanics, logic and organization, support of an argument, critical thinking, and use of literature (White, 2000). Teachers are responsible for developing writing skills of their students (Abbate-Vaughn, 2007; National Commission on Writing for America's Families, Schools, and Colleges, 2003,

2006) and student perfomance on writing assignments is directly related to the quality of instruction they receive (Hattie, 2009; Nye, Konstantopoulous, & Hedges, 2004). Effective teachers of writing are also good writers (Augsburger, 1998; Calkins, 1993; Commeyras, Bisplinghoff, & Olson, 2003). The more experiences pre- and in-service teachers have with writing, the more they favor writing as a professional activity and the better they feel of themselves as writers (Bass & Chambless, 1994). To help pre- and in-service teachers with their academic writing skills, the Center designed and implemented several ervices, including:

1. A series of workshops to teach the requirements of the *Publication Manual of the American Psychological Association* (American Psychological Association [APA], 2010),
2. A series of workshops around conceptualizing a research project and submitting a paper to a conference,
3. Writing support circles, and
4. Individual consultations.

The chapter provides a description of each service, including the purpose and the design, highlights outcomes of these professional development services, and discusses challenges in its design and implementation.

BACKGROUND

Professional Development and Teachers

In the U.S., attention to teacher professional development was prompted by a study by Carpenter, Fennema, Peterson, Chiang, and Loef (1989) that provided evidence on the effect of teacher professional development on student learning. Two groups of teachers were randomly assigned to either a 4-hour professional development program or an 80-hour one. Later, the student achievement was measured and revealed that students whose teachers received the extensive training outperformed the other group of students on three out of six measures of academic achievement. This led national, state, and local authorities to realize that pre-service teacher education alone was not sufficient to improve student academic achievement, and teacher professional development became a priority (Little, 1989). Government and other agencies (e.g., the National Science Foundation) and initiatives (e.g., No Child Left Behind) started to encourage and support teacher professional development initiatives. For example, the National Mathematics Advisory Panel (2008) suggested ongoing teacher professional development support for teachers of mathematics at all levels with content knowledge being the focus of professional development initiatives. To assure quality of teacher professional development, the National Staff Development Council (2001) issued 12 *Standards for Staff Development*, which are divided into context, process, and content standards. The document suggests, "the most powerful forms of staff development occur in ongoing teams that meet on a regular basis, preferably several times a week, for the purposes of learning, joint lesson planning, and problem solving" (p. 1). The document narrates how these standards should be implemented by schools and districts, which could also obtain case studies, discussion questions, suggestions, assessment tools, and literature from the Council to ensure the success of the standards implementation.

Effective professional development fosters changes in teachers' classroom practice, which leads to improvements in student learning (Odden, Archibald, Fermanich, & Alix, 2004). However, researchers struggle to name with absolute certainty what makes an effective professional development program that would impact student achievement the most (Wayne, Yoon, Zhu, Cronen, & Garet, 2008). Most agree that professional development programs that are intensive, lengthy, school-based, and focus on the subject matter are more effective (e.g., Garet, Porter, Desimone, Birman, & Yoon, 2001; Neufield & Roper, 2003; Popham, 2008). For example, in her review, Kennedy (1998) found that programs focused on teacher content knowledge, curriculum, teaching of the content, and student learning had more effect on student achievement than those that focused on teacher behaviors. Effective professional development programs are also well-designed and include active learning, inquiry, and collaboration, while the traditional internal or external trainings bring the least results (Garet et al., 2001; Wiggins & McTighe, 2008). These programs are also aligned with the existing educational policies (Guskey, 2003). Effective professional development programs address the existing gaps or problems in the classroom, are the most relevant to teachers' every day teaching practice, incorporate teachers in the planning and delivery of these programs (Smith, Petty, & Day, 2008), and are flexible to account for a variety of professional needs, interests, and learning styles of teachers (Diaz-Maggioli, 2004). Ultimately, effective professional development programs center around student learning and achievement (Sparks, 2002).

The effectiveness of professional development programs also depends on the culture of the school and district (Elmore, 2005; Halley & Valli, 1999; Sykes, 1999). Schools and districts should create and maintain values, norms, and behaviors that foster learning among teachers (Halley & Valli, 1999) and reject the norms and practices that create barriers for teacher learning (Elmore, 2005). If school and district administrators do not support continuous learning of their teachers, do not seek for opportunities to expand the repertoire of teacher skills, knowledge, and competencies, do not help utilize the new skills or knowledge in their classrooms, or do not invest time and money into the improvement of quality of professional development programs, much would be lost. School and district culture could also foster collaborative spirit that would help teachers share their new knowledge or skills with colleagues (Sykes, 1999). This culture should also help teachers develop a sense of responsibility for and ownership of their continuous learning (Arnau, 2009).

As was suggested by the National Staff Development Council (2001), the most common form of professional development has become professional learning communities (Thompson, Gregg, & Niska, 2004). Inspired by Senge's (1990) concept of the learning organization, professional learning communities commit to collective problem-solving and individual learner performance (DuFour, DuFour, & Eaker, 2008). Professional learning communities are a school-based form of professional development. Teachers, administrators, and other school staff develop shared vision, goals, strategies, and resources and work collaboratively to achieve the common goals. Collaboration helps share accountability for each student achievement among all teachers, administrators, and staff and replaces competition and isolation.

Academic Writing Skills and In-Service and Pre-Service Teachers

The complex nature of writing, and learning to write, can be challenging not only for students, but also for teachers. (Limbrick, Buchanan, Goodwin, & Schwarcz, 2010)

Writing is a complex process that challenges the writer' creativity, experience, patience, prior knowledge, learning, professional and interpersonal experiences and at the same time brings personal joy and professional growth to the writer. Writing could be defined as a process that

involves exploring and mulling over a subject; planning the particular piece (with or without notes or outline); getting started; making discoveries about feelings, values, or ideas, even while in the process of writing a draft; making continuous decisions about diction, syntax, and rhetoric in relation to the intended meaning and to the meaning taking shape; reviewing what has accumulated, and anticipating and rehearsing what comes next; tinkering and reformulating; stopping; contemplating the finished piece and perhaps, finally, revisiting. (Cooper & Odell, 1977, p. 9)

The product of this writing process comes in various forms, for example letters, blogs, essays, poetry, product instructions, ads, dissertations, books, reports, journal or newspaper articles, and many more. Each of these forms of writing follow certain accepted guidelines, styles, or philosophies. In institutions of higher education, most course writing is expected to follow the academic writing style (Craswell, 2005), which is often referred to as scholarly writing. This writing has specific expectations to the identification of the audience, mechanics, logic and organization, support of an argument, critical thinking, and use of literature (White, 2000). "Academic style is clear, concise, unambiguous, and accurate; it is factual and backed up by evidence" (Lee, 2011, p. 105). Using literature requires reading, which precedes writing. "Scholarly writing would hardly count as scholarly if it ignored what other scholars had written on the topic" (Wallace & Wray, 2011, p. 44). Therefore, academic writing goes hand in hand with research, both empirical and theoretical. Research is another complex process that involves identification of a research problem, learning what is known in the field about this problem, collecting, analyzing, and synthesizing literature on the topic, designing and carrying out empirical or theoretical investigation, analyzing the results, and making implications to theory, practice, research, or policy (Creswell, 2002). Academic writing which involves doing research and following expectations "takes authors to various places, making them jump hurdles, run in circles, face dead ends and crossroads, and confront other challenges" (Plakhotnik, 2006, p. 3). Writing is art but at the same time a skill that could be developed. "Learning to write involves reading about writing, critically reflecting on what you read, discussing writing with others, and listening to authors talk about the writing process" (Rocco, 2011, p. 7). Learning to write requires a deliberate effort, time, instruction and guidance, feedback, and as much practice as possible.

Unfortunately, in the USA student writing skills are not adequate to successfully complete writing assignments. A national writing assessment *National Assessment of Education Progress* indicated that more than 80% of 8th and 12th graders show only "partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at a given grade" (Salahu-Din, Persky, & Miller, 2008, p. 6). This statistic showed no improvement in writing skills compared to the results of the same assessment done five years earlier. Partially, this is due to the ineffective writing instruction and insufficient practice of writing skills in schools. Partially, this is caused by very different views on the high school graduates' levels of writing skills and readiness to perform college level writing among university faculty and school teachers (American College Testing, 2009). Only 26% of university faculty think freshmen students have sufficient writing skills to perform college level writing while 76% of school teachers believe in their graduates' readiness to write successfully in college.

Another indicator of insufficient writing skills is the results of K-12 literacy assessments. Reading and writing have a lot in common. When reading and writing, the student attends, first, to the content,

second, to the quality of the argument, and then to the way the arguments are laid out (Wallace & Wray, 2011). Recently, a national debate evolved in the USA around students' performance on such international tests as Program for International Student Assessment (PISA) and Progress in International Reading Literacy Study (PIRLS). For example, PISA measures reading literacy, mathematic literacy, and science literacy among 15-year old students in over 65 countries every 3 years. The reading assessment focuses on student understanding, use, and reflection on written text for a variety of purposes and settings. The most recent PISA (2014) assessment placed US students 23rd in reading. U.S. students were outperformed by students from many countries in Asia and Europe as well as Canada, Australia, and New Zealand.

Not surprisingly, coming to the university, half of freshmen makes mistakes in their papers (National Commission on Writing for America's Families, Schools, and Colleges, 2003). Students at both undergraduate and graduate programs in social and behavioral sciences, including teacher education programs, are assigned to write longer essays than their peers in math and engineering (Hale, Taylor, Bridgeman, Carson, Kroll, & Kanto, 1996). These essays include exposition and argument type texts that ask students to explore cause and effect relationships, explore a problem and provide a solution, classify, compare and contrast, or analyze a concept or a phenomenon. As pre-service and in-service teachers continue their education, they are expected to use their writing skills to write such writing assignments, term papers, capstone projects, theses, and dissertations and struggle with these assignments. For example, they have been observed to struggle to identify significance of their research and to write up a literature review (Switzer & Perdue, 2011), to understand the purpose of a literature review on a topic and its connection to their writing projects (Bitchener & Turner, 2011), to avoid plagiarism (Clement, 2001), to understand the purpose of an assignment and the audience (Warner, 2008), or to write for publication (McMillen, Garcia, & Bolin, 2010). The overall academic performance at the undergraduate level of pre-service teachers directly affect their performance on writing projects at the graduate level (Abbate-Vaughn, 2007).

Teacher preparation programs focus mostly on reading, and little attention is given to teaching writing and writing pedagogy (Grisham & Wolsey, 2011; Hochstetler, 2007). This could minimize or eliminate writing instruction during field experiences when pre-service teachers have opportunities to try themselves as classroom teachers and provide writing instruction to students (Norman & Spencer, 2005). When asked, what college courses teach them how to teach writing, in- and pre-service teachers cannot name one (Neill, 1982). Some universities offer remedial writing courses to provide pre-service teachers with basics of argument construction and logic, essay organization, paragraph and sentence construction, revision skills, rules of source citations, and tips for literature search. These courses are helpful but they alone cannot close the gap in writing skills. Freshmen English courses also provide help with writing, although their focus is on the expression of ideas, rather than on their presentation in an essay (Sallee, Hallett, & Tierney, 2011).

Not surprisingly, pre- and in-service teachers are not confident in their writing skills and feel little prepared to teach in the area of literacy/language (Grisham & Wolsey, 2005). Although many pre- and in-service teachers like to write and look forward to teaching writing, they have "a number of anxieties about teaching writing, such as lack of instructional confidence, lack of knowledge necessary to teach grammar, lack of knowledge about writing itself, and lack of knowledge about curriculum/content standards" as well as lack of editing skills (Grisham & Wolsey, 2011, p. 354). Because of these anxieties, some teaches feel intimidated by writing (Fleischer, 2004). Teachers do not believe they are good writers and do not have sufficient writing experience, effective professional development opportunities, and time to teach students writing and provide feedback on their writing projects (Street & Stang, 2008). They do not always understand the importance of writing and reflection for their teaching practice and

personal well-being (Fleischer, 2004; Gallavan, Bowles, & Young, 2007). Not surprisingly, teachers prefer creative writing to academic writing (Grisham & Wolsey, 2011). Some teachers do not consider the type of writing they do in schools to be interesting or significant, so they do not consider themselves as writers (Augsburger, 1998). Faculty teaching in the teacher education programs have also been concerned with pre- and in-service teachers' abilities to write in different formats, teach writing to their students, and integrate writing across the curriculum (Gallavan, Bowles, & Young, 2007). How teachers think of themselves as writers and of writing affects how they teach writing (Grossman, Valencia, Evans, Thompson, Martin, & Place, 2000; Jay, 2002).

Opportunities to Improve Pre-Service and In-Service Teachers' Writing Skills

To keep America competitive, and to make the American dream of equal educational opportunity a reality, we need to recruit, reward, train, learn from, and honor a new generation of talented teachers. (Duncan, A., 2009, p. 1)

Professional development opportunities that provide guidance with writing have been shown to improve teachers' confidence as writers and their teaching performance (Fleischer, 2004). Some professional development opportunities to learn writing and teaching writing come from national initiatives and local communities. The most well-known nation-wide and the only federally sponsored project around teaching teachers how to write in the USA is The National Writing Project (n.d.). One of the project core principles states, "Writing can and should be taught, not just assigned, at every grade level. Professional development programs should provide opportunities for teachers to work together to understand the full spectrum of writing development across grades and across subject areas". The project provides professional development opportunities related to writing to teachers of all content areas and grade levels across the country in collaboration with schools, colleges and universities, government agencies, corporations, and individual contributors. The project develops resources for teachers, programs, events, and local opportunities for collaboration and networking. Teachers participating in the project experience an increase in their writing and teaching abilities that fosters the development of their students' writing skills (Whyte, Lazarte, Thompson, Ellis, Muse, & Talbot, 2007).

Another well-known local initiative that has been promoting writing of teachers for 40 years is the Bay Area Project, in California, USA. The underlying idea of the project is that "teachers are the best teachers of teachers" (The Bay Area Writing Project, n.d., para 1). The project serves not only in-service and pre-service teachers but also students in 4th-8th grades who are interested in writing. Their boot-camps, summer institutes, professional development programs, and other initiatives offer learning around such topics as writing across the curriculum, writing with technology, aligning writing instruction with the state educational standards, providing feedback to student writing, and evaluating student writing, among others.

Pella (2011) discusses a two-year project that was developed partially in cooperation with the National Writing Project and aims to help middle school teachers collaborate to create teaching resources and teaching methods to increase effectiveness of their writing instruction. As a result of such collaborative practice, teachers broadened the spectrum of their teaching strategies, increased their expectations of students' writing abilities, and became more confidant in their ability to teach writing. Muller (2004) reports on a year-long course for in-service teachers that was designed by a university faculty and offered through a continuing education unit of the university. Teachers met eight times each term for 2.5-hour

class. "Half of each class period is spent talking about writing instruction, sharing responses to readings and reflecting on classroom anecdotes. The other half is spent writing, as teachers participate in all the aspects of a writing workshop" (p. 42). As a result, teachers changed the way they think about writing, about selves as writers and as teachers of writing, and of their students as writers.

Some teacher education programs and faculty teaching courses within these programs have reported deliberately including teaching writing as a part of their curricular. Florio-Ruane and Lensmire (1990) and Shrofel (1991) designed writing instruction courses that were connected to the pre-service student field experiences where students had exposure to children's writing and to teaching writing to children. Kelley, Hart, and King (2007) report on Teaching Writing in Elementary School course for pre-service teachers who after the completion of the course served as writing tutors for children at a local community center. Colby and Stapleton (2006) discuss how a year-long sequence of two courses with a strong emphasis on writing affected pre-service elementary school teachers' perceptions of teaching writing to second graders. During the sequence of courses, the pre-service teachers "participated in the writing process to produce and publish their own work; studied the theories and patterns of children's written language development; examined effective methods for teaching writing in the elementary classroom; and learned how to assess children's writing" (p. 356). After the courses, pre-service teachers went to teach writing to second graders. This turned out to be the first time pre-service teachers were taught how to teach writing. Although they struggled to customize their instruction to the needs of the students, at the end of the practicum they had a more positive view of themselves as writers and expressed appreciation of the writing instruction they received and the opportunity to teach writing to elementary school students.

Some incorporate writing instruction into other subject matter or methods courses. McCarthy (2008) incorporated writing into a math education course. The students were first taught how to use a Four-Square Graphic organizer to write about math content and then teach this method to elementary students. This experience improved pre-service teachers' skills in writing in math classes, their attitudes about writing, and understanding of elementary students' writing skills. Uy and Frank (2004) divided teachers in their math class into groups, gave each group an unfinished folklore story, and asked teachers to write an ending to the story that included a mathematic concept. Such interdisciplinary activity that connected math, writing, and multicultural literature provided teachers "opportunities for higher-order thinking, problem solving, and making real-world connections" (p. 182). McMillen, Garcia, and Bolin (2010) redesigned a master's level social studies seminar for in-service teachers to incorporate writing a paper that could be submitted for publication to foster their professionalism. The completion of such course helped improve in-service teachers' "sense of self-efficacy as researchers and as writers", "rethink approaches in the classroom or school district setting", learn the research process, and increase "sense of professionalism as a result of the research writing process" (p. 433).

A CASE OF A WRITING CENTER

A college of education at a large southeastern public university in the USA established a writing center to help graduate students in the college improve their academic writing skills. The university is located in a large urban city and is considered Hispanic-serving institution. The center is funded by a national grant. The center provides proof-reading and editing services but the main goal is to develop writing skills and knowledge that would help students with other projects in the future. Although initially the center was

created to help graduate students, quickly the center extended its services to undergraduate students too. Pre-service and in-service teachers in the college are enrolled in a variety of teacher education programs that are commonly offered in colleges of education. The center has two employees: a director who is a full-time faculty member and worked part-time at the center and an assistant director who is employed at the center full time. Both have doctoral degrees and extensive experience teaching writing.

Approaches

To foster student learning of academic writing, the center developed and implemented several approaches or services:

1. A series of workshops to teach the requirements of the *Publication Manual of the American Psychological Association* (APA, 2010),
2. A series of workshops around conceptualizing a research project and submitting a paper to a conference,
3. Writing support circles, and
4. Individual consultations.

All services are offered all year around, during fall, spring, and summer terms.

APA Workshops

The goal of this workshop series is to help students learn the basics of the *Publication Manual of the American Psychological Association* (APA, 2010). The *Manual* describes the academic writing style that is used by researchers in many fields, including education, management, and anthropology, and required by many journals and other publication venues. All students in the college are required to follow APA in their writing assignments. The purpose of the *Manual* is "to advance scholarship by setting sound and rigorous standards for scientific communication" (APA, 2010, p. xiii). Clear communication of ideas is one of the "real hallmarks of research" (Russ-Eft, 2004, p. 3). Clarity includes reporting research results in a logical way, including meaningful organization of all elements of a manuscript and headings, correct grammar, spelling, and punctuation, and proper format. The *Manual* provides guidance to all these components to achieve consistency in writing regardless of the author's topic, area/field in education, type of manuscript, and author's educational, cultural, professional, linguistic, and other backgrounds.

The series of APA workshops include 12 sessions, 6 in the fall and 6 in the spring semester, 1 hour each. The workshops are offered 5-6 pm to accommodate both pre-service teachers who study during the day and in-service teachers whose classes started in the evening at 6.20 pm. Each workshop provides instruction on one or several aspects of the APA style that are the most relevant to student writing. Examples of these aspects include manuscript elements, headings, writing clarity (continuity, wordiness, redundancies, and the pronouns), quoting, paraphrasing, citing sources in text, reference list construction, and reference components. Each workshop includes a 10-15 slide Power Point presentation, examples, and exercises. Participants are encouraged to bring their papers, hard or electronic copies, to the workshops to make corrections or write notes based on the information provided in the workshops. The workshops are marketed throughout the college. They are facilitated by the assistant director. Participants are asked to RSVP to each workshop and the facilitator takes the attendance.

Conference Paper Workshops

The goal of this workshop series is to walk students through the process of writing a paper for a conference. Writing a paper to present at a conference or to submit to a journal are examples of scholarly writing that students are encouraged or required to pursue in their classes. Such opportunities foster students' critical thinking and reflection and foster professional and personal growth (Casanave & Vandrick, 2003). They help teachers connect to a larger community of teachers, share their classroom experiences, participate in fostering changes in K-12 education, critically reflect on their teaching profession, and better understand their students as writers (Smiles & Short, 2006).

Similar to the series of APA workshops, conference paper workshop series include 12 sessions, 6 in the fall and 6 in the spring semester, 1 hour each. The workshops are offered 5-6 pm to accommodate both pre-service teachers who study during the day and in-service teachers whose classes started in the evening at 6.20 pm. Each workshop provides instruction around some aspect of the process of writing and presenting a paper at a conference. Examples of workshop topics include how to conceptualize a paper, components of a paper, how to refine a problem statement, how to address reviewers' feedback, and how to prepare a successful presentation. The series centers around a local conference in education where for many years undergraduate and graduate students from the college of education present their papers and posters, participate as discussion panelists and paper reviewers, and serve as the conference volunteers before the conference and on the day of the conference. Each workshop includes a 10-15 slide Power Point presentation, examples, and exercises. Participants are encouraged to bring their papers, hard or electronic copies, to the workshops to make corrections or write notes based on the information provided in the workshops. The workshops are marketed throughout the college. They are facilitated by the assistant director. Participants are asked to RSVP to each workshop and the facilitator takes the attendance.

Writing Support Circles

Writing support circles (WSC) are too a series of workshops aimed at creating a community of learners who collaboratively work on writing projects. The idea was borrowed from Vopat (2009) who used such approach to foster writing in children. He facilitated children's collaboration on writing a book, from deciding on the book idea, dividing the roles and responsibilities, writing, editing, illustrating, and publishing.

WSC are offered to cohorts of 10-12 graduate students in an urban education program who are teachers in local schools and recipients of scholarships provided by the same grant that funded the center. The students are expected to participate in WSC as a part of their obligation to the grant. WSC are also offered to those instructors who ask to provide additional help to their students with some class writing assignment. Since its first implementation (see Plakhotnik & Rocco, 2012), the purpose and the design have been changed to increase the effectiveness of WSCs (Plakhotnik & Rocco, 2015). In its current format, WSC focus on helping students with their class assignments. The facilitator helps understand the assignment, break it into parts, plan the process of completing the assignment and manage time, search and identify resources, and edit writing assignments. Each workshop lasts for 1 hour, but the number of workshops varies and depends on the type of writing assignment students are completing. Each WSC series is customized based on the type of the assignment. The facilitator meets with the instructor and discusses the content of the WSC. For example, when asked to help with writing a methods section to

undergraduate students working on their action research project, four WSC workshops were offered. When asked to help with writing a course paper that connected an educational theory to classroom teaching, six WSC workshops were offered.

Individual Consultations

The goal of individual consultations is to provide one-on-one help to individual students with their writing projects. Individual consultations resemble coaching, which, in simple terms, involves face-to-face meetings and discussions between a less experienced person and a more experienced person to improve the performance of the less experienced person in a short period time. Coaching includes gathering data, providing feedback, motivating, and ensuring results (Kirkpatrick, 1982). Effective coaching requires coaches to be optimistic and have a strong sense of moral value, honesty, humility warmth, and trustworthiness (Riley, 1994). These qualities of a coach foster the other person's commitment to learning and improvement and excitement about the process. In management, coaching is defined as "a process used to encourage employees to accept responsibility for their own performance, to enable them to achieve and sustain superior performance and to treat them as partners working toward organizational goals and effectiveness" (Desimone et al., 2002, p. 369). In the case of individual consultations, coaching aimed first and foremost at improving writing of pre- and in-service teachers.

Each consultation usually lasts 1.5 hours, but if a student needs help urgently and the consultant has an opportunity, a longer consultation could be scheduled. Usually, one 1.5 hour session is not enough to help the student, so with each student the consultant schedules a series of meetings. Some last for a month; some schedule consultations for the entire semester. Students come looking for help with their class projects, master's theses, dissertations, conference papers, manuscripts to be submitted to journals, curriculum vitas, and letters of intent when applying for further education. Some come in the very beginning of the project and ask to help start the project; some come asking to help proofreading a paper or a dissertation. They are asked to first email the consultant and explain their problem, attach a description of the assignment or project, if possible, and their draft if they have any. During the consultation, the consultant opens their draft on the computer, clarifies the task, and starts reading the draft out loud making changes and comments using track changes. The consultant keeps three books for a quick reference that could help with the most common problems students have. The *Publication manual of the American Psychological Association* (APA, 2010) is used when students have problems following the style. The consultant is an expert in the APA style, but the consultant uses the *Manual* to help students learn how to locate information in the book and be able to find answers to their questions on their own in the future. *The Bedford Handbook* (Hacker, 1998) is used when students need help with grammar, punctuation, and mechanics. And *The Handbook of Scholarly Writing and Publishing* (Rocco & Hatcher, 2011) is used when students need help conceptualizing their papers.

Outcomes

The center staff holds regular meetings to discuss the quality of the services, receives feedback from the students in formal (e.g., surveys) and informal ways, meets with faculty to receive feedback on the services, compiles reports after the completion of each series, and keeps track of all individual consultations and publications that pre- and in-service teachers produce after receiving help from the center. The chapter reports on some major outcomes of this data collection and challenges that the staff has faced. The

center has helped to continue a conversation within the college about the quality of pre- and in-service teachers' academic writing and the place of writing instruction and support in courses, programs, and the college. The center staff and its supporters hope that by providing its services, collaborating with faculty on creating a WSC series for their courses, and discussing its services and issues with other faculty and administration informally and at formal meetings gradually more value will be given to writing and writing instruction in the college (Authors, 2016). The number of students who participate in the services provided by the center is growing each year, which could also help bring more attention to writing in classes. "Teacher candidates need better models of what good writing instruction looks like" (Grisham & Wolsey, 2011, p. 362). Students who attend the center services become more knowledgeable in what makes quality writing instruction, feedback, and evaluation, so they might voice their frustration with a lack thereof in their classes.

Although the center aims to serve students, junior faculty members have become clients for individual consultations. Faculty come with drafts of their manuscripts or other writing for publication projects. This points to the usefulness of the center and the fact that after getting a doctorate and securing an assistant professor's job, faculty need to continue learning and mastering academic writing and writing for publication skills. By using the center services, they also join the conversation about the quality and place of academic within the college. It is exciting to know that they are willing to join the process of improving the quality of writing.

Serval dozens of peer-reviewed conference papers and posters, manuscripts, and book reviews have been published or submitted for publication as of today by the pre- and in-service teachers who participated in the services. Writing for publication is a tool to increase teachers' understanding of their profession, foster teachers' credibility among their students, peers, administration, and students' parents, help actively participate in the knowledge creation in the profession both at the scholarly and practitioner levels, and increases self-confidence, among other benefits (Smiles & Short, 2006). Pre- and in-service teachers are thrilled to receive "accept" or "accept with revision" letters from the conference organizing committee and enjoy the conference. They feel they become members of a larger community of educators and they can contribute their ideas and experiences to this community.

Therefore, pre- and in-service teachers receiving various forms of support with their academic writing at the center are getting prepared for their future academic life and, ultimately, their career. In-service teachers often feel pressure to continue their education to secure their jobs. Pre-service teachers who are completing their undergraduate degrees and also become introduced to the "demands of advanced writing" (Nackoney, Munn, & Fernandez, 2011, p. 27) would have fewer struggles with research and writing if they decide to continue their education and obtain a master's degree. In-service teachers who are completing their master's degree would be more knowledgeable and skilled in writing their dissertations if they decide to obtain a doctoral degree.

Challenges

Most pre-service and in-service teachers do not understand benefits of writing for publication for the professional development. This is especially unfortunate for in-service teachers who have a wealth of experience and, in this case, work in one of the most diverse urban districts in the country that presents challenges, which teachers have to address regularly. If published, their experiences could "contribute to the knowledge base, professional practice, and some insight others could benefit from knowing" (Rocco, 2011, p. 5). If not published, this knowledge is lost. Other teachers who face the same or similar

challenges cannot benefit from knowing how to address them. Presenting their research at conferences, and especially practitioner-oriented conferences, introduces teachers to a larger community of teachers and school administrators and provides opportunities to join conversations about common issues and voice their concerns. Perhaps, support and encouragement should come not only from writing centers and individual university faculty, but also from school and district administration who set expectations to and evaluate teacher professional development and design and implement professional development initiatives.

Another challenge is that many faculty members do not assign writing assignments, do not provide sufficient feedback on these assignments, or do not teach writing or guide students through the writing process for a variety of reasons (Boice, 1990). They may not be required to publish much, so they do not see value in writing. They may not have enough skills themselves, have not received preparation in writing and publishing or in teaching writing and writing for publication. Some think that students dislike lengthy research papers and if assigned, the students would evaluate the instructor favorably at the end of the semester. Others believe they are responsible for teaching the subject matter, not writing (Blowers, & Donohue, 1994). Some do not realize that they are teaching writing even when they do, probably because due to their poor writing skills. Many simply expect students to know how to write, especially at the graduate level (Sallee, Hallett, & Tierney, 2011). The center staff have encountered writing assignments that were difficult to understand and follow and lacked clarity and sufficient explanation that would help students succeed in completing the assignment.

Despite the staff attempts to create opportunities for active learning, inquiry, and collaboration needed for a successful professional development program (Garet et al., 2001; Wiggins & McTighe, 2008), they have been able to incorporate these only into individual consultations. Pre- and in-service teachers are actively engaged in the process, ask lots questions, take notes, express their excitement and frustrations, compare one writing project to another, eager to respond to the consultant's prompts, and explain what they are trying to articulate into an unclear paragraph. For other services, such collaboration and inquiry are difficult to accomplish. Perhaps, due to limited experiences with writing and writing instruction, students are not used to see writing assignments as issues for collaboration and discussion. Even when they work on writing projects in pairs or small groups, usually the collaboration is limited to students simply dividing writing of different sections of the paper among themselves.

FUTURE RESEARCH DIRECTIONS

In the future, researchers could closely examine factors within colleges of education that lead to effective and systematic incorporation of writing instruction into course syllabi and the quality of this writing instruction. When instructors do not require writing assignments and do not provide clear assignment descriptions, guidance, and feedback, pre- and in-service teachers do not have opportunities to improve their writing skills or reflect on the quality of their writing. As a result, they do not understand a need to participate in professional development opportunities to improve their academic writing. The effectiveness of professional development programs depends on the culture of the school and district (Elmore, 2005; Halley & Valli, 1999; Sykes, 1999). Researchers could examine how culture of schools and districts treats in-service teachers' writing skills and the quality of their writing instruction. This examination could help understand how school and district administrators' attitude towards teachers' writing influence teachers' interest in writing and in relevant professional development opportunities.

Effective professional development programs also address the existing gaps or problems in the classroom and are the most relevant to teachers' every day teaching practice (Smith et al., 2008). Further research is needed to understand how professional development programs that target academic writing skills could be linked effectively to teachers' every-day practices. Researchers should also examine how writing centers within colleges of education in the country provide services to pre- and in-service teachers. Such examination could reveal common difficulties and effective solutions and assist centers' staff in improving the quality of their services.

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Section 3

Technology-Enhanced Teacher Education Initiatives

Chapter 14
A Holistic Professional Development Model:
A Case Study to Support Faculty Transition to Online Teaching

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ABSTRACT

Institutions struggle to develop online curriculum that meets increasing student demands for online education. The explosive growth of online learning necessitates that many higher education faculty transition from a traditional classroom to a web-based format, sometimes with little or no training. This chapter describes a holistic online faculty professional development (PD) model developed through use of a concerns-based adoption model (CBAM). The CBAM model provides an affective and behavioral lens for managing change. Through two of CBAM's components called stages of concern and levels of use, a PD plan was constructed that approaches the transition to distance learning as an ongoing process rather than simply as technology training. The holistic PD model considers each faculty member as an individual with unique needs. Components of the PD model and new Center for E-Learning (CeL) development and program building are explained. Impact on faculty and students and recommendations for program planning and future research are included.

INTRODUCTION

Distance learning (DL), a critical component of the long-term strategy of over 70% of higher education institutions (Allen & Seaman, 2015) continues increasing at a steady rate. Millions of U.S. students take online courses every year (Allen & Seaman, 2015), a number that rose at a spectacular rate in the past decade. Distance learning, undeniably an instructional delivery mode with staying power, still prompts

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strong opposition from traditional faculty members, with concerns ranging from technology to time to fundamentals of teaching practice. Changes incorporating web-based technologies in higher education curricula surge forward as some faculty struggle to keep up with the most basic techniques. Acceptance of online learning by faculty remains nearly flat, from 27.6% in 2003, rising only slightly to 28% in 2014 (Allen & Seaman, 2015).

This chapter describes a case study of the journey of a large state university's Center for e-Learning (CeL) to incorporate the faculty voice into enterprise-wide decisions affecting the growth of DL, including training and support for faculty transitioning to online teaching of graduate and undergraduate courses. Yielding 35% growth in this university's faculty and staff participation so far, implementation of the change in services represents over 50% participation of total university faculty utilizing services.

This chapter discusses a flexible, holistic program of online faculty professional development (PD), which emerged as a product of a needs assessment based on a concerns-based adoption model (CBAM) described later in this chapter. This model, chosen for its implications in supporting change in individuals, allows for acknowledgement of faculty experiences at varying levels of comfort and ability. Initially responding to the immediate needs of faculty identified through CBAM stages of concern and levels of use, the PD program design also offers a suite of pedagogical and technological development opportunities from novice through advanced levels. Serving a broader purpose, a consequence of this PD plan is the opportunity to provide pedagogical training addressing the gap that may exist between being a subject matter expert in a field of study and having knowledge of best practices in higher education instruction. Trainings developed recognize change as a process rather than as a one-and-done occurrence and honor individuals wherever they are in the adoption process. The PD model uses a holistic view to address the comprehensive experience of online faculty as having technology concerns and course design and facilitation needs, as well as the social factors related to their transition to online teaching. Emphasis on community building among faculty across all disciplines, a key component of the holistic PD program, allows for maximizing the potential for social learning, peer-to-peer knowledge sharing, and support.

In the pages that follow, a case study is presented on one institution's efforts to determine how to best support faculty teaching online. First the authors show a brief history of the evolution of distance learning in the United States, then follow with an overview of a change initiative that fueled the development of a holistic PD model at a southeastern state university. In addition, this chapter includes a review of general perspectives on a shift to online teaching and to adoption of DL. Recommendation for the development of a holistic PD model and evidence of impact are presented, along with future research directions in online faculty PD.

EVOLUTION OF DISTANCE LEARNING IN U.S.

Distance learning has a long, rich history in the United States, which has changed overtime. An instructional delivery method where time and distance separate instructor and student, DL in the United States dates back to a shorthand course offered in 1728. In that course and many that followed, the U.S. Postal Service provided a delivery system for two-way correspondence between student and teacher (Holmberg, 2005). Early DL offered passive learning experiences with the student accessing instructional materials through text, photos, and, eventually, recordings. These formats delayed feedback extensively making communication with the instructor challenging. The Society to Encourage Study at Home, founded in 1873 by Anna Eliot Tickner (Holmberg, 2005), became the earliest formalized DL effort in the United

States. Most of Tickner's students at the time were women bound by family responsibilities, yet eager to advance their education.

Some of the same reasons that correspondence courses were offered in the 18th and early 19th centuries remain relevant for 21st century learners. However, equal access to higher education remains a challenge. In contrast to the traditional, full-time, 18- to 24-year old college students, many nontraditional post-secondary students are older and engaged in career and family responsibilities, making it difficult to take classes on a set schedule that requires travel to a campus. With the explosive growth of online learning (Allen & Seaman, 2014), higher education now provides access to people previously without time or ability to attend college, some of whom include students with disabilities (particularly those 18-22), parents with young children, full-time employed, men and women in the military, and those in remote locations. Access to higher education for students with various challenges to attending classes in a traditional classroom contributes to an increased demand for distance learning courses and degree programs.

Growth of Distance Learning

To put DL growth in perspective, imagine having a new product adopted by 70% of all businesses, which would be considered quite a windfall. Now, imagine that in order to implement the adoption of the product, extensive and ongoing training is necessary; the cost and logistics of supporting the product now become daunting. Next, consider that scenario in the context of managing the change to DL. According to Allen and Seaman (2014), most recent data on the state of online learning in the United States show that 70.7% of higher education institutions now offer online courses. For institutions with over 1,000 students, the percentage increases to 83.6%. For those with over 5,000 students, the number jumps to 95%. Moreover, the number of students taking at least one online course now totals 7.1 million, representing an all-time high of 33.5%. That level of growth, absent a well-planned infrastructure of support, creates confusion and dissatisfaction among those on the frontline of the change.

To keep up with the rapid growth in online learning, higher education institutions often rely on seasoned faculty to teach online. The transition for these traditional classroom instructors requires significant changes in their teaching practices, including the adoption of web-based technologies (Wells, 2007) and a shift in their pedagogical approach (Gunawardena & McIsaac, 2004). Faculty transitioning to online teaching experience discomfort in the struggle to learn new computer skills with which their students often are more comfortable (Hanson, 2009; Lesht & Windes, 2011). For the most part, many faculty members convey instruction via a lecture-based or didactic method of communicating course knowledge to students, which has been the norm at postsecondary institutions. At the university level, the requirement to teach is typically a terminal degree in the discipline with no prerequisite for pedagogical training. Teachers tend to teach the way they were taught; namely, in the lecture mode. However, in online learning, faculty shift from being conveyers of knowledge to being facilitators of the acquisition of knowledge. Furthermore, in an online classroom, rather than being the main information source, faculty guide students to be navigators of learning resources.

Teachers new to online must adjust to a lack of physical presence in a classroom and to conveying knowledge to students through online learning management systems (LMS) and synchronous and asynchronous software tools. In the delivery of asynchronous online content, the instructor no longer has visual cues as the students learn the material. Online students access their courses at different times of

the day and on different days of the week. Synchronous web-conferencing tools offer real-time exchanges between instructor and student; however, communicating online makes it challenging to achieve energy and interactivity equivalent to that of a classroom setting (Lesht & Windes, 2011). The extent of change involved in shifting to teaching online, coupled with the ever-growing demand for more online offerings, makes it increasingly urgent that administrators at postsecondary institutions develop curriculum and training to support faculty in their transition to DL.

MAIN FOCUS OF THE CHAPTER

Barriers in the Adoption of Distance Learning

Multiple barriers hamper faculty participation in online learning. Variable factors include changes in teaching methods, which present challenges in managing shifting pedagogical practices (Allen & Seaman, 2014). Also at issue for faculty are access to technology as faculty struggle to obtain equipment necessary for teaching online (Neben, 2014; Seaman, 2009) and availability of support for IT issues (Osika, Johnson, & Buteau, 2009). Troubling also is some faculty feel they lack the knowledge and proficiency to use technology to teach their students (Neben, 2014). One of the highest levels of concern comes from the increased time commitment associated with preparation and facilitation of online courses (Allen & Seaman, 2015; Seaman, 2009).

Shifts in Pedagogical Approaches

Beyond the need to learn new technology, the adoption of distance learning involves a shift in pedagogical approaches, requiring faculty to convey knowledge to students in new ways. Many examples of these shifts can be named, but due to the limits of this chapter, only a few changes are noted here. Digital media options for recorded instructional materials replace the typical face-to-face (F2F) delivery style that is familiar to many seasoned educators. In a DL course, short video and audio recordings take the place of in-class lectures. Far from the traditional 1- to 3-hour long class time, the optimal length equates to six minutes for a recorded video lecture for students (Kim et al., 2014). A new trend has emerged to produce a series of short, single topic videos suitable for access via mobile devices, often referred to as micro-content or micro-learning (Bruck, Motiwalla, & Foerster, 2012). Also, for faculty who are used to lecturing in class for much longer durations, adaptation to an online format where students are accustomed to watching short videos on YouTube, Facebook, and other social media sites can be a challenge. Furthermore, teaching online means engaging students through web-based social interactions, which is a significant departure from F2F communications typical in a traditional classroom setting. By changing the roles from lecture-based instructors to facilitators of technology-based learning, the transition to DL marks substantial shifts in the ways instructors teach.

Access to Technology and Support

Technology ranks high as a concern for adoption of DL (Neben, 2014; Seaman, 2009). Faculty who experienced frequent past technology breakdowns worry about adequate infrastructure not being available

to support distance learning (Osika et al., 2009). Though most faculty have a computer in their office, the equipment may be outdated, with slow Internet connectivity, or they have had negative past experiences getting help with computer-related problems. Obtaining technology also may be a challenge. For instance, a large number of faculty prefer laptops, usually for the flexibility of using the same computer at work and at home; however, their department's budget may not allow for new hardware expenditures. Some additional factors influencing faculty adoption of DL are technology reliability, availability, and obtainability (Neben, 2014; Osika et al., 2009).

Knowledge of Technology/Available Training

Despite increased training availability for online faculty, knowledge about technology remains a barrier to faculty adoption of DL (Neben, 2014). Rates of development for new technologies have been far greater in the past 10 years than they were in the late 1990s and early 2000s. Over the past decade, the number of institutions providing DL training has increased greatly. The report, *Changing Course: Ten Years of Tracking Online Education in the United States*, indicated that only 6% of the institutions did not offer some type of training for DL (Allen & Seaman, 2013). Though support is offered, faculty find it to be lacking (Seaman, 2009).

To stay current, ongoing training for faculty should be a requirement, considering that the technologies used in the delivery of DL improve constantly. For example, not long ago, a common delivery method for DL instruction was a videocassette tape. The tape then was overshadowed by CD-ROMs. Today, cloud-based digital delivery methods being used widely include recordings made on personal devices and stored on YouTube, Dropbox, and Google Drive. Course development software with easy-to-use interfaces empowers faculty to create their own digital content. The steady change in the tools used in DL requires faculty to develop skills continually to keep their knowledge of technology relevant.

Time and Effort

Other variables – time and effort – should be considered for adoption of DL. In addition to the various duties and tasks beyond teaching and course preparation, teaching online involves the development of recorded materials, facilitation of discussions and group activities, and, in many cases, re-envisioning the delivery of course materials and assessments. Faculty in the study by Seaman (2009) rated increased time and effort as the most significant barrier to teaching online; in fact, a large majority (85%) of faculty respondents indicated that developing an online course took more effort than traditional courses. Additionally, a majority (64%) also felt that teaching online required more effort than F2F courses. Concerns about time and effort for delivery of DL remain high, as the annual survey by Allen and Seaman (2014) showed: Over three quarters of survey participants (78%) considered time and effort an important factor in DL adoption, which is a figure that has remained at over 75% for the past six years. Often faculty members are expected to become leaders in their fields, resulting in service beyond the institution. With their existing workload, it becomes difficult for faculty to have time to learn technology and develop online courses (Allen & Penuel, 2015; Allen & Seaman, 2013; Neben, 2014). Taking into account the identified barriers to transitioning to DL, the holistic PD model emerged over a 5-year span and is chronicled next in this chapter.

Institutional Change Initiative

A university-wide task force consisting of faculty and other campus stakeholders collaborated to create a report, *eLearning Task Force Report* (Florida Atlantic University [FAU], 2010), that outlined a vision for DL, propelling the university toward the establishment of a DL support system. As a result of these recommendations, a Center for eLearning (CeL) was established formally in 2010 with the appointment of an assistant provost of eLearning, a director of eLearning, a director of digital media and two instructional designers (ID).

The results of the task force report informed a plan for institutional change by increasing DL offerings. A key finding from the report noted the need for faculty support. Specifically, the report recommendations included the need for a supportive environment for eLearning, multiple approaches to PD, online resources, on-call support, acknowledgement of all levels of faculty experience, incentives for participation, and a welcoming location for consults and collaboration with IDs. The CeL's first PD offering was a semester long course, CeL1001.

Initial Steps in Professional Development Course Design

Two steps in the evolution of the CeL services are described: (a) the original semester-long course, CeL1001, launched in 2012 as a direct result of the 2010 taskforce report, and (b) the holistic PD model, developed in 2014, representing a major review and revision of CeL1001 to include a more flexible pathway to online certification and a wider array of faculty support services.

The first effort toward online faculty support at the CeL was the creation of CeL1001 in 2012, a semester-long PD course focused on pedagogical principles and best practices in online course facilitation. Though a big step forward for the institution, ultimately the course proved to be too rigid for those who were not ready for full e-learning intensive training and full immersion. The course required mandatory, all day F2F attendance three times during the semester and had multiple graded assessments for each unit. CeL1001 opened a channel of communication with faculty and administrators regarding DL that previously was non-existent. Feedback from faculty participants in CeL1001 provided valuable insight into faculty preferences for PD. Key points influencing the re-envisioning of the CeL PD plan noted in faculty feedback from CeL1001 included the desire for a more flexible schedule for receiving training; more just-in-time training (solving specific issues at the time they arise); and a greater focus on hands-on, real-world application of training.

In 2014, the second faculty PD effort for the CeL, the holistic PD model, incorporated faculty feedback from the previous CeL1001 course, a fresh look at the recommendations from the original 2010 task force report, and a series of listening forums held at each college across the main campus and at the two primary satellite campuses during the summer/fall 2014 semesters. Presenting to university faculty and administration stakeholders, the assistant provost of eLearning shared the CeL's desire to broaden the services offered beyond the one semester-long course, CeL1001. At each meeting, attendees were asked for input for the re-design of the CeL PD program.

Notes on suggested changes from each meeting were considered, along with results from a short questionnaire surveying faculty regarding preferences for training times, types, and topics. Also considered was feedback from end-of course surveys from the original CeL1001 course and the use of one-

legged interviews (Hall & Hord, 2011), which provided essential guidance for development of the new PD program. One-legged interviews are short, unscheduled, and informal dialogs that probe for issues related to the change; the term refers to the idea of two people talking casually in a hallway with only one leg planted on the ground. Indeed, analysts noted conversations with faculty in casual situations as helpful in drilling down to specific, individual concerns, which, taken as a whole, yielded key feedback.

Factors driving the impetus for change in the PD model included the identification of the need for support for course development, technology and pedagogy training as well as a mechanism for recognition of the increased workload transitioning to online entails. This support did not exist in the initial PD model at the CeL, which consisted of the semester-long CeL1001 as the only pathway to receiving services. Insights from faculty listed the need for more options for just-in-time training, information delivered in bite-sized chunks, more time and location options, personalized services, and forums that encourage collegial knowledge exchange. Results from the needs assessment indicated that more flexibility and an increased variety of PD options were needed.

In response to the needs assessment, a new vision for anytime, anyplace, and any pace training was noted. Needs assessment at the individual faculty level for the creation of the holistic PD model was based on the structures suggested in the CBAM model. Use of the CBAM framework offered a multi-dimensional approach to change management, from which a fully redesigned PD plan and the development of a new flexible, holistic PD model for online faculty training were established. The CBAM framework allows for the acknowledgment of unique perspectives and experiences of individuals undergoing change. Two of the main components of CBAM, stages of concern and levels of use, were instrumental in analyzing faculty needs and determining the appropriate direction for the creation of training workshops and support services.

CBAM Stages of Concern

The stages of concern describe progress through the affective aspects of a change process in the adoption of an innovation (Hall & Hord, 2011). Stages of concern address perceptions, apprehensions, and points of dis-ease about a change, initially focusing on the change as related to self, then to the task, and finally to impact on others. In the context of the development and implementation of training for faculty transitioning to online, stages of concern provide a structure of categories of concerns associated with faculty adoption of distance learning. The stages begin with an individual becoming aware of an innovation, then moving through the use of that innovation, and then incorporating the innovation into his or her work (Hall & Hord, 2014). Throughout the design of the holistic PD model, the stages of concern provided a lens to view PD as a change process rather than simply as a training need, while remaining aware of the distinct responses experienced by individuals. A short description of the different stages and the concerns faculty expressed within the context of the adoption of DL follows in the next section. In addition, the description contains examples of actions faculty may take at each stage:

- **Stage 0 Awareness (Self):** I do not see dl as applicable to my content area. faculty often believe that the content cannot be adapted for dl. for this reason, they are not concerned about teaching in a dl environment.
- **Stage 1 Informational (Self):** I want to know more about dl. faculty may have attended a presentation or conference or have read an article about dl in their field. they may have talked with

a colleague who received a stipend for developing a course or they may have been asked by their department to teach their course using a dl technology. at this point, they begin to inquire about dl.

- **Stage 2 Personal (Self):** How will teaching a dl class affect my work? at this stage, faculty are concerned about spending time in the development and facilitation of a dl course as compared to f2f. they may be concerned that the extra time could impact their ability to focus on research or to serve on committees.
- **Stage 3 Management (Task):** I seem to be spending a great deal of time preparing to teach my course. as the faculty begin to adopt dl, they may find it difficult to manage time spent organizing, building, and facilitating their courses.
- **Stage 4 Consequence (Impact on Others):** Are my students learning? faculty may be concerned about whether students are obtaining the same skills as those attending traditional f2f courses. this concern includes communication and collaboration skills, which may be perceived as difficult to teach in an online environment.
- **Stage 5 Collaboration (Impact on Others):** I wonder how my course compares to other dl courses. as faculty become more comfortable with the management of a dl course, they want to share what they are doing and explore what other faculty are doing in their online courses.
- **Stage 6 Refocusing (Impact on Others):** I wonder, if I were to add new activities would the students learn better? the faculty member is able to reflect on and to evaluate the pedagogy he or she is using in the dl course and begin to experiment with different strategies for teaching their content. the faculty member may begin to conduct research and publish his or her findings to share with others.

Guided by the stages of concern, the CeL team was able to create PD offerings to address identified areas of need. The holistic approach to this model takes a comprehensive look at the whole person and the many facets that affect the transition to online teaching, including personal and professional concerns related to the impact on self as well as technical/managerial concerns. Table 1. lists examples of the concerns expressed by the faculty transitioning to online teaching and the interventions developed as part of the holistic PD model.

CBAM Levels of Use

In contrast to the focus on the reaction to or attitude about change in the *stages of concern* component of CBAM, *levels of use* applies a behavioral lens as a diagnostic tool guiding the examination of individual experiences with the adoption of change based on what the user does at each level (Hall & Hord, 2011). Applying the levels of use structure, the CeL ID team based decisions about new services on all levels of faculty use of DL, with recognition of the need for flexibility to address a range of adoption levels from none, to novice, to confident user. Just as the stages of concern supported the identification of types of PD needed, the levels of use allowed the team a framework for monitoring the types of content that should be presented within the PD opportunities promoted by CeL. Through the levels of use lens, the focus directs toward the skills faculty want at each level. Table 2. displays examples of faculty feedback at each level, with the corresponding CeL services available to address the need. Support at all levels is a vital component for establishing the ongoing relationship between faculty and the CeL.

Table 1. Stages of concern matrix showing example interventions from holistic PD model

Stages of Concern	Expressions of Concerns	Interventions
Stage 0. Awareness	I do not see relevance of DL for my teaching practice or content area.	Outreach by asst. provost at all colleges across the university to acknowledge the changing landscape of universities and student needs. Campaign of messaging new services through department visits by ID team (called roadshows), web presence, attendance at faculty meetings, and top-down presentations by administration.
Stage 1. Informational	I have a healthy skepticism about DL. I know that others do this, but I am not sure if it is for me. Will my students learn as much as they do in my face-to-face course? I'm not very good with computers. Will I be overwhelmed with the technology?	Website information, online learning roadshows to programs and departments, single-topic workshops on familiar topics (i.e., using free PowerPoint templates, recording narrations, simple LMS functions, etc.), micro-learning content created.
Stage 2. Personal	It is going to be a lot of work to convert my course to online. I have research and committee responsibilities. Where will I find time for this?	**eDesign:** Partnering with ID to build course. **Online Course Template:** Course shell created based on national standards for course quality. All units built out, just insert content.
Stage 3. Management	It will take a lot more time to teach the course online. The technology will be too complicated for me to manage. What is the best technology to use to convey my subject matter expertise?	Continuing consults with ID.LMS support from Office of Information Technology (OIT). **Weekly Workshops:** Topics include: time-saving strategies, pedagogical best practices for enhancing student-student and student-teacher engagement, online communication, re-envisioning assessments, rubrics, and grading management strategies. **eCertification workshop:** A flexible, self-paced or cohort-based certification for facilitation and online course design basics. Offered fully online and hybrid. Badging system for individual modules provides step-out and step-in points. Marketed as anytime, anyplace, any pace training.
Stage 4. Consequences	How will this change impact my students? How can I improve the way I am teaching my students?	**Open lab:** Weekly drop-in day for faculty questions and assistance. No appointment necessary. **Consultations:** One-on-one instructional design support for building and revising.
Stage 5. Collaboration	What are my colleagues doing in their courses? How can I share what I have learned with my peers?	**Community of Practice:** Faculty-centered topical collaborative of shared resources, issues of common interest, ongoing dialogue **Teaching with Technology Showcase:** Faculty and staff showcase innovations in using technology for enhancing teaching and learning.
Stage 6. Refocusing	Now that I have taught my course, I have some ideas about how this can work even better. Does strategy A work better than strategy B?	**Quality Matters Course Submission Process**: IDs work directly with faculty to prepare a mature course for submission for national recognition through the Quality Matters program. **Grant writing** toward research to add to body of knowledge on online learning advancements. **Consults** resulting in course revisions.

Development of the Holistic PD Model

Based on the analysis of needs identified through faculty input and task force recommendations, a PD model with six main components was created: eDesign, eCertification, community of practice, consultations, PD workshops, and open labs. A differing yet complementary purpose appears in each component designed to accommodate varying levels of faculty involvement. Figure 1. identifies the main compo-

Table 2. Levels of use divided between nonusers and users

Levels of Use	Examples of Faculty Feedback at Each Level	Content
Level 0 - Nonuse: At this level, the faculty member is not using DL and is doing nothing to become involved.	• DL is not applicable to my area of expertise. • You cannot teach my subject online. • The students need to see me in order to understand the content. • My course is not lecture-based, we just discuss the readings. That can't happen in an online class.	**Outreach by Assistant Provost:** For broad awareness, the assistant provost presents at faculty assembly at the university and college level. AP explains the importance of DL for the university mission and discusses support options. At the department level, information about the different online programs offered in the state are shared. The CeL website is offered as a resources for faculty members who may be curious and are exploring DL. Research articles are made available about the quality of distance education, support options, and the application of intellectual property rights in DL.
Level I - Orientation: Faculty members begin to explore DL. Information gathering.	• This may work, but I have a healthy skepticism about it. • My department chair wants me to do this. • How can I make my current assessments work online? • How will I know that it is really the student taking the course? • If I build all of this ahead of time, what is my role in the course?	**eCertification workshop** provides bite-sized chunks of information that allow faculty to try one topic at a time (i.e., writing objectives, reviewing assessments, adding active learning). **eDesign:** Faculty move through the course building process with an ID to help manage change along the way.
Level II - Preparation: Faculty member is willing to plan the development of the course.	• I have never given much thought to the objectives of each unit. • Aligning the assessments and the objectives is hard work, but it makes sense. • This is a great way to see how each unit flows to the next. • Oh my gosh, this blueprint is great. Can I use this for my face-to-face course too?	**Course blueprint:** Faculty create unit objectives, instructional content, and assessments. Course alignment is established. C**ourse template** is introduced to promote ease of student navigation. Faculty are introduced to course facilitation strategies during the course building process.
Level III – Mechanical Use: Faculty member focused on the use of DL. Teaching course.	• How do I change my grading scheme to percentages in the rubric? • How can I change my discussion board prompt? • Can you show me how to upload my recordings?	**One-on-one consultations** and **open lab days:** As the faculty member teaches the course, the IDs are available to assist faculty when they run into issues related to running the course.
Level IV A - Routine: Faculty members develop a routine for teaching online. Use becomes stabilized.	• I just had one quick question. Can I stop by to see you? • I'm thinking about another course I might bring online next semester. Who would I talk to about that? • I want to come by and show you some of the great comments I got on my student evals.	At this point, faculty feel comfortable with their course and may be reaching out to the CeL less frequently. Faculty continue to use the **consultations** or **open lab,** and **PD Workshop** options to continue to advance skills. The ID team begins to channel questions to different team members so the faculty member becomes exposed to different approaches and ideas.
Level IV B - Refinement: Based upon experience in teaching the course, the faculty member is interested in modifying the original course to improve student outcomes.	• I heard about this technology. Would it improve my course? • One of my colleagues is using an interesting strategy for groups. I would like to try that to see how it impacts the students.	**Weekly PD workshops, recorded webcasts, micro-learning resources:** Faculty access resources for saving time, best practices, new technology tools and course improvement tips The workshops are delivered F2F, video streaming, and online.

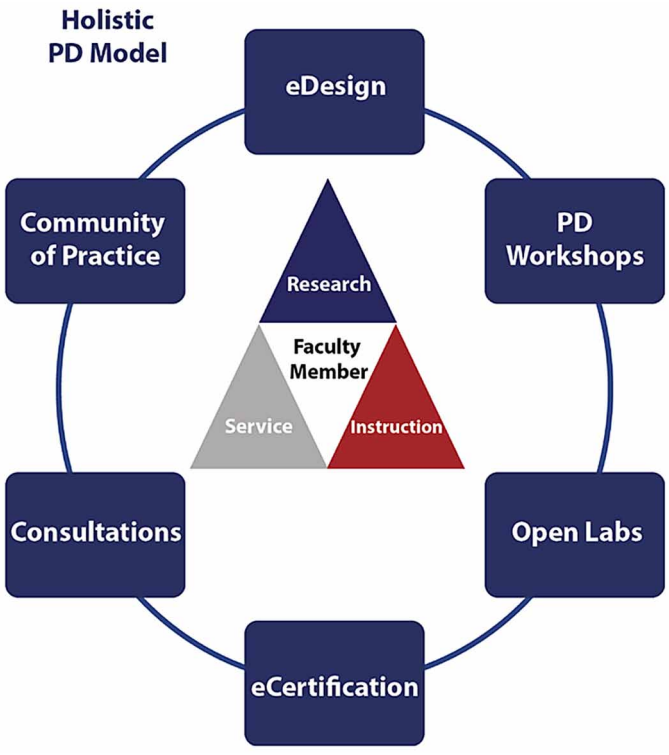
continued on following page

Table 2. Continued

Levels of Use	Examples of Faculty Feedback at Each Level	Content
Level V - Integration: The comfort level with teaching online is high enough to begin coordinating with colleagues to ensure the students' experiences are similar across courses. Faculty exhibit a willingness to share their challenges and successes with colleagues.	• I am on the committee in my department to explore bringing our whole program online. • I want to share what I have learned through teaching my online course with my colleagues. • What do I need to do to get my course ready for a Quality Matters review? I would like to get feedback on my course. • I offered to put my colleagues in my course so they could see what I built.	**Community of Practice:** Faculty participate in sharing online teaching experiences and exploring new ideas. Faculty at this point are ready to submit their courses for a **Quality Matters review** and to receive feedback from others outside the university about their course. Also at this level, departments may be going through **program migration** to fully online degrees. Seasoned faculty may become **program migration coordinators** to mentor their colleagues as they begin the process of adopting DL. Program-wide alignment of outcomes and assessments may be undertaken with the input of DL faculty.
Level VI - Renewal: The sharing and collaboration leads to experimentation, research, and publication in DL pedagogy and delivery. Mastery.	• Now that I have taught my course online a number of times, what would happen if a different approach were taken? • I am curious to find out which method has better results for the students. • The data from my course would be useful to publish in a journal article.	At this point, faculty have reflected on their courses and may be ready to rebuild based on new information or lessons learned. The cycle begins again with a new partnership and ID. Faculty are ready to share their work at technology showcases, conduct research on their online teaching strategies, present their results at conferences, and publish in journals.

Source: Hall & Hord, 2014.

Figure 1. Holistic professional development model developed by CeL



nents of the faculty-centered, holistic PD model. The center of the model represents the faculty role at the institution, which includes research (for some), service, and instruction.

Consultations

At all levels of use, consultations with IDs are offered both virtually and F2F. Consults represent the least amount of time commitment on the faculty member's part. Consults often consist of one or two main questions or challenges. Common topics for consultations include advice on the process of restructuring a grading scheme, strategies on facilitating group discussions, suggestions on addressing accessibility issues, and/or recommendations for multi-media tools, to name a few. Consultations provide opportunities to open the door to a new relationship between the faculty member and the CeL. These also have been found to be instrumental in reinforcing relationships established through prior interactions. Consultations provide assistance with immediate needs and guide faculty members to the next level of their PD.

eDesign

No prescribed order exists in which faculty utilize the components of the PD model. However, one of the more common steps after a consultation is for the faculty member to engage in the eDesign process, which pairs a faculty member with an ID for the purpose of designing and building a fully online course. Choosing eDesign makes a substantial commitment of time and effort, working with an ID over an 8- to 10-week period. Financial incentives in the form of stipends compensate for time expended.

The key to the eDesign course-building process resides in developing the course blueprint. This blueprint serves multiple purposes, including:

1. A quality assurance tool for establishing alignment between course level objectives and unit level objectives;
2. A way to drill down to achieve alignment between unit level objectives, assessments, and course content; and
3. A faculty PD tool.

The blueprint with three columns and 16 rows represents a snapshot of a 16-week/unit course from start to finish and adjusts to provide a structure for courses or trainings having more or less units.

The first step of the blueprint process establishes course-level objectives by documenting them in a structured, 3-column table. Typically, a program chair or program committee dictates the course-level objectives. Course-level objectives are entered above the grid to guide the construction of the remainder of the blueprint. To begin filling in the blueprint, the ID guides the faculty member through the writing of specific, observable, and measurable objectives for each week or unit. Entering assessments in the second column that corresponds to the appropriate objectives is next. The last column represents the lesson content, which corresponds to the assessments and objectives. Finally, the ID works with the faculty member to check for alignment between objectives, assessments, and course content, utilizing Bloom's Taxonomy (Krathwohl, 2002). Course alignment including specific, measurable objectives impacts clarity of instruction and students' ability to learn new material by focusing a specific goal at the proper level for the type of knowledge they are expected to develop (Blumberg, 2009). In some cases, this is the faculty member's first exposure to pedagogical preparation. This blueprint process adds rigor,

which increases the likelihood of course quality with the added value of providing PD in the form of tacit knowledge exchange on instructional design principles between the ID and faculty member.

Building the blueprint has remained the most time-consuming step in the course design process. Developing objectives and aligning assessments and content require a deeper examination of the purpose and sequence of all course materials than may have been done in the past. Nevertheless, the blueprint development typically yields the most ah-ha moments. As one faculty member noted with appreciation, "Using the blueprint has helped me organize my thoughts about how the course should flow. I am going to use this to revise my other courses as well." Frequently, the new experience of working with an ID to map out specific student expectations for a course and assuring each assessment corresponds to learning activities presents a new approach to course construction for faculty members. Building the course blueprint with an ID provides a PD opportunity for the faculty member to get hands-on practice using course design and alignment techniques.

The purpose of the eDesign component of the holistic PD model is two-fold:

1. To promote quality course building, and
2. To provide a learning opportunity for faculty to develop design skills that are transferable to future courses whether they be online or blended.

The eDesign process also includes a peer review and revision component to confirm alignment and quality. The eDesign process requires a major time and effort commitment. Nonetheless, in the first year of implementation of the new holistic PD model, 77 new courses were developed, with numbers of eDesign participants growing each semester. For those who are seeking a less extensive challenge, the holistic PD model has other options such as those detailed next.

Community of Practice

All faculty, whether or not they teach online, can begin exploring new technologies and eLearning teaching strategies through the community of practice (CoP) meetings held monthly. As originally conceived by Lave and Wenger (1991), CoPs, broadly defined, mean groups of likeminded individuals who share a repertoire of resources, a social connection to one another, and a common interest (Wenger, 1999). The main purpose of the CoP component of the model stands to encourage interaction between faculty members to promote social learning in a supportive environment.

An exciting consequence of bringing faculty together from all colleges campus-wide for CoP meetings is that, while participants discuss their various experiences with technology and eLearning, sharing occurs organically. As an example, one CoP participant in response to an idea shared by another faculty member remarked, "I would never have thought to create icons for my course to visually represent concepts for my students. This is an amazing idea." The peer-to-peer, open exchange that takes place in CoP meetings and also in other components of the model, like the PD workshops and eCertification workshop, often produces innovative solutions that have benefits for the whole group. To further illustrate, during a CoP meeting on the topic of facilitating group work, a faculty participant affirmed, "I would not have tried using groups in my course if I hadn't heard that others have used it successfully. It doesn't seem so intimidating now." For the ID team, the opportunity to learn and share with faculty in CoP meetings creates a warm, supportive atmosphere that provides PD for IDs and faculty. CoPs

are a safe environment of collegial support that contribute to a successful transition to online teaching (Golden, 2016; Maier, 2012)

PD Workshops

Weekly workshops on micro-topics leverage the social learning aspect of communities of practice by facilitating collegial interaction centered on a common interest. The purpose of the PD workshops is to offer bite-sized chunks of information taught in a hands-on format by IDs as a means of providing training without overwhelming faculty with complex concepts or multiple steps to learn. Topics chosen are based on relevance to the design and delivery of online courses and typically are suitable for implementation in current faculty courses. At times, seasoned eLearning faculty facilitate a PD workshop upon request by CeL staff. Often the PD workshops and CoPs overlap in purpose as a space for facilitating social learning and transfer of knowledge among colleagues. As a result of the on-going efforts to build community at the CeL, the entire state has adopted the CeL CoP as a central point of knowledge exchange promoting communication and a common narrative surrounding eLearning best practices state-wide. CoP attendees join the interactive sessions in person or through a web portal.

Open Lab

During the open lab component of the holistic PD model, the ID team assembles one day each week in a training area, making themselves available for walk-in questions and assistance. Each week at noon during open lab, a PD workshop available online and in person offers training on various technology and pedagogical topics. Since the implementation of the holistic PD model and within one year, 120 unique visitors have used open lab services and 209 unique visitors have attended PD workshops and CoP. The term unique visits refers to a single count of each individual regardless of the number of times they have utilized a service, for instance if the same individual has attended PD workshops four times, they are counted as only one unique visit.

eCertification Workshop

A larger commitment to PD beyond CoP participation and attendance at weekly PD workshops, the eCertification workshop is suitable for those who are ready for a deeper dive into DL course design and facilitation. The flagship PD option at the CeL, eCertification is an 8-week workshop offered fully online or hybrid that can be taken self-paced or as part of a cohort. A more formalized training, eCertification offers a certificate of completion and a small stipend for faculty. eCertification, intentionally designed for flexibility, accommodates a wide range of faculty schedules. The design incorporates gamification techniques through a badging system to provide easy, step-in/step-out options in each unit for those who are not able to finish in one semester.

The eCertification workshop represents a complete overhaul of the original semester-long CeL1001 training course, which, prior to the new holistic PD model, was the only way to receive services from the CeL. The re-conceptualization of CeL PD training resulting in the eCertification workshop incorporates three core changes – added flexibility, community building, and applicability of assessments. Feedback from faculty on the previous CeL1001 course indicated that the rigid schedule requiring multiple, daylong F2F trainings in addition to the online work was incompatible with faculty schedules. In the holistic PD

model the options for self-paced or cohort-based participation, hybrid or fully online attendance, and the opportunity to step-out/step-in at the end of each unit provide flexibility and address faculty concerns regarding time commitment for DL. Utilizing a gamified format as a motivator and tracking method for stipend payments, upon completion of each unit – assessments, blueprint, community/collaboration, teacher presence, active learning, rubrics, and PD – participants receive a badge. At the completion of a unit, participants choose to continue to the next unit or to take a break and return when time permits. Earning all seven badges results in online designer/facilitator certification and payment of a stipend.

Another key area of change from the original CeL1001 course was streamlining and re-focusing the assessments to have practical application tasks rather than graded assignments. For practicing the skills learning in eCertification, faculty who sign up for the workshop are asked to choose either a course that they want to migrate to online or a course that they are teaching F2F. Toward the end of the eCertification workshop, creation of a developmental course shell for each participant provides a sandbox for faculty and staff to try out new techniques. Each unit has one authentic assessment, which allows faculty to practice what they have learned. For instance, the unit on assessments culminates in the creation of an assessment planner for their course. As another example, to earn the community and collaboration badge, participants work with peers in an online group to develop a lesson example, giving faculty a first-hand view of the dynamics and logistics of online group work from a student perspective. In addition to the authentic assessments, faculty have opportunities to reflect on the learning and achievement in each unit using online journals and wikis.

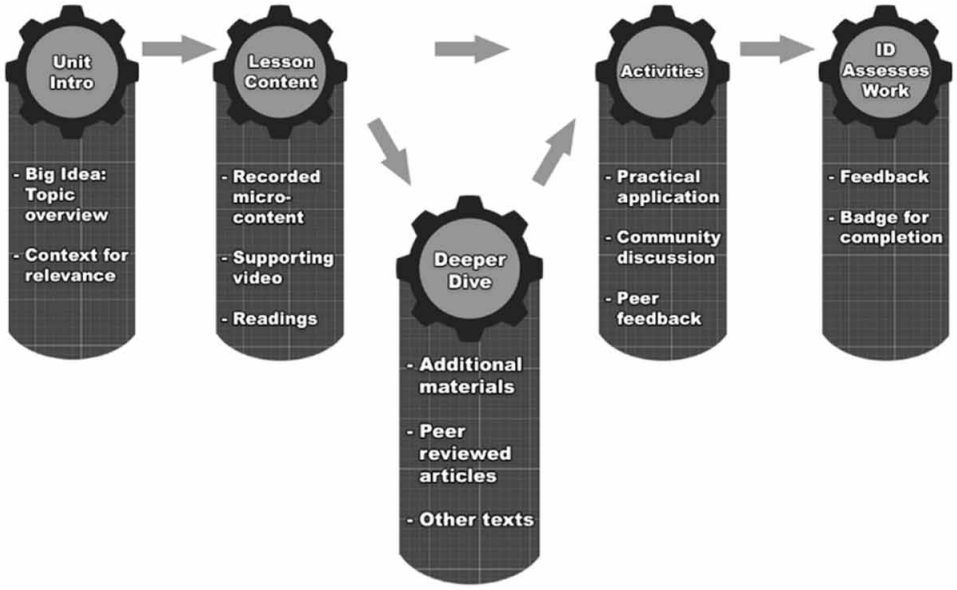
The CeL encourages community building through the learning platform's discussion board in each unit, which provides a forum for faculty and staff participating in the workshop to take part in a reflective dialogue surrounding the adoption of DL. As a compliment to CoP meetings, building community across disciplines through discussions in the workshop became a primary goal for the holistic PD model. Interaction among faculty positively demonstrates the willingness of teachers to adopt technology (Wang & Wang, 2009) and contributes to the exploration of new ways of approaching teaching (Golden, 2016; Johnson, Ehrlich, Watts-Taffe, & Williams, 2014). CoPs support sense making in a change process, inviting open discussion of challenges and collaborative solutions (Golden, 2014). An essential element in supporting the process of faculty transitioning to DL remains the inclusion of opportunities to reflect on changes occurring in faculty as they begin to reconsider their long-held beliefs about how to teach (McQuiggan, 2012).

The CeL PD team remains encouraged by the quality and volume of discourse occurring among faculty and staff in the online discussion boards. Growth in the number of participants in eCertification affords a fertile environment for knowledge and resource sharing. In a 1-year period following the implementation of the holistic PD model, 119 faculty members and a small number of staff have participated in the eCertification workshop. Figure 2. illustrates the sequence of instruction in each eCertification unit.

Summary

Created to offer a seamless flow between all components of this PD model, multiple entry points for access to the CeL's services afford flexible participation options. A common thread emphasizing quality throughout all of the PD components includes well-written objectives, proper course alignment, teacher presence, student interaction, varied assessments, accessible content, and active learning features. Keeping quality at the core of all PD offerings allows for a consistent message, even as services expand to maximize the potential for faculty participation in development opportunities.

Figure 2. Sequence of instruction in eCertification units



An important feature of this PD model is scalability, which small and large institutions can manage when adjusting for budget and personnel. In the case of this institution, PD is supported through a distance learning fee paid by all online students. An institution can begin small by picking one or two of the components, then grow over time with a goal of implementing a full complement of services for maximum results. One recommendation, based on experience, is that there should be a full needs assessment prior to implementing the holistic PD model. This will assure that each component fits well within the institutional context. Key concerns for achieving success include knowing the stakeholders and soliciting their input to achieve sufficient buy-in (Goolnik, 2006). Further recommendations are made within the conclusion of this chapter.

EVIDENCE OF HOLISTIC PD SUCCESS

Success of the PD Model

Expanding reach occurring at the CeL as more faculty access services and develop high-quality courses provides evidence of impact of the holistic PD model. Faculty at the institution have expanded options for services, including course revisions, assistance with present courses, and training on the use of online technologies. With the increase in volume of services and participants, a tracking mechanism for incoming service requests was a vital tool for managing the rapid increase in projects. At first an Excel spreadsheet was sufficient; however, within the first year as the program grew, hiring a database developer to construct a client resource management (CRM) database became a pressing need. As an entry point for each service, completion of a short form sends client information to the CRM database, which then provides ongoing information on participant use of services. A vital means of project management, this

tracking system has further utility in providing a means for creating growth reports for provost, board of trustees, and board of governors' meetings.

In the first year of implementation of the holistic PD model, the CeL provided course development support to 167 faculty members, resulting in 77 newly developed courses and 20 course improvements through conversions to the CeL course template. The entire College of Nursing has adopted the CeL course template for all courses. After four semesters of the implementation of the expanded services, the CeL averages over 40 new courses per semester. Through the eCertification workshop, open lab, and web-based PD options, another 337 faculty utilized the services at the CeL. Participation in the eCertification course alone has grown 237% now has been adopted state-wide as a central point of collaboration for eLearning faculty and staff.

Impact of the PD Model on Faculty

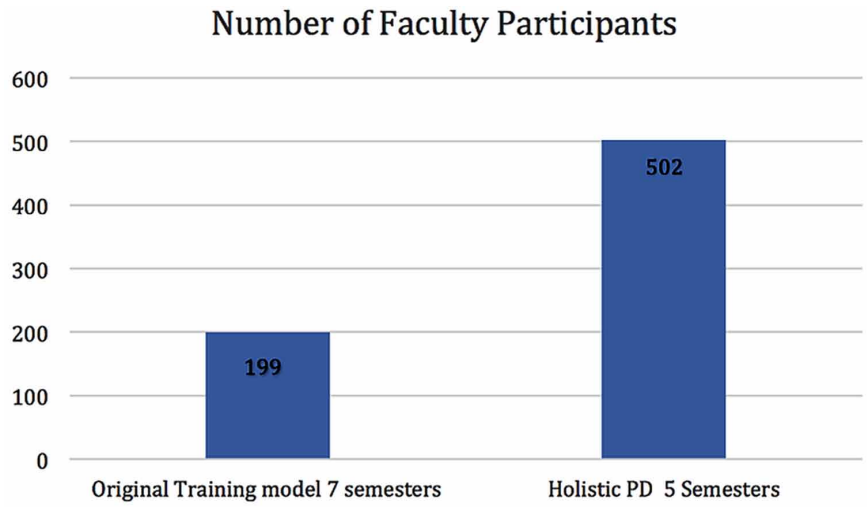
Since the implementation of the change in services, 701 faculty received support from the CeL. To put these numbers in perspective, the university has 820 full-time instructional faculty and 501 part-time faculty. This means that over 50% of the faculty have sought assistance from the CeL, and 90% of those faculty are new CeL clients since the launch of the holistic PD model. See Figure 3. for comparison.

In under a year, the CeL's online presence grew, with 1,005 page views for just-in-time training modules. Additionally, the CeL CoP site showed significant growth with over 3,000 hits in one year's time. With increasing participation by the faculty in the services offered, the CeL became the main hub of faculty support originally envisioned in the Task Force Report (FAU, 2010).

Significance of Impact on Faculty

Though the numbers illustrate the strength of the PD model, sharing the faculty voice shows an equally strong indicator of the process by which quality online learning is promoted throughout the PD system. The faculty asked for multiple entry points based upon their experience. The following quotes are from faculty members from across the spectrum of disciplines represented at the university.

Figure 3. Faculty Seeking Assistance from CeL

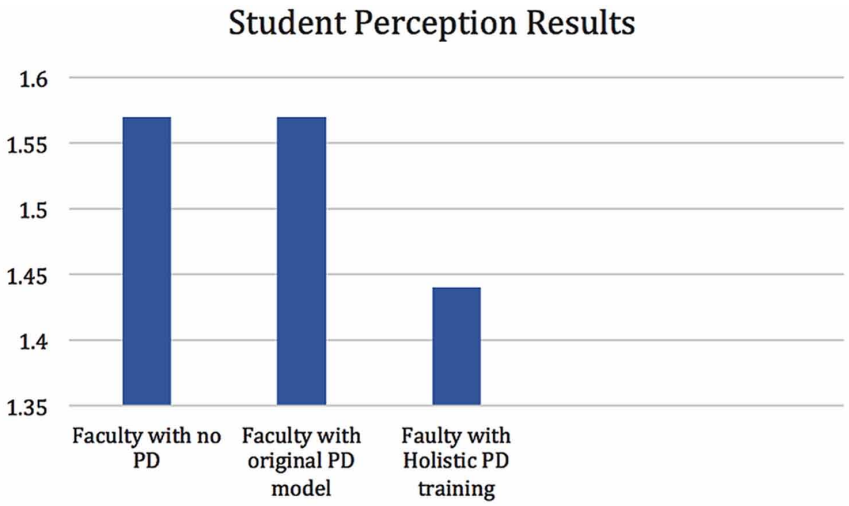


To illustrate faculty satisfaction with the holistic PD model services, an experienced distance educator described his experience with the ID team, remarking, "While I have many online courses I developed myself, I did not know how to take full advantage of the online environment, making the content interactive, so that I could reach out to the types of students we have today." Another faculty member, new to DL, made the observation, "I was not sure how I could incorporate videos into my research course, but after completing the blueprint for the entire semester, it became clear to me. I decided to create a video for each stage of the course." Commenting on the changing pedagogical approach, a faculty member noted, "I am beginning to think of myself as part of the small community that is my online class. More than just trying to monitor how to deliver content to my students, I am now thinking about both myself and them as a learning community." Increased use of services and positive feedback provided by faculty indicate that implementation of the holistic PD model has resulted in more faculty being exposed to best practices in online course design and facilitation and finding their experience to be of value to their teaching practice.

Significance of Impact for Students

Data on the impact on students became available only recently. Quantitative data from the Student Perception of Teaching (SPOT) report offer a glimpse into the online student experience. Every student across the university's campuses, regardless of the delivery method or the content, receives an online survey asking about the quality of their course and the course instructor. Students now rate the courses developed through the PD options as being of better quality. On a scale, with 1 being *highly agree* and 4 being *highly disagree*, online courses built with the assistance of the new holistic PD model achieved a rating of 1.44 as compared with 1.57 for those developed with no training or with the original semester-long training (a lower number indicates higher agreement). The courses also are rated as better than the traditional F2F courses, which are rated at 1.49. Figure 4 provides a graphic describing the results.

Figure 4. Rating of holistic PD compared to traditional face-to-face courses



Note: **A lower number indicates higher agreement.**

DISCUSSION OF IMPACT ON FACULTY AND STUDENTS

Faculty participation in PD in support of transitioning to online teaching has been found to have a positive impact on the delivery of DL courses and a broader impact on strengthening teaching skills in general (McQuiggan, 2012; Torrisi & Davis, 2000). The holistic PD model described in this chapter recognizes the stages of adoption of DL as being ongoing even after mastery achievement. Torrisi and Davis (2000) affirmed that online PD provides a process of transforming teaching practice rather than simply training on the use of technology. Furthermore, findings indicate that the process of participating in PD for online teaching acts as a catalyst for reflection on all modes of instructional delivery, not solely on DL (Torrisi & Davis, 2000). Also, the reflective nature of the peer-to-peer dialogue built into the eCertification, PD workshop, and CoP components of the holistic PD model facilitates idea sharing and the building of supportive communities. The process of change involved in the move to DL results in reconsidering teaching methods for all modes of course delivery (McQuiggan, 2012), which ultimately influences the student experience with DL.

Young and Hoerig (2013) examined faculty PD from a student perspective, assessing student perception of online courses developed through a PD training program based on three main categories: course design, instructional content, and communication and interaction. Findings indicate that PD offerings, to be effective, must have a connection to how students prefer to learn online. Student participants in the study agreed that course navigation and organization are important to them. Students favored multimedia presentations over text. Additionally, courses with little to no interaction with the faculty member caused dissatisfaction among participants. Furthermore, the indicators of student satisfaction in Young and Hoerig are encouraging as they are well aligned to concepts introduced in the holistic PD model; these include rapid development tools such as the course blueprint and online course template, which provide structured, consistent navigation for students. Active learning such as interactive content, teacher presence, and recorded multi-media unit introductions has been emphasized highly in the eCertification, CoP, and PD workshop components of the holistic PD model. Faculty and staff using one or more of the CeL services receive tools and teaching strategies that promote quality course design through the use of engaging student-centered instructional content and the inclusion of techniques for embedding community and collaborative experiences that promote student-to-teacher and student-to-student communication.

SOLUTIONS AND RECOMMENDATIONS

Recommendations for Developing a Holistic Model

Because every higher education institution is unique, several general recommendations can be made to develop a new PD program; however, examining the specific needs of an institution is a recommended step in customizing training and support. Factors present at this university may not be applicable in another context. The authors offer six main recommendations as guidance for undertaking the development of a holistic PD plan.

Step 1: Needs Assessment

The university-wide task force for DL was an excellent starting point for DL adoption as the stakeholders represented a cross section of faculty and staff who would be impacted by the change. It is recommended to create a similar open system amenable to diverse input in order to produce an empowered, learning collaborative rather than a self-referencing silo of decision makers (Duke, 2002; Goolnik, 2006). If an institution-wide needs assessment is not an available option, a mission statement with regard to the institution's vision for DL will serve as a foundational document from which a new program can be built. At whatever level is available – college, department, program – take steps to gather information through formal or informal channels including the CBAM recommendations of one-legged interviews, the stages of concern questionnaire, or through open-ended concerns statements (Hall & Hord, 2014). An initial needs assessment will help address concerns and allow change recipients to become part of the change process – a strategy to build support for change.

Step 2: Listen

Bringing institutional stakeholders into the planning stage provides steps toward achieving buy-in for the change process. If there is resistance, it is vital to identify the specifics involved by providing forums that allow resisters to have a voice. For example, start by contacting the dean of each college and the chairs of programs likely to be most affected by the change. Plan presentations to faculty in each discipline as a means of giving and getting information. Allow time in each presentation for faculty to share their ideas and concerns. Dissenting opinions and pushback offer valuable feedback that can drive innovation. Waddell and Sohal (1998) proposed that resistance to change, rather than being a hindrance to success or progress, be used as a tool for the management of change. Addressing concerns and answering questions early in the process help diffuse anxiety about the unknown and add some measure of stability to the process. For instance, faculty at our institution had concerns about job security and intellectual property. Rather than allow rumor and conjecture to steer the change narrative, presentations to faculty senate were instrumental in disseminating accurate information about the change and in gathering input about faculty concerns. Faculty are on the frontline of DL and listening is an important step towards acceptance. What do they want? How do they envision the support and the training needed? Where would they like to be when they finish participating in the PD activities? Find out first what questions cause resistance.

Step 3: Evaluate

The next step, during the listening phase, requires evaluating concerns that the faculty express. This evaluation, using the CBAM model, allows for an understanding of where faculty stand on the continuum toward adoption of DL. It is recommended that the stages of concern and levels of use be used as tools to organize and categorize feedback so as to make an action plan easier to envision. Evaluating concerns will add insight into the types of PD needed. The objective is to move the faculty through the different levels of concern as they grow in their understanding of what DL is and how it can become a part of their teaching experience.

Step 4: Financing Professional Development

A crucial consideration for program planning includes financing questions. From where is financing coming? How will it be disbursed? What stipend amount is enough? Is the plan sustainable? At the university in this case study, a DL fee was created university-wide at $30 per credit hour. Each student taking a course listed as 80% or more online, pays this fee. The DL fee allows the CeL to provide faculty incentives for participation in eCertification and eDesign. Both of these programs demand a significant amount of engagement and effort above and beyond typical faculty teaching, research, and service commitments. At the university discussed here, stipends are offered to compensate faculty for the increased involvement in partnering with an ID. Beyond just transferring F2F content to an LMS, quality online course design and delivery require faculty to re-envision the structure and sequence of a course. Furthermore, the eCertification workshop is designed to mimic an online course requiring faculty to engage with online content, interact with peers, and complete authentic assessments. Sustainability is built into the model. As a result of increasing the amount of online courses, more funds have become available for the addition of critical support staff including IDs, instructional technologists, digital media specialists, and PD trainers. Ultimately, the return on investment is realized through well-trained faculty incorporating online pedagogy and technology in the facilitation of their courses. Additional benefits include higher quality courses designed according to national online standards and concierge-style student support from an eLearning student success advisor. Due to successful implementation of the holistic PD model, the CeL grew from its original 4 staff members to 10 instructional design and support personnel, which resulted in increased faculty involvement producing 40 or more online courses per semester and 15-20 eCertification completers per semester – an astounding achievement.

Step 5: Messaging Change

Communicate the new plan to stakeholders. It is recommended that a marketing plan be developed focused on the faculty experience. Suggested components of a marketing plan include the creation of engaging web-based content and micro-learning resources to allow small steps toward adoption. Additionally, do not wait for the faculty to arrive on the doorstep; take the show on the road. Roadshows say volumes about the intent to provide service to the faculty. Also consider the inclusion of support staff in PD planning. DL strategies can offer time-saving, budget-friendly training solutions. In-person presentations to department meetings, deans, chairs, faculty senate, and new faculty orientation provide an opportunity to engage on a personal level. Until faculty cease to see eLearning personnel as change insurgents, it is difficult to re-establish equilibrium following the instability triggered by change within the organization (Schein, 2002).

As with any business, satisfied clients are great advertising. Maintaining a flexible, customer service outlook will help faculty become more at ease with engaging in PD. Make workshops lively and interactive. Use adult learning strategies to honor the knowledge and experience that faculty bring to the training. Utilize CoP members as faculty champions to spread the word. Finally, ensuring that faculty have good experiences when they need support will help spread the good word.

Step 6: Ongoing Evaluation and Assessment

Constant evaluation of faculty feedback will guide the growth of PD training. Faculty needs vary between individuals; therefore, we recommend a mechanism for gathering input on all services. A database for customer relationship management (CRM) provides an excellent way to keep all feedback and information in a central spot where customized reports can be pulled to assess individual ID performance as well as evaluations of resources or programs. Consider adding quick online surveys at the completion of workshops, certification courses, consultations, and course builds, which will provide a wealth of data to inform the revision of existing materials and the creation of new trainings and resources. Informal gatherings once per semester invite casual feedback in a relaxed setting. Often faculty are so busy they rarely have time to meet with one another. Providing this space to meet and collaborate is an excellent use of time and thus a recommendation for PD plan implementation.

FUTURE RESEARCH DIRECTIONS

For the medium-sized state university discussed here, the holistic PD model has remained sustainable with increasing support from faculty, staff, and administration. However, building a sustainable, holistic PD model by other institutions that may have limited funding for PD could prove to be more challenging than it was at the institution described in this chapter. Investigation into the benefits of investment in the holistic PD model would provide useful information that would add to the existing literature on building support programs for online faculty. If PD can be viewed as an investment into the future of the institution, questions emerge which build a solid area of future research:

1. With the additional investment in PD, are faculty members more likely to persist in online teaching?
2. Given the extent of ongoing support suggested in this model, is the faculty level of commitment to the institution and to online teaching affected? Data from this question would provide valuable information that would guide the development of eLearning initiatives and inform infrastructure investment planning.
3. Will ongoing support increase faculty willingness to teach online?
4. How will research on a larger scale impact results? Investment of the dollars for PD also has the intangible result of improving of the quality of the courses offered. Using a small sample of 32 courses, indications support the notion that the quality of the courses supported by the holistic PD model is better when comparing student satisfaction in the online and traditional versions of courses.
5. Is there a correlation between pedagogical training in course design and facilitaon afforded by the transition to online teaching and levels of student success including pass rates, persistence toward graduation, and grade achievement?
6. Many additional options in support of hybrid learning, flipped classrooms, and technology-enhanced F2F classrooms can be added to this model for extending the reach of PD. Additional research is recommended to examine the potential of DL support for improving pedagogy across all course delivery modalities. Furthermore, additional research on best practices for supporting all web-enhanced instructional methods requires attention.

CONCLUSION

As postsecondary institutions continue to perceive DL as an important addition to the curriculum, the number of faculty needed to participate in the delivery of high quality DL courses increases. Faculty encounter numerous barriers in the adoption of DL course delivery, including comfort level with the technology, time to learn the skills and technology required, and modification of their course pedagogy to provide effective learning experiences. By using the CBAM model's categories, an understanding of the concerns expressed by faculty guide the development of training elements that meet the needs of online faculty.

Present indicators from evaluation of the initial development and implementation of the holistic PD model show increased interest in DL from university faculty. Participation in PD by the faculty garnered new interest from department chairs, deans, university support staff, graduate assistants, and doctoral students. The courses developed through the process described in this case study receive higher ratings from students and faculty indicating satisfaction with workshop participation and instructional design services. Approaching DL professional development holistically while taking into account the total experience of the individual became critical to the implementation of this model. Viewing PD as a process that is ongoing rather than a one and done undertaking proved equally important.

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KEY TERMS and DEFINITIONS

Change Management: From an organizational perspective, with recognition that change does not occur in isolation but rather has system-wide impact on people, change management is a process of coordinating a structured process for transitioning from original state to new, changed state.

Concerns-Based Adoption Model (CBAM): A model of change designed to assess concerns expressed in the adoption of innovations.

Distance Learning: A method of instructional delivery in which instructor and student are separated by time and distance.

eLearning: A broad term encompassing instruction conducted through electronic means, known as electronic learning. Typically refers to web-based instruction; however, classroom-based instruction making use of web-based or electronic resources also falls under the umbrella of eLearning.

Holistic: Consideration of the whole individual, including affective and behavioral concerns.

Instructional Designer (ID): In an eLearning context, an individual concerned with the construction of instruction at the curriculum level, individual course level, or at the level of developing learning objects or training modules. Often paired with subject matter experts (SME), an ID acts as expert in the technology used to deliver instruction.

Micro-Learning: Short, narrow-topic chunks of instruction or learning activities, often designed for use on mobile devices or in web-based formats. However short items of text, audio recordings, learning games, vocabulary lists, and self-check quizzes also apply to micro-learning.

Online Learning: Internet or web-based learning, often used interchangeably with eLearning; although eLearning is a broader term. Similar to distance learning, online learning is a method of instruction whereby instructor and student are separated by time and/or distance and not geographically bound.

Professional Development: Work-related skill building. Learning opportunities for improving job-related knowledge or skills through training and instruction.

Chapter 15
A Multimedia Tool for Teacher Education and Professional Development

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ABSTRACT

This article describes a tool that can be used in teacher education called Content Acquisition Podcasts (CAPs). CAPs are short multimedia vignettes designed to teach targeted, specific concepts. They are developed in accordance with design principles that are intended to reduce learners' cognitive load (Mayer, 2009). CAPs are simple to create and can be made with readily-available software; this accessibility and their flexible design makes them extremely versatile. They can easily be incorporated into flipped or blended classes. In this article, the authors explain how CAPs are created, describe three ways to integrate CAPs into teacher education and professional development, and explore how CAPs can begin to address the challenges of preparing teachers for a complex working environment.

BACKGROUND

Even the best teacher education programs lack the time to prepare special and general education teachers for every possible employment scenario they may encounter (Grossman & McDonald, 2008). For example, special educators need a broad range of preparation because in many states they can be hired to teach students with any disability in any subject area at any grade level. They also must develop skills for teaching content in both self-contained and inclusive settings (Brownell, Sindelar, Kiely, & Danielson, 2010). Special educators must be prepared to meet the needs of students across all of these possible settings and therefore need to be well-versed in a variety of evidence-based practices.

Similarly, general educators have a wide array of possibilities for career placements. General educators must develop deep understanding of their curriculum content and acquire skills in behavior management,

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classroom organization, and effective teaching strategies for use in varied contexts (Darling-Hammond, 2008; 2012). In addition, 90% of students with disabilities (SWD) receive their education primarily in general education settings (National Center for Education Statistics, 2012), so general educators also need to learn about at least basic evidence-based practices for teaching SWD.

In addition to these content concerns, teacher education programs of all kinds must include instruction and modeling of technology use in the classroom. Research shows that although most teachers believe technology helps them engage students at all levels and report that technology benefits students' learning, the majority of teachers (both novice and experienced) do not routinely incorporate technology into their teaching (Grunwald Associates, 2010). In particular, teacher candidates need to learn how to incorporate technology that is simple to use and easily accessible because lack of time and lack of access to technology are the main reasons teachers do not use technology more often (Bauer & Kenton, 2005; Lu & Overbaugh, 2009). Even if these challenges can be overcome, SWD face an additional challenge because very few digital curricula or online systems are designed to be accessible for them (Center for Online Learning and Students with Disabilities, 2012); therefore, technology in teacher education should include evidence-based practices for SWD as well. With all these areas to cover, it is essential for teacher educators to maximize their instructional time in classes. CAPs are one tool that can help them accomplish this goal.

CAP DEFINITION

CAPs are short multimedia vignettes that combine carefully-chosen images and words with narration to explicitly teach specific concepts or terms. They are designed according to the principles of Mayer's Cognitive Theory of Multimedia Learning (CTML; 2009). According to the CTML, many multimedia products overwhelm learners' cognitive load because they combine too many visual and auditory elements. This complexity requires learners' visual and auditory senses to compete for attention, resulting in more attention being paid to sorting out the disparate inputs and less to learning the actual content. Mayer (2009) proposed 12 design principles that are designed to streamline the inputs for learners, thereby lessening the cognitive load demand and allowing for more efficient learning. All 12 principles have been examined and verified through extensive research (Mayer, 2008). Table 1 provides brief definitions for these principles, and a more detailed explanation of them and how they relate to CAP creation is described in Kennedy, Aronin, O'Neal, Newton, and Thomas (2014).

Types of CAPs

There are three distinct variations of CAPs: CAPs for Students (CAP-S), CAPs for Teachers (CAP-T), and CAPs for Teachers plus Video (CAP-TV). Each has a specific purpose and design, which will be explained in this section.

CAPs for Students

CAP-S are intended for use with elementary and secondary students. They are typically under three minutes long and are narrowly focused on the main points about a specific topic. To date, they have primarily been used for vocabulary instruction for K-12 students. A single CAP-S introduces a vocabulary

Table 1. Design principles in the cognitive theory of multimedia learning

Purpose	Research-Based Design Principle	Description of Principle
Limit Extraneous Processing	Coherence Principle	Exclude irrelevant or extraneous information
	Signaling Principle	Provide explicit cues that signal the beginning of major headings or elements
	Redundancy Principle	Include only carefully-selected words or short phrases; avoid extensive text onscreen
	Spatial Contiguity Principle	Present onscreen text and pictures in close proximity to one another to limit eye shifting
	Temporal Contiguity Principle	Ensure that narration corresponds to the pictures and text onscreen
Manage Essential Processing	Modality Principle	People learn better from spoken words combined with pictures than from pictures or text alone
	Segmenting Principle	Divide multimedia presentations into short bursts as opposed to longer modules
	Pre-training Principle	Provide an advance organizer highlighting and reviewing key background knowledge prior to instruction
Foster Generative Processing	Multimedia Principle	People learn better from pictures combined with spoken words than from words alone
	Personalization Principle	Present narration in a conversational style to increase engagement and learning
	Voice Principle	Present narration with a natural-sounding voice (as opposed to a computer-generated voice)
	Image Principle	Select non-abstract images that clearly represent the content being presented

(Mayer, 2008, 2009)

word, provides a definition, gives examples and non-examples, as well as presents any morphological parts. In addition to following the CTML principles, they also incorporate evidence-based instructional practices for SWD, such as explicit instruction, strategy instruction, and use of mnemonics (e.g., Gersten et al., 2009; Jitendra, Edwards, Sacks, & Jacobsen, 2004; Vaughn, Gersten, & Chard, 2000). CAP-S can be viewed as part of a class assignment or discussion, or they can be viewed by students outside of class time as a review or reinforcement. Research demonstrates they are efficient and effective learning tools for students with and without disabilities (Kennedy, Deshler, & Lloyd, 2015; Kennedy, Thomas, Meyer, Alves, & Lloyd, 2014; Kennedy, Romig, Rodgers, & Alves, 2016).

CAPs for Teachers

CAP-T can be used either with teacher candidates in preservice teacher education or as professional development (PD) for in-service teachers. Similarly to CAP-S, CAP-T are designed to comply with the CTML principles, and each one explicitly teaches one specific topic or idea. In contrast to CAP-S, CAP-T are longer – up to 15 minutes – and although they still incorporate strong instructional methods, they are not solely based on evidence-based practices for students with disabilities. CAP-T can be used to teach about content, such as phonological awareness, curriculum-based measurement, or explicit vocabulary instruction.

Table 2. Three types of CAPs

CAP Type	Audience and Purpose	Possible Topics	Links to Sample Videos
CAP-S	For use with students in grades K-12; explicit instruction on a specific topic or vocabulary term	photosynthesis right triangles capitalization rules	Photosynthesis: www.qmediaplayer.com/?1000
CAP-T	For use with teacher candidates or in-service teachers; explicit instruction on a specific education-related topic	Characteristics of learning disabilities Theories of behavior management	Functional Behavior Assessment: https://vimeo.com/118376284
CAP-TV	For use with teacher candidates or in-service teachers; explicit instruction on how to implement a teaching method; video model embedded within	Using semantic feature analysis Increasing math discourse among students	Providing Student-Friendly Definitions: https://vimeo.com/143387419

CAPs for Teachers with Embedded Video

Finally, CAP-TV can also be used with teacher candidates or in-service teachers. CAP-TV are similar to CAP-T in that they are meant for teacher candidates or in-service teachers; however, CAP-TV include embedded modeling videos in addition to the taught content. In CAP-TV, a particular teaching strategy is introduced and explained and then viewers get to see that strategy modeled. This allows them to see the strategy in action after learning about the steps of implementation. Due to the complex nature of many teaching methods, CAP-TV are often created in sequences, with one CAP-TV explaining the purpose of the strategy, then another for each step in the process. Video reflection has been shown to positively affect teachers' practice (Sherin & van Es, 2009), and although the research base on the use of video models for teacher education is limited, findings demonstrate video models can anchor instruction in problem-based, realistic settings, making them effective tools for teacher learning (Dieker et al., 2009). Initial studies on the use of CAP-TV indicate they can provide a strong option for PD meant to instruct teachers to implement evidence-based practices (Ely, Kennedy, Pullen, Williams, & Hirsch, 2014; Ely, Pullen, Kennedy, & Williams, 2015).

A summary of the three types of CAPs, sample topics, and links to examples in each category can be found in Table 2. More examples of CAPs can be found currently at www.SpedIntro.com., and a website solely devoted to CAPs (www.vocabsupport.com) is under construction. The following sections outline the process for creating CAPs and describe three ways CAPs can be implemented in teacher education and PD.

CAP CREATION

CAPs are created using PowerPoint or a similar program. The process involves building slides that are visually simple and straightforward using clear images and limited text. For a full explanation of CAP creation and sample slide layouts, see Kennedy, Aronin et al. (2014). There are five easy-to-follow steps to create a new CAP:

Step 1: Select a topic. Creators should choose a topic that is relatively straight-forward. (For more complex topics, two or more CAPs should be created.) Along with the topic, creators also determine

the specific ideas or details they want students to know about that topic. These details should be limited to main ideas – the most important aspects related to that topic.

Step 2: Develop a template. Creators use the presentation program to lay out the information about the topic in a logical order. To do this, blank slides are created with text in the Notes field that will later be used as a script for the narration. In this step, creators can also make notes on the slides about key words or ideas for images that would fit the information on that slide.

Step 3: Design the visuals. The visual design of the CAP must be carefully planned and executed to be in accordance with Mayer's CTML (2009). Table 1 presents the principles of CTML along with definitions for each. These principles are evidence-based (Mayer, 2009) and specifically designed to lessen the viewer's cognitive load, allowing more attention to be spent on processing and learning the target information.

Step 4: Set up timings. Once the script is written and the slides are designed, creators then use the Record function within the program to set timings for each slide. This is done by reading the script on each slide before advancing to the next one. With the Record function activated, the program will save the time spent on each slide. When timings are saved, creators export the recorded slides as a movie.

Step 5: Record narration. The slides are uploaded into a movie editing software such as Windows Movie Maker or iMovie, and narration is recorded to match the timing of the slides. The final product is a visual podcast that can be uploaded to a website and streamed from any device.

USING CAPS IN CLASSROOMS

The authors have used CAP-T and CAP-TV in teacher education with preservice teachers and in PD for practicing teachers. There are three distinct ways CAPs can be useful in these settings: course augmentation, practice-based learning tools, and interactive PD. This section will explain each of these in more depth.

CAPs as Course Augmentation

One way to use CAP-T in teacher education is to augment student learning in teacher preparation courses. Numerous studies have compared CAPs to reading a practitioner-friendly article or a textbook section (Driver, Pullen, Kennedy, Williams, & Ely, 2014; Hart & More, 2013; Kennedy, Driver, Pullen, Ely, & Williams, 2013; Kennedy et al., 2012; Kennedy & Thomas, 2012; Kennedy, Thomas, Aronin, Newton, & Lloyd, 2014) and to viewing a film (Sayeski et al., 2015). In these studies, one group watched a CAP on a particular topic while the comparison group read an article or watched a film on the same topic. The groups took a post-test that assessed their knowledge and implementation of the content. In all cases, the group that viewed the CAP outperformed the comparison group on both knowledge and application. Studies have also compared CAPs to a traditional lecture, and again the intervention group outperformed the lecture group (Alves, Kennedy, & Rodgers, 2016; Hirsch, Kennedy, Haines, Thomas, & Alves, 2015; Kennedy et al., 2016). These studies are not meant as evidence that CAPs should replace all readings or lectures, but they provide strong support for using CAPs as an effective way to deliver knowledge to teacher candidates and thus are an important tool for teacher educators.

CAPs have been used to supplement course materials for content as wide ranging as early reading skills (Driver et al., 2014; Kennedy, Driver et al., 2013), learning disabilities (Kennedy, Ely et al., 2012), the No Child Left Behind Act (Kennedy, Hart, & Kellems, 2010), and functional behavior assessment

(Hirsch et al., 2015; Kennedy, Hirsch et al., 2016; Kennedy & Thomas, 2012). Teacher educators can create CAPs about important terminology, procedures, strategies, or methods. For example, an instructor of an Introduction to Special Education course could create CAPs on the difference between accommodations and modifications, the members who make up an IEP team, or components of the Individuals with Disabilities Education Act. These CAPs could be uploaded to a course-hosting website such as Blackboard, where students can watch the freely-available CAPs outside of class as many times as they need in order to fully understand the information. CAPs can serve as great review tools before assessments. In addition, because students have reviewed the content outside of class, more class time can be devoted to application activities, such as discussions, modeling lessons, or group work. Such accessibility and flexibility make CAPs easy to work into a flipped, hybrid, or online class as well.

Teacher educators can make CAPs more interactive by using a site like EdPuzzle.com or QMedia to host the videos. Websites like these allow creators to add questions and pauses within and at the end of videos, so teachers can write questions to provoke thought or to assess understanding and space them throughout the videos. Students must respond to the questions before moving along. This creates opportunities for them to reflect on the material and to be accountable for watching the CAPs. Teachers can set up class accounts so they can view the responses, allowing CAPs to be used as formative assessments to guide instruction. Many of the recent studies using CAP-S and CAP-T use one of these hosting websites, allowing researchers to assess treatment fidelity, exposure, and comprehension of the materials. The sample link for the CAP-S in Table 2 corresponds to a QMedia example.

Using CAPs to supplement course material may require a little more time up-front in preparation, but the dividends are well worth it. They are extremely low-cost to make and free to watch, and once a CAP is created, it can be used year after year. In addition, they extend the learning outside of the classroom and provide opportunities for students to review or preview material at their own convenience and in an interactive way. An added benefit is that teacher educators are providing a strong model of using technology effectively to promote evidence-based instructional practices. The strategy discussed in the next section extends that modeling into practice.

CAPs as Practice-Based Learning

Many teacher educators are strong proponents of field experiences because they allow teacher candidates to practice the skills they are learning in their courses, resulting in stronger internalization and deeper understanding of teaching practice (Darling-Hammond, 2006; Leko, Brownell, Sindelar, & Kiely, 2015). However, field experiences can be difficult to coordinate with local schools, making them less effective than they could be (Zeichner, 2010), so teacher educators should work practice-based learning opportunities into their coursework as well (Darling-Hammond, 2008).

One way to incorporate practice-based learning into teacher education is by instructing teacher candidates to create their own CAP-S. Preparing CAP-S fulfills learning needs for both general and special educators because they are an evidence-based practice for students with disabilities that can be easily incorporated into general education settings and are also effective for students without disabilities (Kennedy, Deshler et al., 2015; Kennedy, Thomas, Meyer et al., 2014). Therefore, in creating CAPs, teacher candidates are not only strengthening their own knowledge, but they are also learning a technology-based practice that they can use in their future classrooms. This is an essential feature of effective teacher education – connecting what students learn in courses to a real context and actual classroom practice (Darling-Hammond, 2006).

In addition, although they are not materially difficult to make, creating high-quality CAP-S requires understanding and application of strong pedagogical content knowledge (PCK; Shulman, 1986) – knowledge not just of the content but of the most effective ways to teach that content. In order to create an effective CAP-S, evidence-based practices must be embedded in the mode of instruction and the content of the scripts. Creators must be able to identify the central ideas related to a topic, present those ideas clearly and concisely, address common misunderstandings, consider sequencing, address requisite background knowledge, and incorporate strong examples and non-examples related to the topic (Kennedy, Thomas, Meyer et al., 2014). Because CAP-S creation requires such a deep level of topic understanding, the production of CAP-S can be an instructional tool in its own right, serving as a form of alternate assessment tools for teacher educators as well.

Research on CAP-S as practice-based learning is evolving but promising. Researchers have shown teacher candidates can learn to create strong CAP-S and can then implement the evidence-based practices used in the CAP-S in their own teaching (Kennedy, Aronin et al., 2014). In a recent study, Alves, Kennedy, and Rodgers (2016), two groups of teachers watched a series of CAP-T on evidence-based practices for vocabulary instruction. After training, one group of teacher candidates were assigned to create CAP-S on a given topic, and a comparison group completed a paper-and-pencil activity on the same topic. Both groups took a pre- and post-assessment, and the CAP-S creation group outperformed the paper-pencil activity group on the knowledge post-assessment. In addition, the CAP-S creation group included more vocabulary practices in a recorded video where they taught a lesson on a vocabulary word. This is preliminary evidence that creating CAP-S can be an effective way for teacher candidates to learn about a topic as traditional instructional methods; further research in this area is ongoing.

CAPs as Professional Development

No matter how strong a teacher education program may be, the complexity of teaching and the wide range of potential placements indicate there will always be a need for teachers to continue their training throughout their careers. Therefore, a new line of research uses CAP-TV as PD tools for in-service teachers.

In contrast to CAP-S and CAP-T, which provide explicit instruction about a specific topic, CAP-TV are intended to teach someone how to perform a specific set of actions. To support transfer of knowledge into action, CAP-TV contain embedded modeling videos which portray a teacher using the target practice with fidelity, implementing all steps presented in the informational sections of the CAP-TV.

Preliminary research on the use of CAP-TV with teacher candidates and in-service teachers is promising. Researchers tested CAP-TV by using them to train teacher candidates in a particular method of explicit vocabulary instruction. A comparison group was given a practitioner-friendly article on the same method to read. The teachers then took a knowledge assessment related to the method and were observed using the method with their students. On both assessments, the CAP-TV group significantly outperformed the comparison group (Ely, Kennedy, Pullen, Williams, Hirsch, 2014; Rodgers, Kennedy, Romig, & Alves, 2016).

In a separate study, researchers used CAP-TV as one part of a multimedia PD package designed to improve vocabulary instruction in inclusive middle school science classrooms. The supporting parts of the package were included because researchers hypothesized CAP-TV alone would most likely not be effective in changing long-term teacher behavior. This is based on research that shows extended interaction with the content and ongoing mentoring or coaching significantly enhance the effectiveness of PD (Brownell, Ross, Colón, & McCallum, 2005; Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). To test

this hypothesis, the research team added two supports to the CAP-TV: (1) targeted feedback provided daily by email, and (2) sample instructional materials demonstrating use of the evidence-based practices addressed in the CAP-TV. Using a multiple-baseline single case design, researchers provided the PD to three middle school science teachers after baseline observations of their initial vocabulary instruction were conducted. After receiving the PD package with CAP-TV, teachers were observed to use significantly more evidence-based vocabulary practices and spend more time teaching vocabulary than they had in baseline (Rodgers et al., 2016).

As with CAP-S, CAP-TV are freely available and can be viewed many times, making them a valuable and efficient tool for building teacher knowledge. PD providers can create them for any practice and upload them to a shared website, so teachers can access them either at school or at home. An added benefit to their easy availability is that they can be used as targeted, individualized PD. Specific CAP-TV can be recommended to teachers based on identified needs or personal goals, and teacher mentors can use them as a way to evaluate teacher use of the practices or as a starting point for a discussion about use of the practices in their particular context.

SOLUTIONS AND RECOMMENDATIONS

The research base on CAP-T and CAP-TV provides a strong rationale for using these tools with teacher candidates and in-service teachers. Study methods and results indicate CAPs can be used effectively to introduce, augment, or extend learning on the user's schedule. CAP-S, CAP-T, and CAP-TV have been collected and made freely available online (www.SpedIntro.com). One ongoing goal of the research team is to develop libraries of CAPs (which will be available at www.vocabsupport.com) that cover a range of topics and that are available to teachers, teacher educators, and researchers. This will reduce the up-front preparation time required to use them in practice, making CAPs even more efficient and easy for practitioners to implement.

FUTURE RESEARCH DIRECTIONS

The research on the use of CAPs in teacher education and PD is active and ongoing. Current studies are expanding the use of CAP-S with teacher candidates. One study used three groups to compare traditional lecture to CAP-T and CAP-TV to examine how the different conditions impact knowledge (as measured by a post-test) and application (as measured through observation of a recorded microteaching demonstration (Alves, 2016). Another study is comparing the use of CAP-T to a more traditional paper-and-pencil lesson to determine which enhances teacher candidate knowledge and application more positively (Alves, Kennedy, & Rodgers, 2016). Other planned projects will examine the extent to which creating rather than simply viewing a CAP impacts a teacher's classroom instructional practice.

Researchers are also currently designing and conducting studies to extend the research on best practices for implementing CAP-TV with in-service teachers. Studies will examine the extent to which supplemental materials are needed to support teachers in implementing the target practices independently and with fidelity. Researchers will also analyze student performance data to investigate whether changes in teacher practice are associated with student gains in vocabulary knowledge.

Additional avenues for future research include expanding the use of CAPs with a greater range of grade levels and content areas. Thus far, most studies have focused on practices for teaching vocabulary in middle school science classes. Studies are currently being planned in high school math, writing, and reading at various levels. Other research could focus on the number of practices that can be successfully introduced to teachers at one time and on the most effective sequencing of practices.

CONCLUSION

CAPs can help address the challenges inherent in teacher education described at the beginning of this chapter. Their convenience, accessibility, and brevity make them useful tools to build teacher candidate knowledge and experience with practice-based learning activities. Because students watch them outside of class and they are so effective, they allow teacher educators to instruct on more content without taking up more class time. In addition, CAP-TV provide a low-cost, effective method to instruct teachers on the use of evidence-based teaching practices which can be easily incorporated into existing PD efforts. Thus, they can be a strong addition to teacher education or in-service PD programs.

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Chapter 16
I Play I Learn:
Introducing Technological Play Theory

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ABSTRACT

The purpose of this chapter is to describe and report the development of an original theoretical work which emerged from comparative and international empirical research. The theory is called, "Technological Play Theory." In sharing about Technological Play Theory, this study has three purposes. First, the study explains how Technological Play Theory emerged in a grounded theory way (Glaser & Strauss, 1968) from research findings about the social construction of technology among elementary school teacher and students in England, Cuba, India, South Korea, and the United States. Second, the study examines the contours of the Technological Play Theory in relationship to empirical findings. Third, the study examines how Technological Play Theory can be empowering and utilized as an "agent of change" in education and schooling.

BACKGROUND

Educators almost universally recognize the importance of play in a child's development. Play, at an early age, is the child's work and the child learns about the world via play. Yet, something sad and tragic often happens once the child enters the four walls of the lower elementary classroom: play is often neglected or just meant for "recess time." Theories around play, though, are quite helpful in providing deeper insights into the importance of play and how it can sustain innovation. One early theorist on play, Johan Huizinga, posited that play is an essential part of cultural development. Huizinga (1995) defined play in this way: "We might call play free activity standing quite consciously outside 'ordinary life' as being not serious, but at the same time play absorbs the player intensely and utterly" (p. 9). The focus here is on the investment in play. Children are intensely engaged in play and so much so that Huizinga (1955) believes that "play proceeds with its own proper boundaries of time and space according to fixed rules and in an orderly manner; play promotes the formation of social groupings" (p. 10).

Two other *play* theorists, Roger Caillois and Brian Sutton-Smith, build on Huizinga's early work. Caillois makes a distinction between play and games. He believes while games are a part of play; the

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rules of play are looser or non-existent. However, for Caillois (2001), the structure of games includes the following six formal qualities: "freedom, separateness in time and space, rules, uncertainty about the outcome, non-productiveness, and make believe" (p. 10). According to Caillois, these qualities help to spur on the culture created by play and games.

Brian Sutton-Smith is considered to be the most important and influential scholar of play (Buckingham, 2013; Caillois, 2001). He understands play as a somewhat ambiguous cultural formation. Yet, still it is a cultural form, and as such, play "cannot be neutrally interpreted so it is impossible to keep ambiguity from creeping into the relationship between how play is perceived and how it is experienced" (Sutton-Smith, 2009, p. 216). The point here is that *there is* something more than just play happening when people are at play, however this is easier to observe than it is to actually define.

Many researchers in the fields of educational technology and information technology have investigated the nuances of play in relationship to learning with technology (Bertozzi & Smith, 2007; Fleer, 2011; Plowman, McPake, & Stephen, 2010; Stevens, Satwicz, & McCarthy, 2008; Taylor, 2009; Verenikina, & Kervin, 2011). Researchers have found correlations between play and creativity (Mishra, Koehler, & Henriksen, 2011; Mishra, 2012); increased interactivity which is spurred on by digital play (Kline, 2003); and greater motivation among children for problem solving when playing games on the computer (Soute, Markopoulos, & Magielse, 2010). This current study picks up on similar themes, but with a deeper investigation as to how computer technology is socially constructed through play.

MAIN FOCUS OF THE ARTICLE

The chapter's main focus is to identify and explain the connections between play and the development of technological knowledge on a digital device. In the chapter, the author identifies and defines an empirically based, theoretical framework called Technological Play Theory, which connects play with digital technology. Technological Play Theory (TPT) emerged in a Grounded Theory (Glaser & Strauss, 1967) from comparative and international field studies about the meanings and uses for computer technology among elementary school teachers and students. The chapter's author conducted these field studies while utilizing the methodological approach found in the Social Construction of Technology (SCOT) theory (Bijker, 2010). SCOT theory maintains that the meanings and purposes for technology come from people.

SCOT theory offers four steps for investigating how people negotiate meaning for technology. The first SCOT step is identifying relevant social groups. According to Wiebe Bijker (1997), relevant social groups are the actors who share space in a technology's meaning construction. The study's relevant social groups were students and teachers in elementary schools across five countries. The second SCOT step is to distinguish the relevant social groups' interpretations of technology. Bijker (1997) calls this interpretative flexibility (p. 20). Bijker (1997) asserts that interpretative flexibility is detected via a social group's rhetoric about a technology's goals, outcomes, and problems. The third SCOT step examines how the social groups negotiate their interpretative differences. Bijker describes this negotiation process as a technology's stabilization. Different degrees of stabilization include:

1. Relevant social groups come to a consensus about the meaning of a technology,
2. One social group dominates the "meaning making" process of technology,
3. Two or more social groups compete in the "meaning making" process and the meaning gets negotiated through this competition (Bijker, 1997).

The fourth SCOT step requires a further examination of demographic data in order to identify each social group's technological frame. The technological frame is each group's cultural and socio-economic characteristics (Bijker, 2010). Bijker explains that as social groups interrelate, they negotiate and construct a common interpretation of a technology using their technological frame characteristics.

Method

Using comparative case study research design (Yin, 2008) in the ethnographic tradition, the chapter's author investigated the uses and meanings for computer technology in 13 schools across 5 countries with a participant sample size of 471 students and 52 teachers. In total, the sample size was 523 participants (n=523).

The study employed qualitative and quantitative methods to compile a case study of each sample school. The comparative findings from each case study formed the empirical basis for Technological Play Theory. There were four qualitative data sources: field notes from on-site observations, student focus group interviews, teacher interviews, and collected artifacts like curriculum documents and digital images. By far, the field notes made up the bulk of the data collection. Across the 13 case studies, there was over 1000 hours of time logged in the field. The student focus group interviews and teacher interviews were structured to identify interpretations for using computer technology. Collected artifacts included curriculum documents and digital images as visual data the types of computer hardware and software at each of the case study schools.

Two sources of quantitative data included: a student questionnaire and teacher questionnaire. The questionnaires generated demographic data and identified perceptions about using computer technology. The student questionnaire was given to all 471 of the student participants across the case studies. The questionnaire was adapted from Vekiri's (2010) survey about students' perceptions of using computer technology. All of the 52 teacher participants across the case studies completed the teacher questionnaire. The teacher questionnaire was adapted from Law, Pelgrum, and Plomp (2008) and generated data about the teachers' perceptions and interpretations of computer technology use in the classroom.

Data Analysis

The qualitative data were examined using Miles and Huberman's (1994) three-step interpretive approach and the constant-comparative method. First, the data across the cases were read, re-read, and then coded for data reduction. The chapter's author marked the frequencies in the data in order to establish patterns, which emerged as larger categories. Second, visual displays of the data were developed and analyzed to further synthesize the categories. Third, conclusions were drawn from these larger categories in order to identify the finding's themes. The chapter's author used the constant-comparative method (Glaser & Strauss, 1967) to compare findings. The quantitative analysis was at a descriptive level. Descriptive statistics were analyzed to identify the participants' demographics and perceptions about the purposes for educational technology.

Findings

The social construction of technology varied slightly throughout the 13 case studies, but there was a common lexicon that all the participants shared. The most frequently used words that the participants

used to describe computer technology were fear, play, and creativity. The chapter's author examines these three words as larger themes across all the case studies. The themes capture the foundational premises for Technological Play Theory. The chapter will first discuss the theme of fear. Next, the chapter identifies play as another theme that emerged across the studies. Finally, the chapter identifies creativity as a third theme.

Fear is an interesting word to associate with computer technology. Across the 13 case studies, the teacher participants all discussed fear. The teacher participants described fear in two different ways. First, fear was personalized as teachers explained how they were fearful that their students would know more about computers or educational technology. One teacher participant, for instance, openly worried that, "I am afraid that if I don't know how to work certain software my students will be demotivated to use that software in the future." Another teacher participant explained, "I fear that I won't be able to stay up-to-date with technology. Everything is changing so fast, including the computer equipment. It is hard to keep up with what my students know how naturally do." In the two examples above, the teachers were anxious and had fear about being ill-equipped to use the computer.

The second—and more common—way that fear was described by the teachers was that students were often fearful to use computer technology because they might break something on the computer. A teacher participant put it this way, "When we first introduced laptops at our school, the children were afraid to use the laptops because they thought they might break it just by opening it up. They feared even touching the laptop." Such sentiment was echoed by another teacher participant who shared, "The students in the class were fearful that they might touch the wrong key and somehow permanently shut down the computer. I believe it is important to remove this fear from the students' minds by encouraging exploration of the computer." Across the case studies, many of the teacher educators spoke about helping children overcome their fear of the computer by building confidence. One of the teacher participants from India, for example, stated that, "I believe that children should not be scared to use the computer. We teach them confidence. The child should see that using a computer is the same as using his fingers to learn." Like this teacher from India, many teacher participants identified that building confidence was a way to address the fear that students may have about using computer technology in schools.

While fear was an oft-repeated word and idea shared among the teacher participants, none of the case studies' student participants even mentioned fear. Instead the student participants brought up the word "play" the most. Across international contexts, cultures, and socioeconomic status, the student participants discussed their use of the computer in terms that are synonymous with play. For example, asked about favorite activities on the computer, one of the student participants shared, "I like to play with TuxPaint. It is fun to make pictures with it." Another student participant explained, "My favorite thing to do is play on Google Earth. I like to learn about maps and the world. I put in the directions on how to get to Boston from Bangalore and then see the world spin to get there." A student participant from England put it this way, "I play with the eJay program [a music DJ software] to make techno music. When I play, I learn how to mix up music I like." The equation of play and learning was also something that was evident in the field observations at each of the 13 schools that made up the case studies.

From the field notes, the chapter's author observed how play was contextualized by the computer hardware and software. One case study school in rural India, for instance, only had a single laptop for 13 students to share, which meant that there was a heavy emphasis on collaboration (Byker, 2015). Whereas in another case study school, all the students had access to desktop computers so the computer technology use was more individualized (Byker, 2014). Yet the types of equipment or software applications did not matter to students as much as the perception that they playing with computer technology. If the student

participants perceived that they had the freedom to play with computer technology, they were more apt to use the computer technology longer and for educative purposes. For some student participants play meant adding new fonts and colors to their Word documents. Other students played on the computer by creating artistic designs in PowerPoint to be used as school advertisements. Engaging in virtual simulation games about significant historical events became a form of play for another group of students.

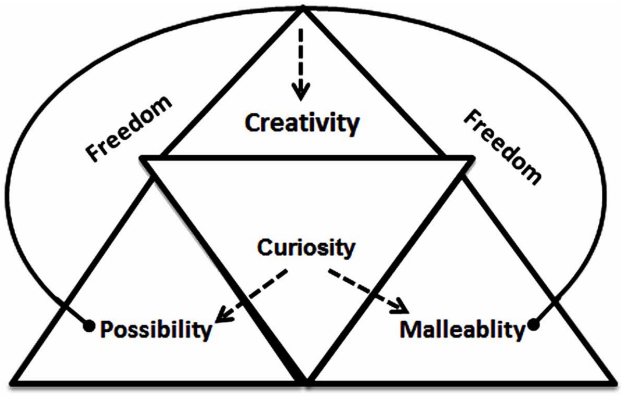
The chapter's author asked the teacher participants about what role play might have, if any, in how the students use and assign meaning to computer technology. Many of the teacher participants believed that their students demonstrated greater motivation for schooling and learning when playing with computer technology. One teacher participant shared that, "Children are motivated to play games and make things with the computer, which helps to build their confidence with the computer's keyboard." Another teacher participant intentionally gave students time to explore different software programs in the school's computer lab. The teacher explained that the exploration time was, "Freedom for my students to explore and play around with software programs. The freedom helps my students to become familiar with computer equipment and to do creative things with the technology." The notion of a linkage between freedom to play and play to create was also observed in the field notes at several of the case study schools.

Across the case studies, the teacher participants would often repeat the words "create" and "creativity." The student participants placed a high value on the opportunities to create something with the computer. Close to 85% of the students in the case studies shared how they were motivated to use the computer based on what they can create. Teacher participants had more nuanced ideas about what creativity entailed. Across the case studies, only 9% of the teacher participants indicated that "creating multimedia presentations" was the primary purpose for computer technology use among elementary school student. The teacher participants' top choice was "search for information" with over 59% of the teachers selecting that option. One of the case study schools in Bangalore, India, had a big sign posted in the school hallway that stated, "Creativity and curiosity are cousins." A teacher participant shared that, "Most everything the students do on the computer requires some creativity. They create things on the computer by putting together presentations and reports. Creativity is part of the process of becoming an independent self-learner." One of the student participants concurred with what this teacher shared and explained that, "I think the computer helps with the creativity in my presentations, because I want to find pictures on the Internet and include them in my PowerPoint presentation to better explain my research." Another teacher summed up the importance of creativity in this way, "The children are prepared to create and present with the computer. This is also preparation for their future career. I think that the computer will be indispensable to them in the future as they continue to create with such technology." Indeed, creativity was largely perceived as an important output for the use of computer technology.

SOLUTIONS AND RECOMMENDATIONS

Katie Salern and Eric Zimmerman (2004), who are both play theorists, define play as "free movement within more rigid structures" (p. 304). In this section the chapter moves to a discussion of the structures of technological play among elementary school learners. The section's central question is to inquire about the relationship between play and learning on digital devices. What are the features of the "I play, I learn" connection when children turn on a computer? To answer that question, chapter's author discusses comparative findings from over 1000 hours of field observations in school settings around the globe. These comparative field observations—in addition to interviews and surveys— form the empiri-

Figure 1. A graphic representation of technological play theory. This figure illustrates a model for technological play theory



cal foundation for a theoretical framework called Technological Play Theory. Figure 1 illustrates the contours of the Technological Play Theory.

Figure 1 provides a graphic representation for a working definition for Technological Play Theory. The chapter's author defines Technological Play Theory as the movement of curiosity to creativity while using technological tools. In stating this definition, the chapter's author heeds Brian Sutton-Smith's (2009) warning that, "No theory of play would be adequate if it did not leave scope for its own deconstruction and distortion into nonsense. Any earnest definition of play has to be haunted by the possibility that playful enjoinders will render it invalid" (p. 213). Such is the reason that the aforementioned definition of Technological Play Theory is a working and evolving definition.

As Figure 1 shows Technological Play Theory is centered in curiosity and bounded by freedom. Technological Play is facilitated when students have the freedom to be curiosity about computer hardware or digital devices. When curiosity is encouraged, technological play often flourishes. Sugata Mitra's work related to the "Hole in the Wall" computer demonstrates how curiosity is the seedbed for the germination of technological play (Mitra & Rana, 2001).

Mitra and his colleagues placed a computer in wall outside of their office building in New Delhi, India. A video camera was anchored to a tree nearby the computer in order to film how people might interact with the computer. The computer was turned on, but no instructions were provided about how to use it. Children from a nearby slum neighborhood were the first to explore this outdoor computer kiosk. The children were also the most enthusiastic about using the hole-in-the-wall computer. Mitra and his colleague note how the children first approached the computer with curiosity about how to operate the device in order make it work. They had the freedom to touch and play with the computer. Eventually, the children's curiosity led to the construction of meaning and purpose for the hole-in –the-wall computer. The children learned how to operate it, taught other children ways to use the compute, and created their own language system for the computer. For example, the children used the word "channels" instead of websites and called the loading hourglass symbol a "damru" for Shiva's drum (Mitra & Rana, 2001, p. 229). Even with minimal instructions, children have a curiosity about how tools work, including digital tools like the computer. Technological Play Theory is centered on the encouragement of curiosity that is nurtured through free exploration. Such freedom can launch and accelerate the meanings that children construct for a tool. Curiosity is at the center of the meaning construction for technological tools.

As children grow curious about technological tools, they explore the possibilities and malleability of the tool. Possibility and malleability are similar features of Technological Play Theory. The chapter will discuss possibility first. In their seminal work *Rules of Play*, Salern and Zimmerman (2004) discuss how games are designed with "spaces of possibility" (p. 67). They discuss how possibility spaces are generative and interactive. When children explore the possibility of technological tools, they do so by interacting with the tool. Such interaction generates ideas about possible purpose for the tool. Investigating the possibility of tool is an important part of play as it is a feature where meaning is made through trial and error. Children are not only curious about computers, but they want to see what is possible with the computer. They desire to participate in its possibilities. Sometimes these possibilities take the shape of deconstructing a computer to uncover the mystery of what is inside; other times it means exploring the possibility of software like TuxPaint. Possibility cannot be squelched for fear that something could get broken. Rather, possibility needs to be encouraged.

Malleability shares similarities to possibility, but has a more active and social quality to it. The malleability of computer technology is a similar finding across the case study schools. Malleability means the many ways that people shape and reshape the meanings for computer technology based on several factors like social context and negotiations with other people (Byker, 2012; Bijker, 1997; Feenberg, 1991). Bijker (1997) identifies that malleability allows for the possibility of choices to be made about the uses for technology and these choices represent the "bundle of meanings about what computer technology can be used for" (p. 281). There were many "bundles of meaning" that participants assigned to technology in the context of the 13 case studies that form the empirical foundation for Technological Play Theory. The uses of Microsoft PowerPoint® software is an example. Students in South Korea used the software to create digital stories for English language learning whereas students in England used PowerPoint to create and present collaborative social studies reports. The malleability of technology is how the technology is used and by whom. A technology's malleability can be individual or collaborative.

Creativity is very often the output of exploring the possibilities and malleability of technology. Indeed, creativity forms the apex of Technological Play Theory. This is especially true in schools where the uses for technology can include the production of some kind of artifact. There is a difference, though, between creating and producing an artifact. Creativity is more akin to play whereas a producing is synonymous with work. In the *Adventures of Tom Sawyer*, Mark Twain (1876) writes, "work consists of whatever a body is obliged to do and play consists of what a body is not obliged to do" (p. 19). The space between work and play gets a little more complicated in schools. Yet, the point here is that Technological Play encourages creativity through the encouragement of curiosity. In the 13 case studies, the student participants consistently reported how they enjoyed creating artifacts with computer technology. It did not matter so much if the artifact was a digital story on PowerPoint, a drawing created on TuxPaint, or a virtual skit created with Kar2ouche, what made it enjoyable was that students were encouraged to play with the technology and were given freedom to explore the possibilities.

Technological Play Theory has a number of implications for teacher candidates, teachers, and teacher educators. Technological Play Theory sheds light on how students go about their play on computer technology. The theory is meant to be useful and instructive. It is designed to increase a deeper understanding and dialogue of pedagogical ways in which play connects to student owned learning via computer technology. Like Kurt Lewin (1952) said, "Nothing is so practical, as a good theory" (p. 169). This dictum provides the first recommendation for educators: give students time and freedom to be curious about technology in the classroom. A technological tool is also a tool for play. Curiosity is at the very locus of Technological Play Theory as all play begins with a learner's curiosity about a tool.

Encouraging students' curiosity means asking questions about technology rather than just telling about the technology. For example, when educators introduce assignments that include technological tools and inquiry can also be introduced. The inquiry could include questions like:

1. I wonder what technological tools could be used to create [insert project name] for this assignment?
2. What are the possibilities of using this technology?
3. How would you go about using the technology?
4. How can multiple people collaborate to create the project together with the technology?

Play should be part of the introduction of any new software program to students. Even ten or fifteen minute of play time with a new technology can benefit students in exploring the possibilities and malleability of the technology.

FUTURE RESEARCH DIRECTIONS

It should be noted that Technological Play Theory emerged in a Grounded Theory way from mixed-methods research that was comparative and international in scope. That being said, the methodology was largely observational. A future research agenda should include more experimental designs in order to investigate Technological Play Theory compared to a control group. These 13 case studies discussed in this chapter were all situated in upper elementary classroom setting with students who were in Grades 4 and 5. A future research agenda should include sample populations of early childhood students as well as students who are in middle and secondary schools. Correlating the features of Technological Play at various stages of development might prove to be a fruitful pathway for such research. Additional research is also needed about the Technological Play of teacher candidates who are being prepared to teach the future. Future research directions would benefit from the comparative understandings that emerge from international research in these areas. So a comparative and international research agenda for all future research related to Technological Play Theory is encouraged.

CONCLUSION

In his insightful book, *The Game Believes in You,* Greg Toppo (2015) shares the paradoxical nature of the word *play*. While much of society accepts play as beneficial, play has largely been divorced from what is expected in schools. Play is confined to being childish. He explains how society is "quick to jettison play when we feel it is not up to the task of moving large amounts of material into our children's minds, especially when they are older" (p. 6). Of course this "banking model" (Freire, 1973) of cramming students with information is not the true purpose of education. Education's true purpose is something more aligned with being curious, exploring possibilities, using tools in collaborative ways, and with the creation of new knowledge and meaning. These are the tenets of Technological Play Theory. It is a theory that can guide students in connecting their uses for computer technology and digital devices from play to learning.

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KEY TERMS AND DEFINITIONS

Creativity: The artful expression of curiosity.

Curiosity: The free expression of interest and intrigue in something.

Educational Technology: Technology that has the primary purpose of being used by students and teachers.

Malleability: The ways that people shape and reshape their uses for tools based on their social context and social interactions with other people.

Play: The freedom of curiosity and movement within a bounded structure.

Possibility: The interactive way that people generate ideas about the purposes for a tool.

Technology: Tools that people use for a variety of purposes.

Technological Play Theory: The movement of curiosity to creativity while using technological tools.

Section 4

Constructs and Frameworks for Professional Development

Chapter 17
Culturally Relevant Literacy Instruction:
Promoting Shifts in Teachers' Beliefs and Practices

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ABSTRACT

This study works toward addressing a very critical educational problem in that it seeks to understand how gaining conceptual and pedagogical understandings of culturally relevant pedagogy (CRP) impact shifts in teachers' beliefs and practices. Rather, than considering the impact of CRP on students' educational success, this study examined teachers' changing beliefs and practices as they engaged in professional development on issues related to CRP and literacy instruction. Formative experiment was conducted and continuous, teacher-centered professional development focused on CRP served as the intervention for the study. Findings indicate that theoretical learning, critical self-reflection, collaboration, and longevity are integral to support shifts in teachers' beliefs and practices around CRP. Findings also show that the shifting process is dynamic and complex and occurs differently for individuals. The outcomes of this study suggest that professional learning should considers teachers' beliefs, experiences, and work context during the learning process.

INTRODUCTION

Volumes of research studies have established the effectiveness of Culturally Relevant Pedagogy (CRP), in promoting positive identities and academic achievement among students of color (Banks, 2004; Delpit, 2006Gay, 2002; 2013; Ladson-Billings, 1994; Lazar, Edwards, & McMillon, 2012; Milner, 2011; Murrell, 2007; Villegas& Lucas, 2002). However, educational policies and systemic inequalities continue to create "very different educational realities" for African American students and their white counterparts (Darling-Hammond, 2005) resulting in low literacy rates, low test scores, and high dropout rates.). However, many in-service teachers struggle to effectively implement a culturally relevant pedagogy

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(CRP) (Esposito & Swain, 2009; May, 2011; Rozansky, 2010), and limited research has been conducted on professional development aimed at supporting in-service teachers' knowledge and practices around CRP (Knight & Wiseman, 2005; Milner, 2009. The objective of this chapter is discuss the findings of a formative experiment (Bradley & Reinking, 2011) that was conducted to promote shifts in teachers' beliefs and practices centered around culturally relevant pedagogy. A brief literature review will provide a context for the purpose and the significance of the study, an overview of the research design and the intervention, and a discussion of the findings which highlights key factors of a professional learning experience that aimed to shift teachers' beliefs toward a more culturally relevant and critical perspective. This research is framed in critical and sociocultural theories.

BACKGROUND

Teacher Beliefs

The role that teachers play in the academic achievement of all students is critical, especially for students of color. While there are a variety of races and cultures in our schools, white, middle-class, male norms and values are most validated in the educational system (Ntiri, 2009), consequently negating the linguistic and cultural resources of diverse learners. Therefore, understanding teacher beliefs and studying practices that support shifts in teachers' beliefs is of great importance. Kagan (1992) suggests that beliefs "may be the clearest measure of a teacher's professional growth" (p. 85).

Research on teacher beliefs is important to the understandings of teacher actions and decision-making inside and outside the classroom. Teachers make decisions about classroom instruction in relation to the beliefs that they have about teaching, learning, and the students in which they serve (Harste, 1977). Kavanagh (2010) reasons that beliefs, attitudes, identity, and context intersect, influence, and shape classroom practice.

Teachers must reflect on their beliefs and have a critical stance to be culturally relevant. Howard (2003) suggests that teachers should equip themselves with the necessary skills to critically reflect on their own racial and cultural identities to recognize how these identities coexist with cultural compositions of their students. This type of critical reflection is embedded in the genuine belief that all students have intellectual ability to succeed, without ignoring or demeaning their cultural identities and is essential for shaping academic success through cultural validation (Gay, 2002). Critical self-reflection will be implemented during the professional development for this study and teachers will critique their own thoughts and practices and examine how race, culture, and socioeconomic class impacts their students thinking and learning (Howard, 2003). Reflective practice is a critical component in pre-service teacher education but is missing in in-service teacher professional development and subsequent studies (Kurboska, 2011; Powers et al., 2006).

Cultural Relevant Pedagogy

Culturally relevant pedagogy is a pedagogy of power and opposition. Rozansky (2010) states that CRP is critical theory in action and can be a tool to enable teachers and students to "see the contradictions and the inequities" (Ladson-Billings, 1992, p.328) of the educational system and the larger society.

Cultivating a sociopolitical consciousness in students, which is a fundamental tenet of CRP, requires teachers to incorporate issues of social justice within the required curriculum.

With multicultural education and CRP, there are no pre-made lessons or a set of instructions to follow. CRP provides a basis for teachers to develop beliefs about culture and its impact on teaching and learning. All teachers' have beliefs or philosophies of education that provide rationale for decisions they make in the classroom, and it is important for CRP to be a framework for teachers' actions with students of color. CRP provides teachers with ways of thinking about diverse students within an educational and societal context and offers tenets to operate within their beliefs to provide a relevant and equitable education to students. Villegas and Lucas (2007) urge that teaching students from diverse backgrounds and historically marginalized groups is more involved than applying specialized techniques; it demands a new approach to teaching that is rooted in an understanding of the role of culture and language in learning.

Studies conducted by Hefflin (2002) and Kesler (2011) illustrate teachers who made "local, contextualized changes informed by political and historical contexts that require ongoing negotiation and revision" (Compton-Lilly, Rogers, & Lewis, 2012, p.38) to better support their students through CRP. However, Darling-Hammond (2006) states that most of the schools that are in need of culturally relevant approaches do not encourage these kinds of practices and even when some teachers have a disposition for CRP have difficulty transferring their beliefs into practice (Rozansky, 2010; Esposito & Swain, 2009). This study was designed to better understand the factors that inhibit the implementation of CRP, as formative experiment allows for the researcher and teacher to work together to navigate constraints that impede the pedagogical goal.

Professional Development

There is consensus among research that schools need to offer teachers more effective professional development than what is typically available. Professional development has shown to be a powerful tool for teachers' growth and development and for impacting student learning when teachers are involved in the planning process. Due to the drawbacks with traditional, fix-it models of professional development, recently there has been an increase in the research on professional learning that is more collaborative, teacher centered, and committed to powerful and effective change (Darling-Hammond, 2009; Snow, 2012)

The research on shifts in teachers beliefs call for professional development to be rooted in teachers experiences and beliefs as well as for teachers to reflect on their existing beliefs and behaviors so that they can become more receptive to alternative perspectives (Kurboska, 2011; Richardson et al,1991). Flint, Kurumada, Fisher, and Zisook (2011) described their approach to professional development with three assumptions: literacy learning is socially and culturally constructed, teachers are knowledgeable professionals who want to do the best work they can to help meet students' needs, and that relationship building is imperative in a professional development program. These assumptions created a productive space for dynamic learning interactions that resulted in shifts in teachers' beliefs about writing instruction and shifts in their practices for engaging in the writing process with their students. Other researchers (Kennedy, 2010; Smith, 2002) have documented methods that were found effective to promote shifts in teachers' beliefs and practices, such as relationship building and teacher ownership. However, few studies (Knight & Wiseman, 2005; Milner, 2009; Patton, 2011) have examined culturally relevant professional development, and none have focused explicitly on the impact of professional development on teachers' practices around culturally relevant pedagogy when employing a formative experiment.

METHODOLOGY

A formative experiment, which is categorized under the umbrella of design-based research, was employed to document teachers' changing practices and beliefs as they engaged in professional development sessions on issues related to CRP and literacy instruction. The research question that will be explored for this chapter is, what factors enhance or inhibit teachers' understandings of CRP when engaged in professional development activities?

When conducting formative experiments, researchers explicitly work toward a pedagogical goal, which provides a rationale for the study. The pedagogical goal for this study was to promote conceptual and pedagogical understandings of CRP among teachers of African American students. Teacher interviews, classroom observations, teacher debriefs, and classroom artifacts were analyzed to understand how the professional development supported the pedagogical goal as well as to understand what needed to be adapted or added to provide continued support for the teachers in adopting culturally relevant beliefs and practices during literacy instruction.

Setting and Participants

This study was conducted at a public school in a large metropolitan school district in the Southeast region of the United States. Student demographics reflect the surrounding neighborhood: 96% were African American and 4% were Hispanic. 82% of students qualified for free or reduced lunch. Of the 42 teachers at Red Cove, 38 were African American and four were White.

Based on the nature of this formative experiment, purposeful sampling was used to select participants. A total of five teachers participated in the various aspects of study (see Table 1). At the conclusion of the four-day professional development two participants, Bridgette (kindergarten teacher) and Monica (fourth grade teacher), were selected as focal teachers to be observed and supported as they implemented culturally relevant literacy instruction in their classrooms once school started in the Fall. This determination was made based on those teachers' class schedules and so the study could gain insight about the implementation of CRP in the lower and upper elementary grades.

Table 1. Participants

Participant	Grade Level	Years of Exp/ Highest Degree	Initial Beliefs	Focal Teacher
Bridgette	1st → K	16/ Masters	• Connect students lives to learning • Caliber of students	X
Monica	3rd → 4th	5/Bachelors	• Students not motivated • Parental support	X
Samantha	4th →1st	12/ Masters	• Get to know students • Parental support	
Carolyn	EIP R→6th	16/ Doctorate	• Develop students' sense of self • Culturally relevant teacher	
Cori	3rd	8/ Masters	• (She began 2nd day of PD/ no baseline data)	

Data Collection and Analysis

This research study was conducted in four phases as shown in Table 2. The phases for this study were adapted from Reinking and Watkins' (2008) study that included phases for the intervention, data collection, and data analysis. This section provides details of each phase of the study except the recruitment stage, types of data that was collected, and the process of analysis. Due to the iterative nature of formative experiment, data was analyzed continuously throughout the study to determine if the intervention is meeting the pedagogical goal. This allowed the researcher to consider what modifications may need to be made to the intervention to better support teachers in their understandings around CRP and how to support the teachers in implementing CRP in the classroom. All data collected was analyzed with a constant comparative method (Glaser & Straus, 1967), which enabled the researcher to compare themes, and categories that emerge from data with one another to determine similarities and differences (Merriam, 2009).

Phases of the Study and Data Analysis

Baseline Phase

The researcher conducted individual interviews with each participant to gain deeper insight into their understandings of culturally relevant pedagogy and their beliefs about their students, literacy instruction, and professional development. The researcher analyzed the baseline interview data with structural coding to gain an understanding of teachers' beliefs and practices prior to the intervention. Structural coding (Saldana, 2012) was employed so codes could be applied to segments of data that related to a specific research question or question, such as, "What shifts do teachers make in their conceptual understandings and pedagogical practices around CRP when engaged in professional development activities?" Four dominant themes emerged from baseline data: "beliefs about students and their families," "beliefs about culturally relevant pedagogy, "beliefs about reading instruction vs. actual instructional practices," and "beliefs about professional development."

Table 2. Research study timeline

Date	Action Taken	Data/Materials Collected
May/June 2013 Baseline Data	• Met with teachers to review details of the study • Received input for professional development from teachers	Teacher interviews
July 2013 Intervention (Part 1)	Professional Development	• Field Notes • Audio and Video recordings • Teacher interviews • Researcher Memos • Teacher Evaluations
September 2013 – January 2014 Intervention (Part 2)	• Classroom observations and continuous professional learning support (11) • Teacher debriefs with teachers (3)	• Debriefs audio recorded • Classroom Observations/Field Notes • Classroom Artifacts
January 2014	• Final debrief with 2 focal teachers • Share interviews with participants and conduct member checks	Teacher Interviews

Intervention Phase

The intervention for this study was implemented in two parts. The first part of the intervention was 20 hours of professional development (4 days @ 5 hours per day) focusing on culturally relevant pedagogy and literacy instruction (Ladson-Billings, 1994; 1995a; 2001). The second part included classroom observations and teacher-debrief meetings during from October – January after the professional development in July. The professional development sessions were designed to provide teachers with research-based theories to understand culture, language, and literacy instruction. The teachers engaged in intellectual dialogue on research related to culture and language development, critical examined their beliefs, and were encouraged to develop their own understandings of CRP to guide their literacy instruction. The professional development sessions were designed to include the features of effective and impactful professional development as defined in the literature (Birchak et al., 1998; Dar-ling-Hammond, 2009; Desimone, 2009; Florio-Ruane, & Raphael, 2001; Snow, 2012). Table 3 identifies features of effective professional development and how they were addressed in the intervention. Topics for the each day's focus included: culture; policy, curriculum, and multiple perspectives; critical self-examination and language; and CRP into practice (See Appendix for additional professional development materials).

During the intervention phases (e.g., professional development sessions, classroom observations, and teacher debriefs), data was analyzed to understand what factors were enhancing and inhibiting the effectiveness of the intervention. The emerging themes that are related to factors that enhanced and inhibited shifts in teachers' beliefs were thoroughly analyzed after the four days alongside researcher memos. Teacher statements that were shared at the end of this phase and during the post-professional development interviews were juxtaposed to highlight shifts in their beliefs. After coding and constantly comparing the data units, the following themes emerged that described factors that enhanced the four-day professional development:

1. The professional development was self-selected,
2. The group of teachers were homogenous, and
3. Theory was presented around beliefs as opposed to strategies.

Table 3. Features of effective professional development addressed in the intervention

Active Learning	Participants were actively involved in the learning process as they engaged in intellectual dialogue, reflected on themselves and the learning process, and participated in various activities during the four-day professional development.
Development of content knowledge	Theoretical and practical knowledge on culture and literacy development were presented during the four-day professional development.
Collaboration	Participants learned through interaction and discourse as they worked collectively on various tasks during the 4-day professional development and collaborated on classroom practice during the teacher debrief sessions. The researcher and focal teachers collaboratively planned culturally relevant literacy interaction.
Teacher Ownership	Teachers' interests and needs were considered in the development of the professional development and the teachers shared resources that were focal points during the four-day professional development.
Trust and Relationship Building	The researcher taught at Red Cove for eight years and had built a relationship with the teachers prior to the start of the professional development.

The inhibiting factors were:

1. Lack of time and
2. Timing of the professional development.

Classroom observation data and teacher debriefs were analyzed after every two observations.

Retrospective Analysis

The data analysis was concluded with a retrospective analysis of all of the data collected to form conclusions and make recommendations from the overall analysis (Reinking & Bradley, 2008). To address the overall research question for the study, What shifts do teachers make in their conceptual understandings and pedagogical practices around CRP?. The data was coded specifically analyzing the beliefs and practices of the focal teachers Bridgette and Monica during each phase of the study.

Findings

For this chapter, the findings section will provide an overview of the two focal teachers' shifts in beliefs and how those beliefs impacted their practices. The findings that relate to the enhancing factors, inhibiting factors, and modifications are detailed in the full dissertation report.

Teacher 1: Bridgette's Shifts

At the beginning of the study, Bridgette believed that it was important to for the books that she read to her class connect to students' personal lives so that learning experiences were meaningful and engaging. During her initial interview, Bridgette recalled that at the beginning of the school year, her students had to be assessed to determine their reading level as they started 1st grade. The story they had to read was about bison, something her students had little or no previous knowledge of, and this determined their reading placement. She stated "It's a conspiracy, and then you feel like, you want kids to enjoy school but how, exactly? They feel like a failure already."

Despite her indication of wanting to value students' cultures and home life, she also seemed to experience a conflict in her thinking around the resourcefulness of the knowledge her students brought to school. During the initial interview, Bridgette stated that there was "a different caliber of students" at her school when the Magnet Program was housed there. She specified that most of her current students lived in single-parent homes, with their grandparents, or were in foster care and that most students were not on grade level at the beginning of the school year. Bridgette was cognizant about her beliefs of her students. During the 4-day professional development, she placed a lot of effort into thinking about how to bridge her students' out-of-school experiences with classroom learning. During her second interview, she acknowledged that she still had some work to do around perceptions of students.

Yes, I have shifted some. Hopefully I'm more open to how students' backgrounds affect their performance in the classroom…..I am aware of those biases now so I can separate how I feel about those kids, from what they really are before I get to know them. (Post PD Interview, July 30, 2013)

After the professional development, Bridgette planned culturally relevant lessons that not only reflected students' lives but also connected to their writing. She became intentional about connecting with the standards, allowing her students time to share their personal experiences in class, and in turn reframed this knowledge in her writing curriculum. She explained:

When I see a standard, I think, "What story can I choose, what I can read to make the students a part of this?". I look at the standards to see what kind of text I can use to teach this and relate to the students. I intentionally look at standards where before I just read books that were relevant or interesting. (Final Interview, January 21, 2014)

Bridgette experienced shifts in beliefs and practices that enabled her to implement instruction that challenged the standardized culture of the public education system.

Overall, Bridgette's shifting process does not reflect a starting point and an ending point, but rather complex, back-and-forth movement along a continuum of beliefs. At the beginning of the study, she noted her beliefs about the importance of students' lives being connected to the learning process but also mentioned there was a certain caliber of students who were more prepared for learning than others. As the study progressed, her instructional approaches were more inclusive of all students and their families as she built on students' personal experiences to support their writing develop. This shift in practice reflected a positive shift in beliefs that supposed all students—not just students of a certain caliber—have something valuable to contribute to the learning process. However, her beliefs were still conflicted in this area as she continued to have experiences with parents that did not align with what she valued.

Teacher 2: Monica's Shifts

During the initial interview, Monica stated that her students were not motivated to learn and did not do well in school because their parents had not instilled in them the importance of education. She felt

Figure 1. Bridgette's shifting process

that she had to work twice as hard to educate students because parents did not do their job. During the four-day professional development session, Monica expressed that she believed the meritocracy, "pull yourself up by the bootstrap" theory, was valid, but questioned whether or not it was really true for her students. She indicated that all of them do not come to school on an equal footing.

After the professional development, Monica expressed how the professional development caused her to address her beliefs and how in turn that will cause her to be more self-reflective. She also stated that she believed that professional development on culturally relevant pedagogy would allow teachers to "kind of look at things in a different light" (Post PD Interview, July 30, 2013). However, lack of time and adherence to the curriculum pacing caused Monica to struggle with her ideal implementation of CRP because she saw it more as interrupting the teaching of the standards as opposed to enhancing the students learning the standards:

I know time is a constraint when it comes to culturally relevant pedagogy. Its time in planning too, because I do not put the time into it as I should to intentionally think of culturally relevant plans. It's easier to pull the textbook and say read this and then you know that standard is covered. Now I don't mind doing things that directly connect to what I am teaching, but it takes more time to plan for that too (Teacher Debrief Session, October 10, 2013).

In an effort to bridge CRP with standards and mitigate the time constraints she faced, Monica began integrating literacy standards into her Social Studies curriculum. This led Monica to begin having more critical conversations with students on Social Studies topics and current events. When she began to look for multiple texts to increase students' reading in Social Studies, she noticed that most information was presented from one perspective. During Monica's final interview she stated, "I empathize with my students now that I have a more understanding of like how history affects their backgrounds and experience. So it is important to have these critical conversations with them" (Final Interview, January 23, 2014)

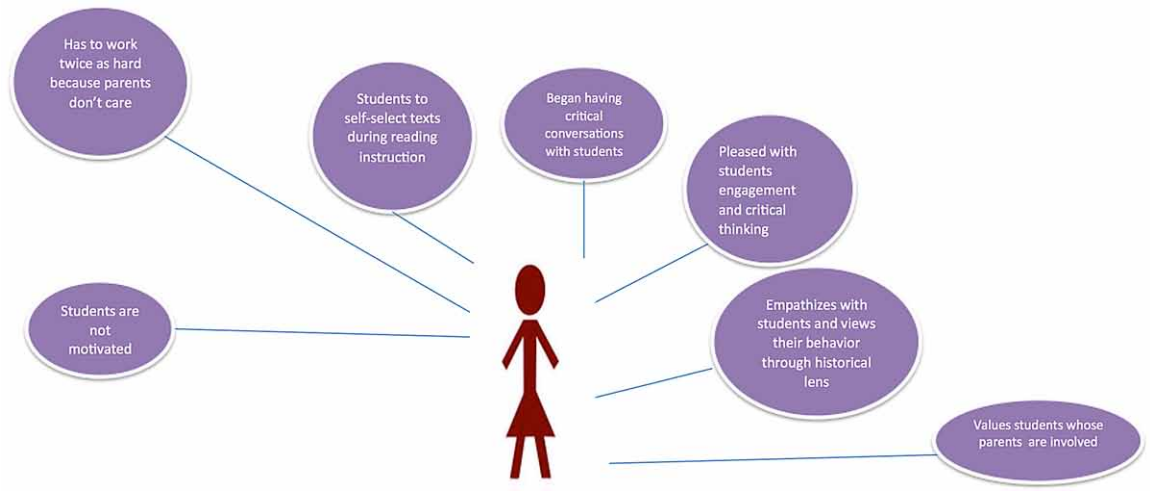
During the study, Monica had an experience with a student who lived with her grandparents and needed extra support in math. The grandparents worked with Monica and their granddaughter to help her improve in school. Monica was excited about this experience she had with her student and the child's grandparents and praised the family for their dedication to education. This experience upholds her beliefs that this kind of parental support is necessary for student achievement. She views students and families who exemplify this sort of hard work in a positive manner, but may be inclined to view families who do not more negatively. Still, her beliefs have shifted, as she also believes that having critical conversations with her students increases their engagement in school and brings attention to inequities in society so that "their fight will be all the bit more" (Monica, Final Interview).

Like Bridgette, Monica has shifted in areas where she saw a direct impact on students' engagement and motivation. Also like Bridgette, her shifts in beliefs and practices do not reflect a starting and ending point, but represent a progression toward a more culturally relevant beliefs and practices.

DISCUSSION

A retrospective analysis was completed to reveal supportable assertions, or claims justified by data, that may reaffirm existing theory, refine that theory, or generate new theory (Gravemeijer & Cobb, 2006). For this study retrospective analysis revealed the kinds of shifts teachers made in their conceptual understand-

Figure 2. Monica's shifting process



ings and pedagogical practices around CRP when engaged in professional development activities. These shifts were analyzed through a sociocultural and critical lens. A key assertion from this analysis is that there are elements of professional development that are critical to supporting shifts in teachers' beliefs.

Critical Elements of PD on CRP

This study asks, "What shifts do teachers make in their conceptual understandings and pedagogical practices around CRP?" Rokeach (1968) explains that changing beliefs is a sizable challenge, because many ingrained beliefs are resistant to change. This was evident throughout the study, as shifts in teachers' beliefs and practices were complex and messy.

Much of the existing literature on teacher professional development suggests that there are specific activities, processes, or programs that teachers experience in isolation to promote learning. However, there is limited literature on the "complex teaching and learning environments in which teachers live" (Opfer & Pedder, 2011, p. 377). In other words, much like student learning, factors that impact teacher learning are contextual. In the this section, the following elements of professional development are described which were found to be critical in promoting shifts in the teachers' beliefs and practices: theoretical knowledge development, critical self-reflection, collaboration, and longevity.

Theoretical

For this study, theory served as the basis for teaching about culturally relevant pedagogy. As teachers read and discussed the tenets of CRP, they developed an understanding of CRP for themselves. They examined other theories that afforded them a different lens from which to view reasons for the lack of academic achievement for marginalized populations. The participants in this study believed that the theory that was presented to them was integral in developing their understandings of not only CRP, but also the need for it in schools. Monica stated that her professional development experience through participating in this study was different from other professional development experiences because she was able to think about and reflect on what she believed about teaching and learning.

Gordon and O'Brien (2007), maintain that a gap between theory and practice ensues when teachers are taught to "plug-in" theory as-is in their classrooms instead of it being a frame of reference for teaching. This study enabled teachers to wrestle with their beliefs as they considered theoretical stances that were new to them. In her post-professional development interview, Bridget stated, "I felt you educated us about things that are going on in the academic realm…while we are in the classroom, we don't know what's going on in the think tank". While Monica reflected on how she had never had the opportunity to reflect on beliefs during other professional development, she states, "But never are we like, you know what, I believe this…." (Monica, Post PD Interview, July 30, 2013).

Therefore, teaching theory in professional development with an understanding of the contextual factors that impact teaching and learning helps to close the gap between theory and practice. The teachers in this study had the autonomy to develop an understanding of the theoretical constructs for themselves based on their previously constructed knowledge and experiences in their school and with the students they teach. Providing teachers only with specific strategies during professional development limits teachers in implementation, but teaching theory that lends itself to multiple strategies and widens the possibilities for teachers and students in the context in which they teach and learn.

Critical Self-Reflection

Critical self-examination allows teachers to examine their beliefs about their students, as well as examine the context of the school in which they work and the surrounding community in which their students live. During the study, the participants examined their beliefs about different races and cultures but also about their beliefs about the population of students they currently teach. They shared stories about students and parents about whom they had negative perceptions, but their perceptions changed once they interacted more closely with the students and their parents. Bridgette also recollected about how her mother-in-law valued education but did not attend parent-teacher conferences because she had 12 children to raise. Sharing these stories was critical for teachers to examine their beliefs since experiences are critical for impacting beliefs. They shared varying perspectives, pushing each other to be more open and accepting.

Collaboration

In the professional development sessions and the teacher debriefs, teachers shared their classroom experiences and developed ideas to implement culturally relevant classroom practices. Through collaboration, teachers constructed new knowledge beyond what they may have constructed on their own. This is reminiscent of Vygotsky's (1934/1986) concept of zone of proximal development. Carolyn, having received a doctoral degree from a top research institution, was able to support her colleagues in gaining new insights into how histories of racial inequality can impact students' sense of self and academic achievement. Collaboration brought the context of the setting into professional learning. When teachers are engaged collaboratively during professional development, their beliefs and knowledge about the world are influenced by the beliefs and values of that community (Jonassen & Land, 2000). The teachers in this study were able to explore practical examples of CRP in the classroom at deeper levels by asking each other questions about their experiences, such as "What did they do then?" and "Why did you ask that?" during group debrief sessions. Since culturally relevant pedagogy does not align with the mainstream beliefs of education, collaboration is key for teachers to continue to grow and support one another with practices.

On-Going Support

Longevity has been shown to be essential to developing teachers' understandings and providing support for classroom implementation. This extended duration sup-ports the sustained implementation of instructional innovations. The focal teachers were given feedback and support in implementing CRP in small steps during their literacy instruction. Monica and Bridgette indicated that on-going support was the most beneficial because instructional decisions were being made based on contextual factors that impacted the implementation of CRP.

RECOMMENDATIONS FOR FURTHER RESEARCH

This study is significant because it provides deeper understandings of the ways teachers learn about and implement CRP. The length of the study was adequate for describing the initial shifts and how the teachers were supported in working toward meeting their goals for implementing CRP, but a study that examines shifts over an entire school year would reveal more information about teachers' shifting process. The researchers would have more time to document teachers' beliefs and develop more modifications to support teachers with conflicting beliefs.

CONCLUSION

Although the current dialogue around education addresses the lack of achievement for students of color, many scholars have worked to disrupt this deficit narrative and position the cultural and linguistic resources of students of color as assets to the classroom and our society (Haddix, Everson, & Hodge, 2015; Kirkland, 2011; Paris, 2012, Souto-Manning & Dennis-Prices, 2012). Smitherman (1977) suggests, "What is needed to prevent the further miseducation of black kids is a change in teacher attitude and behavior, a complete reordering of thought about the educational process and the place of black students in that process" (p. 216). This formative experiment promoted and examined shifts in teachers' beliefs and practices as they considered the implications of students' racialized and cultural ways of knowing and being in the classroom. Theoretical knowledge, critical self-reflection, collaboration, and continuous support were shown to promote shifts that require critical deliberation, but how these elements are implemented depend largely on teachers ingrained beliefs, experiences, and the contextual setting of their work environment. It is the hope of the researcher that the further considerations for developing professional learning not only proceed as an assessment of the needs of the students, but also as an assessment of the learning needs of the teachers.

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APPENDIX

Figure 3. Power point for 4-Day professional development

Figure 4. Power point for professional development

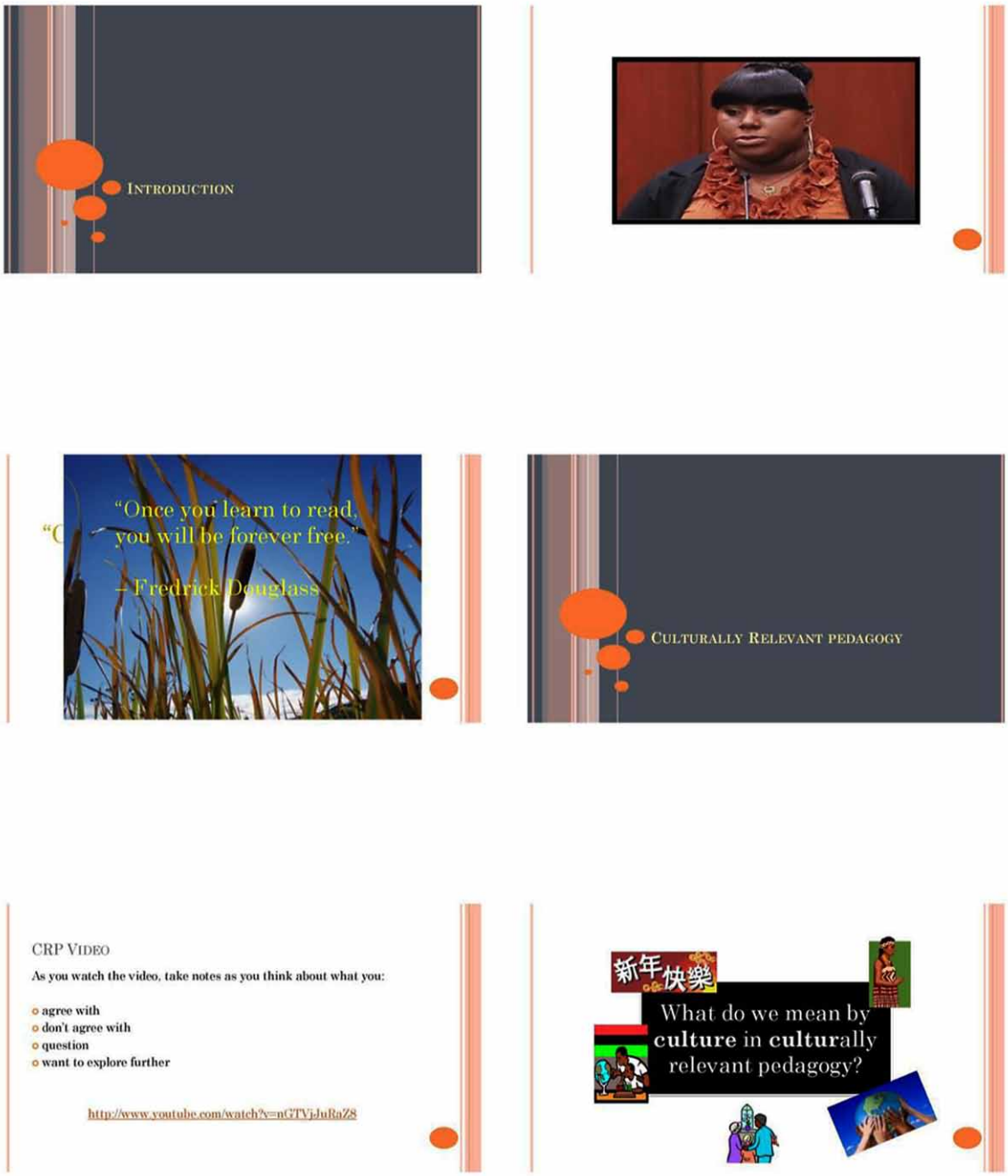


Figure 5. Power point for professional development

Figure 6. Power point for professional development

Figure 7. Power point for professional development

Figure 8. Power point for professional development

Figure 9. Power point for professional development

Figure 10. Power point for professional development

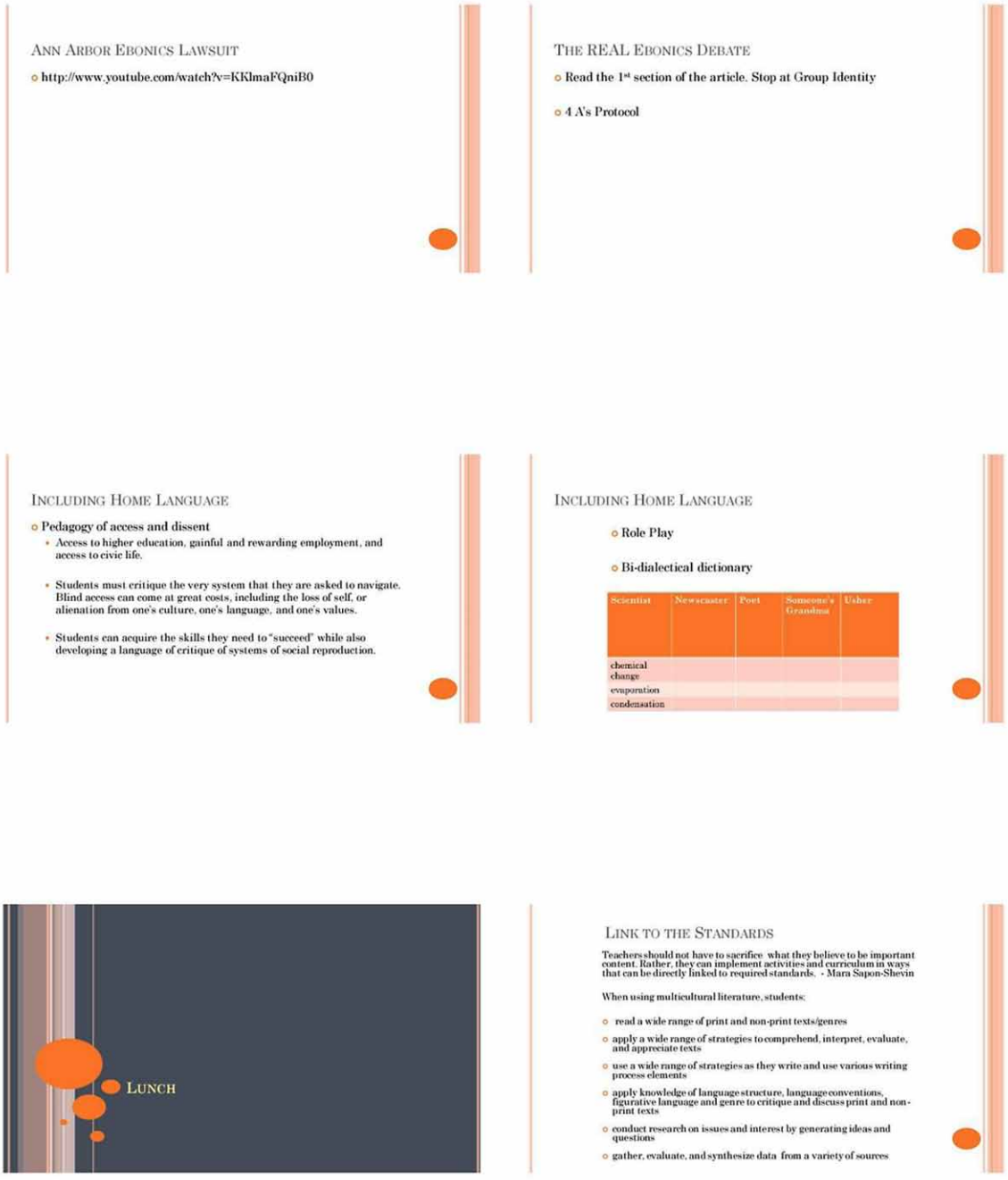


Figure 11. Power point for professional development

Figure 12. Power point for professional development

Figure 13. Power point for professional development. Additional Resources for 4-Day Professional Development

Figure 14. Where I'm from: Assignment ideas

Where I'm From - Assignment Ideas:

1. Use the following categories to list specific details related to you. The key is making this as specific and personal as possible. Use nicknames or words that only you or your family use. Don't worry about the readers not knowing what you are talking about.
    a.) Parent name/s and significant relatives
    b.) Special foods or meals
    c.) Family specific games or activities
    d.) Nostalgic songs
    e.) Stories, novels or poetry that you'll never forget
    f.) Phrases that were repeated often
    g.) The best things that you have been told
    h.) The worst things that you have been told
    i.) Ordinary household items
    j.) Family traditions
    k.) Family traits
    l.) Family tendencies
    m.) Religious symbols or experiences
    n.) Specific story(ies) about a specific family member that influenced you
    o.) Accidents or traumatic experiences
    p.) Losses
    q.) Joys
    r.) Location of memories, pictures, or mementos

2. Select from your lists the items you want to include in your poem. You do not have to include everything that you listed, and you can always add more categories or items to include in your poem.
3. Read the original poem "Where I'm From" by George Ella Lyons. You'll discover that there are items, people, and situations mentioned in this poem with which you are unfamiliar. That's perfectly okay, because this poem is personal and particular to the poet, not the audience.

Composing:
Step 1-Begin with: I am from _____. (Fill in with one of the many items you listed while prewriting.)

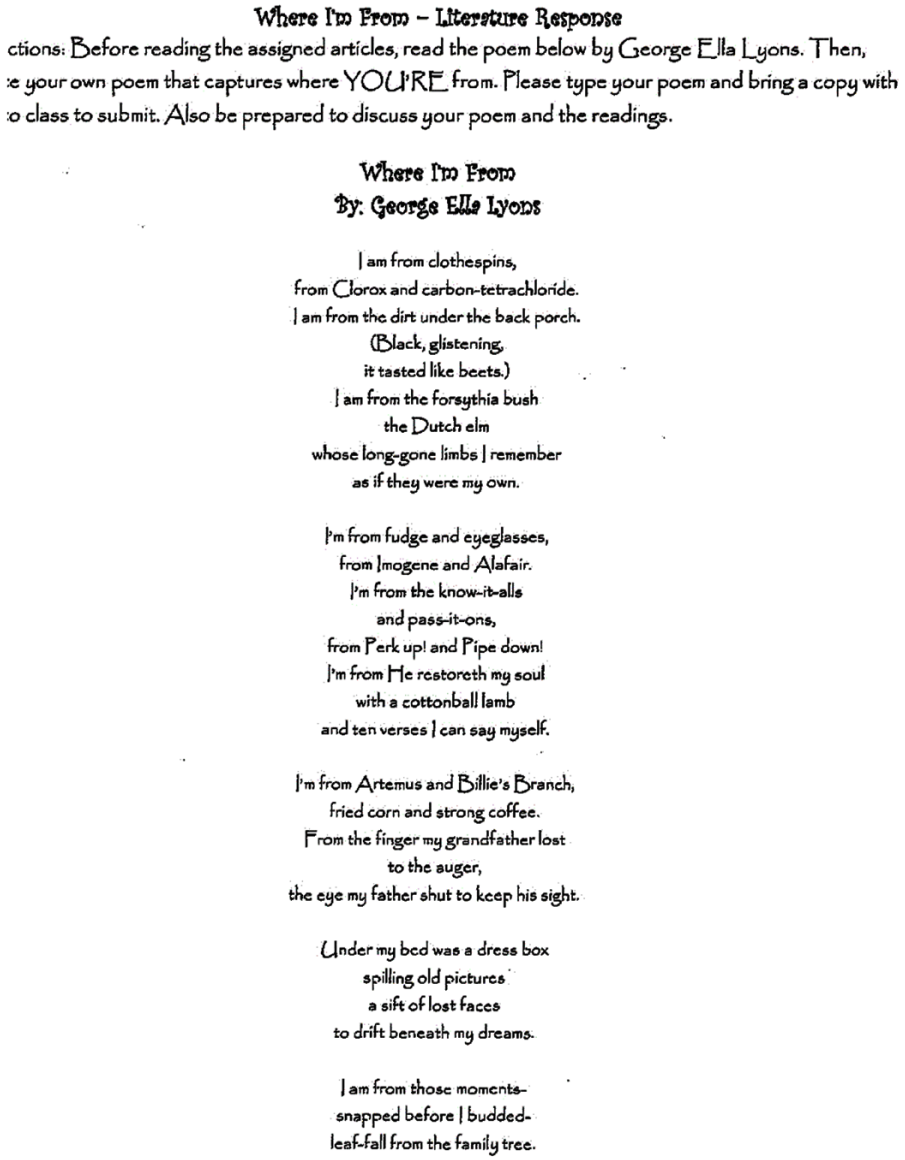
Step 2-Continue on the next line with: From _____ and _____. (Fill in each blank with items from your list.)

Step 3-Continue with: I am from _____ and _____. (Fill in the blanks as you did before.) Continue this format until you have completed your poem.

Step 4-End the poem with an explanation of where you keep any symbols, items, boxes or pictures that may represent some or most of the topics you included in your poem.

Step 5-Reread your poem and make any changes or edits. This poem can be rewritten over and over again, and you'll probably find yourself thinking about more things that you can add to your poem, even when you are finished.

Figure 15. "Where I'm From"



Where I'm From – Literature Response

ctions: Before reading the assigned articles, read the poem below by George Ella Lyons. Then, :e your own poem that captures where YOU'RE from. Please type your poem and bring a copy with :o class to submit. Also be prepared to discuss your poem and the readings.

Where I'm From
By: George Ella Lyons

I am from clothespins,
from Clorox and carbon-tetrachloride.
I am from the dirt under the back porch.
(Black, glistening,
it tasted like beets.)
I am from the forsythia bush
the Dutch elm
whose long-gone limbs I remember
as if they were my own.

I'm from fudge and eyeglasses,
from Imogene and Alafair.
I'm from the know-it-alls
and pass-it-ons,
from Perk up! and Pipe down!
I'm from He restoreth my soul
with a cottonball lamb
and ten verses I can say myself.

I'm from Artemus and Billie's Branch,
fried corn and strong coffee.
From the finger my grandfather lost
to the auger,
the eye my father shut to keep his sight.

Under my bed was a dress box
spilling old pictures
a sift of lost faces
to drift beneath my dreams.

I am from those moments–
snapped before I budded–
leaf-fall from the family tree.

Handouts
Videos
"Introduction to Culturally Relevant Pedagogy" produced by Teaching Tolerance.
http://www.tolerance.org/blog/introduction-culturally-relevant-pedagogy
Culture and Language School of Success (CLAS)
https://www.youtube.com/watch?v=W3AbBFzIokg
I Will Not Let An Exam Result Decide My Fate
http://www.youtube.com/watch?v=D-eVF_G_p-Y&list=PLDq_PGu5_h-qS_wuzM-mP9T4Pziw_jI6X

Chapter 18
Potato, Pot-Ar-To. Tomato, Tom-Ar-To: Is Teacher Quality and Teaching Quality the Same?

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ABSTRACT

Research on school effectiveness largely relates to ways of measuring the quality of a school, which is often quantified in terms of students' 'academic' achievement. The impetus for this research was the recognition that as a pre-university pathway provider, the lecturers at the Eynesbury Institute of Business and Technology (EIBT) face increasingly complex and divergent academic challenges stemming from its 98-100% international student demographic. An anonymous survey comprising two open-ended questions was distributed to EIBT staff for reflection. Rich narrative data from 10 respondents elucidates varied understanding(s) of the difference(s) between 'teacher' and 'teaching' quality, as well as recommendations for their own Professional Development (PD). It is the author-practitioner's belief that institutional advancement requires greater attention to 'teaching' rather than 'teachers', and that PD is a collective effort that is fundamental to overall scholastic success.

INTRODUCTION

Teacher quality may be thought of as the personal traits, skills, and understandings an individual brings to teaching, including dispositions to certain behaviour(s). Indeed, teaching quality is a function of teacher quality. The traits desired of a teacher, however, may vary depending on *conceptions of* and *goals for* education. Thus, it may be productive to think of teacher qualities as those associated with what teachers are expected to be and do; '[e]ffective teachers can be seen, heard, and sensed' (Stronge, 2007). On the other hand, '[w]e may define good [quality] teaching as instruction that leads to effective learning, which in turn means thorough and lasting acquisition of the knowledge, skills, and values the instructor or the institution has set out to impart' (Felder & Brent, 1999, p. 10).

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According to Darling-Hammond (2009, p. 3), a 'high-quality' teacher may not be able to offer high-quality instruction in a context where there is a mismatch in terms of the demands of the situation and their knowledge and skills. In other words, a high-quality teacher in *one* circumstance may *not* be so for another. For example, an able teacher asked to teach subject matter for which they are unprepared may teach poorly; or a teacher who is effective at the elementary school level may be unable to teach at the secondary school level; or a teacher who is able to teach high-ability students may be unable to teach those who struggle to grasp concepts.

Even when a high-quality teacher faces obstacles such as: few opportunities for collegial collaboration; an inadequate or out of-date library; lack of equipment; limited teaching and learning resources; minimal opportunit(ies) for Professional Development (PD); overcrowded classrooms; and/or a poor curriculum, the quality of their teaching can be suboptimal (Darling-Hammond, 2009). Thus, hiring knowledgeable teachers, but asking them to teach out-of-field without the aforementioned tools, is likely to diminish their teaching quality and thus, student learning.

Background

The Eynesbury Institute of Business and Technology's (EIBT) mission is to support students to make the transition from a pre-university preparatory 'pathway' diploma to mainstream university *and* to develop their capacity to succeed at the tertiary-level. A 98% international student population enrol to undertake a Diploma in: Business; Information Technology; or Engineering packaged/partnered with *The University of Adelaide* or the *University of South Australia*. Approximately 40 'sessional' and cross-institutional lecturers—ranging in age from their 20s (i.e., PhD candidates and early career researchers) to their 60s (i.e., experienced academics and/or business professionals)—deliver 40+ courses across three back-to-back trimesters (Velliaris, 2016a, 2016b; Velliaris, Willis, & Breen, 2015a, 2015b; Velliaris, Willis, & Pierce, 2015).

The partner university moderates diploma program delivery and grants advanced standing (also known as 'credit') for courses passed—equivalent to first-year—if students achieve a specified entry-level Grade Point Average (GPA) upon graduation. Lecturers are required, therefore, to maintain a close relationship with the partner institution's Course Coordinator. Assessment activities in the diploma must be deemed equivalent in form and duration to those conducted in the partner university's Bachelor's degree program. In most cases, assessment items such as examinations are provided by the Course Coordinator, but where they are not, lecturers submit examination questions for approval. Annually, a sample of papers and final marks are moderated cross-institutionally.

As Higher Education Institutions (HEIs) face the challenge of meeting increasingly divergent student needs, teacher professional learning for teaching improvement is identified as one answer. Significantly, students studying at EIBT embark on a lifelong journey of personal and professional growth, and their educators should lead by example by updating and renewing their own competencies. Throughout this chapter, the term 'international students' or 'students' is specific to individuals enrolled in EIBT on temporary Australian student visas and who are predominantly Non-English Speaking Background (NESB). For the purpose of this study, there is scant literature pertaining to pre-university 'pathway' programs. This work contributes to bridging that gap. Pathway institutions offer valuable partnerships for the HE sector and it is, therefore, advantageous to conduct research into avenues for strengthening the overall '[international] student' experience.

LITERATURE REVIEW

Teacher Quality vs. Teaching Quality

Teacher 'quality' is a complex—and oftentimes contested—phenomenon for which no general and absolute agreement exists concerning an appropriate and comprehensive definition. The most basic definition of teacher quality, perhaps, is the ability to help students reach high standards. Yet, teacher quality implies that there is a set of inputs e.g., degree completion, practicum placement, official licensure/certification, that serve as indicators of *who* may be successful in the classroom. That is,

Good Teachers: Respect students; are fair and unbiased; culturally sensitive; approachable, available, helpful and caring; motivate their students; are interested in, excited and enthusiastic about their subject; use good verbal skills to explain it well and give 'real life' examples; are well organised; set clear goals and standards, use appropriate assessment and emphasise students' independence. (Prebble et al., 2005, pp. 65-66)

Teacher quality and teaching quality, however, may be linked or conflated, so that there is an assumption that teacher quality ensures teaching quality or that teaching quality is an outcome of teacher quality (Goe, 2007). Questions emerge when contemplating this issue. For example: *Are teachers generally improving their performance over time? Is it possible to identify and measure effective teaching? Is teacher quality the same as teacher effectiveness? What are the best ways to measure teacher quality? What is the relationship between teacher quality and student achievement? What knowledge, skills and attitudes should teachers have? What makes effective teachers effective? What should all teachers know and be able to do?*

The focus of this chapter is on 'teaching' quality, which relates to strong instruction that enables a wide(r) range of students to effectively learn. The capacity to teach and understand others is not innate; it is developed through study, guided experience, inquiry, and reflection. In other words, successful programs cannot be replicated in institutions where, for example, staff lack the ability to bring-them-to-life. Subscribing to Fenstermacher and Richardson (2005), 'good teaching' means that

…the content taught accords with disciplinary standards of adequacy and completeness, and that the methods employed are age-appropriate, morally defensible, and undertaken with the intention of enhancing the learner's competence with respect to the content studied…. the learner actually acquires, to some reasonable and acceptable level of proficiency, what the teacher is engaged in teaching. (pp. 9-10)

Research confirms that teacher knowledge of subject matter, student learning and development, and teaching methods are important elements of 'teacher' quality (refer to Table 1), but does *not* guarantee 'teaching' quality (refer to Table 2).

A review of the relevant literature contradicts the longstanding myth that *'anyone can teach*' and that *'teachers are born and not made*'. In agreement with Darling-Hammond (2000, p. 171), '[p]eople who have never studied teaching or learning often have a difficult time understanding how to convey material that they themselves learned effortlessly and almost subconsciously'. Individuals who have had no former teacher-training often maintain a *single* cognitive perspective that makes it difficult for them to understand the experiences, perceptions, and knowledge bases that influence the approaches

Table 1. Examples of attributes that may be indicative of 'teacher' quality

Teacher Quality
■ addressing students by name ■ admitting to mistakes and correcting them immediately ■ arriving early or on time and being ready for class instruction ■ assuming ownership for the classroom environment ■ communicating clearly and with consistently high expectations ■ conducting one-on-one conversations with students ■ directing students to complete tasks, duties, exercises etc., in a businesslike manner ■ displaying a sense of humour ■ dressing appropriately for the position ■ engaging in positive dialogue and interactions with students inside/outside the classroom ■ enjoying teaching and expects students to enjoy learning ■ following institutional 'codes of practice' ■ investing time with single students or small groups of students outside the classroom ■ listening attentively to student questions and comments ■ looking for the win-win solution in conflict situations ■ maintaining a professional manner at all times ■ preserving a physical environment where instructional materials are in good repair ■ speaking in an appropriate tone and volume ■ understanding students' feelings ■ upholding confidential trust and respect

Table 2. Examples of attributes that may be indicative of 'teaching' quality

Teaching Quality
■ acknowledging the beliefs, values, and practices that may be used by students in the class ■ allowing for acculturation to occur and apportioning room for individuality ■ avoiding colloquialisms and other potentially foreign classroom language ■ capitalising on diversity and strengths from students' own cultural orientations ■ creating an atmosphere conducive to learning and self-discovery ■ disciplining students with dignity, respect, and firm and consistent responses ■ emphasising that students address one another in a positive and courteous manner ■ engaging in active observation and paying attention to subtle nuances ■ incorporating diverse and relatable examples ■ making the new academic culture accessible ■ managing classroom procedures to facilitate smooth transitions ■ offering positive reinforcement and effective feedback ■ overcoming inhibitions and communicating without fear ■ projecting enthusiasm for the content and sequencing it to maximise clarity ■ providing an initial structure to clarify intended outcomes and cue desired learning strategies ■ reading between the cultural lines and seeing the world through students' eyes ■ setting realistic and motivating standards ■ taking up ideas, accepting pupils' feelings, and stimulating self-activity ■ utilising prior knowledge in a cognitive and motivational sense ■ varying the level of cognitive questioning and interaction

to learning of their students. In other words, teachers need to know more than the subject matter they teach i.e., mastery of content knowledge *and* pedagogical skills (Borko, 2004; Darling-Hammond, 1997, 2000, 2006a, 2006b, 2007, 2009; Gay, 2002). As a consequence, '[t]he effect of poor quality teaching on student outcomes is debilitating and cumulative… The effects of quality teaching on educational outcomes are greater than those that arise from students' backgrounds' (Darling-Hammond, 2006b).

The work of Edwards (2000) provided poignant insights into the negative effects of ineffective teaching and learning practices by highlighting the 'teacher-talk-dominated' classroom experiences of many

students. Edwards (2000, pp. 4-5) referred to this happening as '*The Sea of Blah*'. He noted how '[t]he teacher stands at the front of the room and blahs all over the place - *blah, blah, blah, blah, blah*. The sea of blah fills the room and the students bob up and down like corks in this sea'. In support of the notion that 'teaching' bears more weight than the 'teacher', Zbar (2003, p. 218) expressed that 'the one key factor that makes a difference in schools, the one process than can focus these initiatives on improving student learning, is the teaching that occurs in each class'. Moreover, effective practitioners are likely to be those who reflect on their teaching, update their skills and think of teaching from the perspective of its impact on learners rather than from the perspective of 'covering content'.

Pointedly, even the most creative/innovative curriculum ideas will flop in classrooms where they are not understood *and* not supported by the broader activities of the institution. Increasing assessment tasks with formative and/or summative tests to gauge improvement/progress, may only serve to create greater failure—for both staff and students—if teachers do not know *how* students can successfully engage with the subject matter. Exhortations to improve students' 'higher order' thinking abilities accomplish little without teaching quality. Moreover, concerns about 'Students-At-Risk' (STAR) cannot be addressed without teachers knowing how to teach students with different prior educational experiences, different learning needs, and different beliefs about what education means to them (Nelson, Duncan, & Clarke, 2009; Potter & Parkinson, 2010; Sawir, 2005; Stratilas, 2011).

EIBT Staff Selection and Responsibilities

At the Institute, the majority of teaching staff are current or former lecturers/tutors in their respective fields at *The University of Adelaide* or the *University of South Australia*. Foremost, lecturers are nominated by the partner institution's Course Coordinator prior to being interviewed for employment. In this way, the delivery of course content and the standards applied to students' assessments, can be considered equivalent to those of the partner institution. Once selected for a position, however, the appointment must be ratified by the appropriate Head of School, as well as the Academic Director of EIBT. Lecturers are then selected and re-contracted on the basis of their ability to effectively impart the course content to international students with low-levels of English-language proficiency. An important element of the lecturers' contractual relationship with the Institute is that they are required to make out-of-class support time available to students who need personalised assistance.

The Institute's 'Student Learning Charter' distils the essence of a culture of independent learning and clarifies what is expected of students in relation to the support provided by EIBT teachers. This support includes: explaining the difference between dependent and independent learning; designing assessment tasks that are consistent with the aim of helping students become independent learners; encouraging self-reflection; engaging in professional learning discussions and activities; organising classrooms and instruction so that the attitudes, skills and knowledge of independent learning will be fostered; providing regular and timely feedback; recognising that independence is developed by design not chance; and understanding that they will progress from being dependent learners to independent learners at varying speeds.

EIBT Teaching and Learning Model (T&LM)

Following a review of teaching models in other tertiary institutions, the New South Wales (NSW) Quality Teaching Model (QTM) was chosen as a prototype for EIBT for several reasons. These included,

but were not limited to the QTM model: (a) representing a clear and easy to understand framework that defined the dimensions and elements of a quality classroom; (b) exemplifying how each dimension was further described in terms of a number of features required to improve student outcomes; (c) incorporating instructions for practical applications that can be linked to strategic plans; and (d) being underpinned by extensive research from the University of Newcastle and the New South Wales (NSW) Department of Education and Training.

This exemplar, was *not* designed to be prescriptive, but rather to build on individual teachers' expertise by providing a 'common language' to focus discussion and activities on student outcomes. 'Teaching' in this model is defined as 'the provision of structured learning experiences that facilitates effective student learning'. Teaching is: adaptive to the learning needs of students; demonstrates a respect for diversity; develops scholarly enquiry and lifelong learning; influences, motivates and inspires students to learn; and reflects current research and trends within relevant disciplines. Building on these guiding principles, this QTM further describes the major elements of what constitutes effective classroom and assessment practices.

EIBT's adaptation of the QTM has *four* dimensions that best describe classroom and assessment practices. Each dimension helps form good classroom practice, and guides self-reflection and the planning of learning activities. The dimensions found within EIBT's Teaching and Learning Model (T&LM) include:

1. **Intellectual Quality:** To deliver high-quality academic programs and teach to consistently high standards; to demonstrate pedagogy that involves creative, critical, logical and problem-solving skills; and to communicate in an academic context and as a member of an academic community of scholars;
2. **Quality Learning Environment:** To convey expectations and offer timely and regular feedback; to deliver flexible, and many and varied learning activities; to enable students to work both autonomously and collaboratively as a student, a citizen and a professional; and to promote teacher-student interaction and the development of positive relationships based on mutual respect, inside/outside the classroom;
3. **Significance:** To help students see the significance of their learning as a student, a citizen and as a professional; to see the impact of intercultural interactions; to think globally and consider issues from a variety of perspectives; and to understand and be aware of students' own and others' cultural beliefs, values and behaviour, as well as the impact these may have on intercultural interactions; and
4. **Personal Excellence:** To demonstrate and encourage a commitment to ethical action and social responsibility; to help facilitate students' personal and professional development; to offer student support services outside the classroom for additional assistance; and to prepare students for lifelong learning and excellence in continuing education.

A key to EIBT's T&LM is that each of the elements above should not be viewed as a 'standalone', but rather, as working together for the development of the 'whole' student in preparation for HE. Further, the application of the dimensions is not limited to classroom and assessment activities; there is wider development through leadership and high achievement programs, mentoring, organised extra-curricular activities, orientation days, support workshops, and happenings within the broader school community.

When designing lesson plans, educators should consider how to incorporate each element and the most appropriate combination of these activities to achieve the desired learning outcomes. With reference

to Appendix A, the majority of diploma courses comprise four-hour sessions each week, which ideally, should enrich students' learning by allowing time for a combination of classroom activities organised to encompass the following five elements:

1. **D:** Delivery of course material;
2. **IM:** Interaction with resources;
3. **IT:** Interaction with teacher;
4. **IS:** Interaction among students; and
5. **IA:** Intra-action.

Four-hours of delivery alone i.e., 'D' is not considered effective use of lesson time, and using all five activities does not necessarily equate to best practice. Certainly, the decision of which combinations of activities to use in each session is made by individual lecturers as related to their subject matter.

Finally, the inclusion of Core Learning Values (CLVs)—what other HEIs refer to as Graduate Attributes (GAs)—represents a holistic approach to the development of a student's intrinsic 'values' (see Appendix B). By integrating the CLVs into the T&LM, delivery, assessment, and staff performance as examples, are brought together. Overall, the non-prescriptive nature of the model provides a framework that is student-centred, developing a learning culture that engages both teachers and students and equips students with the necessary values to be successful in further study and make a positive contribute to society.

Teacher Evaluation and Performance Review

Academic staff employed at the Institute participate in formal performance planning and are regularly reviewed to ensure that high levels of academic quality in teaching practice are upheld. The monitoring and evaluation of instructional practices is aimed at enhancing teaching and learning effectiveness by collecting feedback in *four*-ways:

1. **Student Evaluations:** Providing staff with student feedback that has been collected in a systematic way;
2. **Peer Review:** Providing staff with feedback from their peers based on established criteria of good teaching practice in undergraduate studies;
3. **Self-Evaluation:** Providing staff with the opportunity to reflect upon their teaching skills on the basis of students' perceptions and against established criteria of good teaching practice in undergraduate studies; and
4. **Interview with Academic Director:** Providing staff with information about their teaching practice as derived from all evaluations.

The 'Peer Review', for example, provides academic staff with feedback from their peers based on established performance criteria. Once a trimester, sessional staff identify a colleague who will provide collegial feedback on the effectiveness of their classroom teaching. A comprehensive review includes observation of a range of teaching activities i.e., lectures, tutorials and workshops. If there is time, it may be possible to observe activities more than once, to account for 'observer' effects. With constructive and critical inspection, the peer reviewer observes teaching interaction(s) and gathers information/

evidence about the quality of instructional processes. Indeed, this process also offers staff the opportunity to contemplate, prepare and then share their individual PD plan.

Importance of Fostering Continuous Professional Development

Educationalists recognise that schools can be no better than the teachers and administrators who work within them and thus, PD programs are systematic efforts to bring about change particularly in the learning outcomes of students. As teacher quality is not fixed at the point of entry into the profession, but can develop through experience and exposure to ongoing PD, this is a central component in nearly every modern proposal for improving education (Guskey, 2002, p. 381). As student learning outcomes depend predominantly on teaching quality, HEIs need to foster teachers' continuous PD in order to meritoriously enrich the quality of their educational delivery.

Promoting PD is an important prerequisite for addressing a continuous stream of changes e.g., fluctuating international student demographics, high-levels of STAR, and low-levels of English-language proficiency as prime examples. With reference to Guskey (2003), high-quality PD within the context of EIBT should:

1. Be based on teachers' identified needs;
2. Be driven by analyses of student learning data;
3. Be ongoing and job embedded;
4. Enhance content and pedagogical knowledge; and
5. Promote collegiality and collaboration.

In summary, '[a]lthough various educational policy initiatives may offer the promise of improving education, nothing is more fundamentally important to improving our schools than improving the teaching that occurs every day in every classroom' (Stronge, Ward, & Grant, 2011, p. 351)

METHOD AND METHODOLOGY

To better understand *how* teachers' practices affect student learning, one must peer inside the black box of the classroom. The author-researcher was interested in EIBT academics' responses to two open-ended' (Creswell, 2008; Kaufman, Guerra, & Platt, 2006; Neuman, 2004) questions:

1. What do you see as the difference between teacher *quality* and teaching quality? and
2. What type of PD would you like to undertake to improve your teaching *quality*?

For the purpose of this study, this question was disseminated via the online portal/intranet with ten (n=10) academics contributing typed narrative text. The multiplicity of social, cultural and educational factors that exist within the Institute can be qualitatively investigated through narrative inquiry because, as Beattie (2001, p. vi) suggested, '[p]rofessional learning begins in an examination of practice, or experience and of the stories we enact in our lives, our schools and our society'.

Contributors remained anonymous and were assigned a Respondent Number (RN1-RN10) for identification purposes. No narrative style or way of articulating the content of responses was established. This

was an 'exploratory' study (Neuman, 2004, p. 15) that involved becoming familiar with a new setting and its particular features, gathering a range of data from a small community, and creating a preliminary picture of contributors' professional viewpoints to be able to generate ideas for future research-informed action. The research objectives included: to employ the writing of narratives that acknowledge the value of one's experiences as a window through which self can be seen as a rich source of description and insight; to raise the profile and encourage recognition of the fundamental importance of teaching in a 'pathway' context; and to stimulate professional values that may encourage EIBT educators to be reflective and innovative practitioners through a continuous cycle of PD.

NARRATIVE DATA AND DISCUSSION

For educators, narrative in written form can 'shine-a-spotlight' onto practice that leads to self-reflection and potential collaborative action for teaching and learning advancement. The first section here forth, shares several excerpts that addressed Question 1: *What do you see as the difference between teacher quality and teaching quality?* With the vast majority of lecturers having a non-language rich background, most responses to this question were relatively brief. Relatedly, respondents would have had limited experience with 'reflective' writing and may have felt uncomfortable with this genre. Nonetheless, these representative narratives offer noteworthy teacher insights.

Respondent Number 1

First, teacher quality refers to what values to we hold. For example: adherence to rules and regulations; developing resilience; effective communication; firm versus fair in application; fostering sincere respectful relationships; and sustaining a positive classroom culture. Second, teaching quality refers to what we know, choose to do or are able to do. For example: breaking down the information that suits a variety of people i.e., scaffolding; demonstrating an array of instructional delivery methods e.g., visual, algebraic, written, graphical etc.; effectively communicating and imparting learning to all students; generally understanding the needs of his/her learners; and sort of applying everything from the first part as 'teaching' is a subset of being a 'teacher'.

Respondent Number 3

Teacher quality refers to the things that teachers are expected to do. That is, their professionalism. Dress, punctuality, collegiality, speech, organisation and time management. Teacher quality involves those things on my list above, but more importantly, engaging students, explaining coursework clearly and effectively, and assessing students according to the aims and objectives of the course. Teacher quality and teaching quality should be coupled, but sometimes they are not. Someone who appears to be 'professional; may be a poor teacher and someone who looks unprofessional may be an amazing teacher. In other words, looks may be deceiving.

Respondent Number 4

Potato, pot-ar-to. Tomato, tom-ar-to. Is this just a question of semantics? Can 'teacher quality' be viewed in isolation from an assessment of a person's character and personality, or is there so much overlap that

they are inextricably linked? Does teaching quality equate to teaching environment, and is there a direct relationship between teaching environment and learning environment? Is the difference dependent simply on the position from which we view the environment of the institution? Is teaching environment that part or parts of the institution that affects and encourages the teaching staff, so that learning environment is the part or parts of the institution that develops the best learning?

Perhaps another way to look at this is to consider that teaching quality is dependent on the institute, not just the individual teacher. It is possible to have a good teacher in a weak teaching environment, and it may be possible to have a weak teacher in a strong teaching environment. A school with a strong teaching environment should encourage willingness to learn, so weakness in a teacher's ability may not have the impact it might in the converse situation, with a good teacher in a weak teaching environment.

So, can good quality learning take place without a good teacher? Well, yes, if the learners are motivated to learn. Of course we need to be careful not to assume that teaching equates to learning, and we need to separate teaching environment from learning environment, so does that take us back to semantics? Maybe all of these things—teacher quality, teaching quality, teaching environment and learning environment—are not so much separate from each other, but linked in a Boolean way, with areas of overlap, commonality and interdependence.

This explorative study enabled lecturers to critically examine themselves as HE educators whereby their narrative was viewed in terms of 'empowerment' rather than 'measurement'; to provoke, confront and illuminate rather than intently searching for a common ground. Below, two respondents were able to write lengthy narratives full of fertile data. They effectively combined 'social, cultural and educational' elements into a powerful and intimate story.

Respondent Number 6

To me teacher quality and teaching quality are both separate, but intertwined. In reflecting on this I think firstly of teachers I have had.

Teacher Quality: When I was 15, one teacher of English came like a breath of fresh air into our Catholic school full of nuns. With limited life experience, she brought vitality, colour in dress and words; washed away the black, grey, white and replace them with soft pastels like the sun through clouds that had never been seen. She conveyed the course content in a whole new multi-coloured way of viewing English.

Her exam results yielded a high proportion of distinctions in the public examinations that had never been achieved before. Even today, I hold her as a role model that 'teaching quality' i.e., content and course content needs to have embedded into it not just a university qualification in a subject area and a parchment (which many diploma or university teachers do not have anyway), but also a special quality to 'reach' students.

For me teacher quality relates to a person to whom you want to listen, who is caring but firm in a respectful way, compassionate about the fact students are just starting to learn what you already know, colourful in the sense that you project to them interest for what you are doing and bring them to a new place, and teaching them what they can see as meaningful. The teacher of quality also has to have empathy to read body language, particularly when dealing with ESL students for whom facial expressions are often much less overt than Western expressions. Thus, the teacher needs to have a strong ability in emotional intelligence to read whether students are 'on the same page' in understanding and interest.

A teacher of quality sometimes needs to divert from the plan, to step back or sideways, to go over again, do it in a different way, or even a 'fun' break' to reinvigorate and refresh the students. Yes, I

guess that many years ago my teachers inspire me even today to aim to be interesting, quietly energetic in approach, fun when possible even if intermittently and my own special addition to this to believe that students have the capability to learn and develop to their personal best in the safe and supportive learning environment I create. However, I am on a learning journey to be the best and most up-to-date in what I do also. There is never a semester that I come away without learning more both from my students and from what I do that can help me become better next semester in a cycle of self-improvement.

Teaching Quality: Although in many ways it is hard to separate teacher quality from teaching quality, I guess for me, it is a more objective outcome than teacher quality which can be construed in many ways as a subjective assessment. In teaching quality, I think of what results students have achieved, has the teacher delivered the curriculum and have all assessments and theory and tasks been delivered as required. However, coming back to being difficult to separate the two concepts—teacher and teaching quality—I could say that the teacher quality is the conduit or catalyst to achieve teaching quality. Two teachers with the same teaching content may achieve different outcomes.

I see this often as coordinator of several teaching teams i.e., two separate teachers in my team may achieve different results for their students not because one is more or less generous in their marking, but because one may read drafts or give students more than the basic requirements of course delivery, or inspire students to listen or use different approaches to conveying the course content. So, on reflection, teaching quality is reflective of teacher quality to some considerable extent. Students will learn from a qualified teacher delivering according to guidelines, but the teacher quality may mean the difference between average and good outcomes.

This semester I received some beautiful verifying emails after course results were published from students thanking me for achieving their good marks and that I had inspired them to achieve their best result they had never thought they could get. I will end as I started by saying that teacher and teaching quality are both separate yet intertwined in a ‘symbiotic’ relationship.

Respondent Number 8

Many years ago, I was a teacher in an international primary school and one of my colleagues appeared to represent the epitome of a professional teacher. She was professionally dressed, spoke clearly, was always punctual, sociable and intelligent-sounding. She exuded all the qualities of what I thought marked a ‘quality’ teacher.

One day, she was absent and I was assigned to cover her class. While I recognise that students can behave differently when they have a new teacher, I was well known in the school and not an external substitute teacher. Teacher expectations such as students raising their hands to answer a question, not talking over each other, not wandering around the classroom during instructional activities, and generally being respectful, were all missing from her class. The students were confused, disorganised, disrespectful, off-target, and undisciplined. Even today, I remain shocked at the disparity between what I perceived to be a high-quality ‘teacher’ with what I (semi) witnessed was a product of her poor teaching.

On another occasion, at the same school, it was the end of a calendar year and recruitment for the following year had just been completed. I was assigned a Year 5 class along with an ‘incoming’ teacher who the Principal had interviewed at an overseas recruitment fair. Based on her Curriculum Vitae and interview, the Principal was adamant that he had found the most ‘amazing’ teacher with an impeccable record of achievement. He bragged that she had so many years of school leadership experience, was coordinator of this and that, as well as athletic and funny. Not wanting to burst his bubble, I thought

to myself that 'actions speak louder than words' and I would not be convinced until I saw her actually teaching/co-teaching the class. She was also assigned as the year-level coordinator, because her age and experience far exceeded mine.

From the day she started, I knew that something was terribly wrong, or should I say, that almost everything was wrong. First and foremost, she was rude to the students telling them to 'get their greasing hands off her things'. When the students were sitting on the carpet, she would remove her shoes, cross her legs, and place her bare foot in their faces. She would mispronounce students' names and when corrected, say 'whatever'. She would circle the room ticking students' work without even checking if their answers were correct. And, as the majority of the students had a non-English speaking background, when they did not understand her she would repeat the exact same expression with a super raised voice as though 'hearing' and 'comprehension' were synonymous.

Finally, it was clear to see that all the Year 5 students disliked her and they informed their parents who in turn informed the Principal. She did not pass her probationary period and my teaching colleagues somewhat blamed me, because I could no longer handle working with her. What my colleagues imagined and what I experienced were at polar opposites. Despite her polished resume and performance in an adult-to-adult interview/social setting, she lacked teaching quality whereby a hostile-type of environment ensued and students could not learn.

I believe that these two examples highlight the difference between teacher quality and teaching quality. One may perceive that a person is/would make a fine teacher, but in actuality, their teaching and thus students' learning is off-track. Despite their professional background, image, likeability and social networks for example, they cannot effectively teach. It is not an easy profession and those who think it is, are not true educationalists - in my opinion…

Respondent Number 5

The section below shares several excerpts that addressed Question 2: *What type of PD would you like to undertake to improve your teaching quality?* Across the data set, there was an interesting array of responses to this question. Once again though, most of the respondents answered with a brief list of PD activities they hope to undertake in the future, while RN8 on the other hand, provided deeper understanding of his/her motivation to pursue specific PD.

There are many PD areas I would like to explore over the coming years. My list includes: benchmarking; conflict management; differentiation i.e., mixed ability classes; exam preparation; Information and Communications Technologies (ICTs) for education; meeting the academic and non-academic needs of students with Asperger Syndrome; meeting the needs of ethnic minority students; progress monitoring and assessment e.g., Learning Analytics; promoting students' social and emotional development; pronouncing Chinese students' names; and training to work with gifted/talented students. There are more, but these are the main ones?

Respondent Number 7

Special-purpose 'pathway' programs differ from regular undergraduate and graduate courses. Given EIBT's student clientele, I would say that I need PD in creating and managing an inclusive learning environment, and better supporting and promoting diversity.

Respondent Number 8

Many colleagues consider PD to be a chore, but personally, I look forward to PD sessions as they give me the chance to see how much I do or don't know about whatever issue is being addressed. I find them inspiring and a change from always delivering content to receiving content and having the opportunity to discuss key topics with fellow colleagues.

So, this question is easy for me to answer. There is no doubt that I need PD in Functional Systemic Linguistics (FSL). It is as though I was never formally taught English grammar during my school days. Yes, I do know the very basics e.g., common and proper nouns, adjectives, verbs, and adverbs, but when students ask me why a sentence is structured in a certain way, my answer is likely 'Because it just is'.

I have tried to read the literature to brush-up on my skills in my own time, but when I read something that says, 'the decision to use a nominal-group (= noun-phrase), rather than a clause, to express a semantic process will be determined by both the textual structure of the text as a whole, and also by the social context e.g., nominalisation is more functional in a science text than in casual conversation, my response is simply, 'excuse me?' I consider myself to be a relatively competent writer, yet with an improved understanding of grammar, the quality of my work could be elevated. Moreover, I would be able to provide clearer feedback to students, which is underpinned by actual knowledge.

Another area for PD would be related to students from the Middle East. I have travelled, lived, worked and studied throughout Asia, but I need to learn more about Middle Eastern gender issues, social roles and cultural traditions. Several years ago, I was teaching an English-language class comprising mostly of students from Saudi Arabia. In hindsight, I really did not know those students as well as I should have, which may have accelerated their English language proficiency… I recognise that it is erroneous to portray all Arabs as strongly religious, hailing from a homogenous cultural religious tradition, since great variety has been identified within the Arab and Muslim communities in Australia. But, I simply do not know enough.

SUMMARY

PD, properly conceived and realised, is the obvious process through which educators can (potentially) incorporate new understandings into their practice. The immediate goal of PD is to improve the quality of teaching; striving to maximise skills in assessment, classroom management, pedagogy, and specific forms of content expertise. And, narrative inquiry involves an intentional reflexive process that embodies the unique, personal, humanness of meaning-making with knowledge generated through self-experience.

IMPLICATIONS, LIMITATIONS, AND FUTURE RECOMMENDATIONS

Unquestionably, 'teacher' quality contributes significantly to student outcomes, but so too do many other things. While 'teaching' quality is an obvious lever in improving students' educational experiences and outcomes, one should not expect it to achieve transformative change alone. Given the wide range of learning situations posed by EIBT students—who represent many distinct social, cultural, and linguistic backgrounds—staff need a deep(er) knowledge base about teaching for diverse learners than ever before and mature diagnostic abilities to guide their decisions. Indeed, experienced teachers as well

as novices, benefit from self-reflective practices. Recommendations for enhancement/advancement and future empirically-based research projects focused on 'teaching' in this context should take into account the following points:

- If students are to achieve high standards, one can expect no less from their teachers and the quality of teaching cannot be judged solely by the qualifications of the academic. Those who have access to enriched professional roles and ongoing collegial work may feel more efficacious in gaining the knowledge they need to teach their students better.
- Educators at the Institute should have subject matter expertise *coupled* with an understanding of how students learn and develop; skill in using a range of teaching strategies and technologies; sensitivity and effectiveness in working with students from diverse backgrounds; the ability to work well with colleagues; and assessment expertise capable of discerning how well students are doing, what they are learning, and what needs to be done next to move them along. That is, the teacher is an instructional leader who 'orchestrates' learning experiences in response to curriculum goals and learner needs, and who coaches students to increased and high-level independent performance.
- The Institute should make ongoing PD part of daily work through collaborative research, joint planning, peer coaching, and study groups as examples.
- The Institute needs a deeper representation of excellence in teachers, a greater challenge and commitment to recognising excellence, and a coherent, integrated, and deep understanding about teacher expertise.
- As cultural diversity will continue to be part of the fabric of the Institute, it is crucial that staff partake in critical discussions about their own teaching in culturally diverse classrooms as cultural incongruence among staff and students may be a/the prime factor that contributes to international student withdrawal.

CONCLUSION

This study attempted to emphasise that 'yes' teachers matter, but their 'teaching' matters more/most. In other words, it is not *where* teachers come from, but *what* they do in their classroom. And, it is possible to make improvements to pedagogical practice irrespective of educational level and/or other qualifications. The primary goal should be to identify ways of improving the nature of teaching and learning within an educational establishment such as EIBT, and to foster a PD culture that feeds forwards and makes the 'pathway'—for both staff and students—ascend ever higher.

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KEY TERMS AND DEFINITIONS

Acculturation: In its simplest sense, this includes the changes that arise following contact between/among individuals from a different cultural background. This may lead to progressive adoption of elements of the other culture (e.g., ideas, words, values and/or behaviours).

Articulation: This is the process by which a university matches its courses or requirements to coursework completed at another institution e.g., EIBT. Students use course articulation to assure that courses they have previously completed will not have to be repeated at the institution to which they wish to transfer.

Course: A syllabus item offered by EIBT or one subject leading to an EIBT diploma award (8-courses required for graduation). Such courses are identified by a subject area and catalogue number e.g., ECON1008 is a first-year 'Principals of Economics' course.

Diploma: An EIBT diploma comprises 8-courses that take between 6-months and 2-years to complete. Diplomas are generally considered equivalent to first-year at the degree level. Such diplomas in Australia are delivered by universities, technical colleges and other private Registered Training Organisations (RTOs).

Eynesbury Institute of Business and Technology (EIBT): EIBT offers full fee-paying pre-university pathways for predominantly international students entering one of two South Australian higher education institutions: *The University of Adelaide*; or *University of South Australia*.

International Student(s): Individuals enrolled in the Eynesbury Institute of Business and Technology (EIBT) on temporary student visas and who are almost exclusively Non-English Speaking Background (NESB). An international applicant must be eligible for an Australian student visa and may be liable for international tuition fees. Students are not 'international' if they are an Australian citizen, Australian dual citizen, Permanent Resident (PR) of Australia, and/or a New Zealand citizen studying in Australia.

Learning Environment: Refers to the physical setting in which a learner or community of learners carry out their work, including all the tools, documents and other artefacts to be found in that setting and the physical setting, but also the social/cultural setting for such work.

Pathway Provider: Educational institutions that specialise in offering students alternative forms of entry into university programs. Applicants may include: early school leavers; those that have not achieved the academic and/or English requirements to obtain direct entry; or students looking to return to study after a period of absence.

Pedagogy: The art and science of teaching, and not in its narrower sense of teaching the 'young'. Its common usage is now sufficiently broad that there is no need to import the word 'andragogy', a term which has only limited currency in the mainstreams of HE practice.

Professional Development (PD): The process of improving and increasing capabilities of staff through access to education and training opportunities in the workplace, through outside organisations, and/or through watching others perform the job as examples. PD helps build and maintain morale and is thought to attract higher quality staff to an organisation.

Qualification: The formal certification issued by the relevant approval body that confirms an individual has achieved either all the units of competency or the subject or course or module learning outcomes required of the qualification.

Recognised Tertiary Education Provider: An education provider registered by the relevant government authority to deliver tertiary awards.

APPENDIX A

Table 3. A conceptual framework of EIBT's teaching & learning model (T&LM)

<table>
<tr><td rowspan="4">PERSONAL EXCELLENCE</td><td colspan="4">EIBT'S T&LM DIMENSIONS</td><td rowspan="4">4-HOUR T&L SESSIONS - D IM IT IS IA</td></tr>
<tr><td>Intellectual Quality</td><td colspan="2">Quality Learning Environment</td><td>Significance</td></tr>
<tr><td>Pedagogy is focused on producing problem-solving skills to apply logical, critical and creative thinking. It requires students to communicate effectively in an academic context and as a member of the community.
The objectives of this dimension include:
• Ensuring teaching standards are consistently high (delivery);
• Providing students with quality academic programs (curriculum);
• Developing problem-solving skills to apply logical, critical and creative thinking; and
• Ensuring students to communicate effectively in an academic context and as a member of the community.</td><td colspan="2">Pedagogy creates learning environments where students work both autonomously and collaboratively as a student, a citizen, and a professional. Expectations are clearly communicated and timely feedback is regularly provided. Flexible delivery and a variety of learning activities inside and outside the classroom provide opportunities for teachers and students to interact and develop positive relationships based on mutual respect.
The objectives of this dimension include:
• Creating learning environments where students work both autonomously and collaboratively as a student, a citizen and as a professional;
• Providing flexible delivery and a variety of learning activities inside and outside the classroom; and
• Enabling opportunities for teachers and students to interact and develop positive relationships based on mutual respect.</td><td>Pedagogy helps student to see the significance of their learning as a student, a citizen and as a professional, producing a greater understanding and awareness of students' own and others' cultural beliefs, values and behaviour, understanding the impact these have on intercultural interactions while developing the ability to think globally and consider issues from a variety of perspectives.
The objectives of this dimension include:
• Constructing a greater understanding and awareness of students' own and others' cultural beliefs, values and behaviour, understanding the impact these have on intercultural interactions;
• Developing students' ability to think globally and consider issues from a variety of perspectives; and
• Ensuring student recognise the significance of their learning as a student, a citizen and a professional.</td></tr>
<tr><td>Respect</td><td>Excellence</td><td>Curiosity</td><td>Passion</td></tr>
<tr><td colspan="4">CORE LEARNING VALUES (CLVs)</td></tr>
</table>

APPENDIX B

EIBT's Four Core Learning Values (CLVs)

- **Respect:** *Respect yourself and others will respect you.* Refers to showing courtesy in everything one does. At EIBT, we treat others with dignity and honour the rules of our society. We show respect by:
  - Acting in an ethical and sustainable manner,
  - Adhering to rules of academic integrity,
  - Developing cultural awareness and a global perspective,
  - Identifying and honouring the needs of others, and
  - Working collaboratively and building positive relationships.
- **Excellence:** *Excellence is the key to success*. Refers to doing one's best. At EIBT, we work with diligence and enthusiasm to achieve. We show excellence by:
  - Being an effective communicator across a wide range of literacies,
  - Gaining a mastery of a body of knowledge,
  - Preparing, planning and committing 100% to everything,
  - Taking responsibility and increased ownership for personal learning, and
  - Using the wisdom of others as a foundation of knowledge.
- **Curiosity:** *Curiosity is the cure for boredom.* Refers to having the desire to know or learn. At EIBT, we work to enhance our understanding and learning through exploration, investigation, and critical enquiry. We show curiosity by:
  - Actively exploring, investigating and analysing possibilities,
  - Asking questions to deepen understanding,
  - Embracing the principles of research and investigation,
  - Engaging in a broad range of learning activities, and
  - Making informed judgments about the validity and reliability of opinions.
- **Passion:** *Without passion there is only work.* Refers to showing commitment and motivation to achieve one's chosen path. At EIBT, we work with purpose and enthusiasm, and take joy from our achievements. We show passion by:
  - Being an active member of the classroom and community,
  - Demonstrating the courage to follow convictions,
  - Possessing a positive attitude,
  - Remaining committed to a lifetime of learning, and
  - Striving to solve problems and generate ideas.

Chapter 19
The Unconference:
A Constructivist Approach to Professional Development

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ABSTRACT

This chapter traces a brief history of professional development (PD) in P-12 schools from the emergence of the National Staff Development Council (1978), now called Learning Forward, and reviews the evolution of evaluation models from Kirkpatrick (1959) to Guskey (2000). It then traces a brief history of learning theory from Behaviorism to Constructivism, and the impact of the evolving understanding of how we learn on changing professional development delivery. The authors share technological advances from the sciences that have influenced the design and delivery of learning and offer a brain-based approach for delivering PD. A recent phenomenon, the unconference, or EdCamp as some have been called, represents a constructivist approach to professional development which is more closely aligned with brain-based principles of how we learn. (Both authors planned, administered, and evaluated an EdCamp Professional Development day for a program of aspiring high school principals in the spring of 2015.)

A BRIEF HISTORY OF PROFESSIONAL DEVELOPMENT IN AMERICAN EDUCATION

In the 1970's, a new specialized role emerged within the education profession in the United States amidst roles such as "teacher" or "administrator;" The new role was termed the "staff developer." Staff developers focused on the professional learning or professional development of the adults in schools rather than just the learning of the students in schools. Under the leadership of Ron Brandt, a group of these educators, focused primarily on adult learning in schools, began to meet regularly; promoting the idea

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that teacher learning was equally important to student learning. They organized themselves, established annual conferences, and emerged as the National Staff Development Council (NSDC) in 1978.

This new organization grew both in size and visibility within the field. In 1987, with Brandt now serving as editor of the national, widely circulated journal *Educational Leadership*, two seminal works were published; "Staff Development and Student Learning: A Synthesis of Research on Models of Teaching" (Showers, Joyce, & Bennett, 1987) and "Synthesis of Research on Staff Development: A Framework for Future Study and a State-of-the-Art Analysis" (Joyce, Showers, & Rolheiser-Bennett, 1987). These articles presented a meta-analysis of studies relevant to staff development that had been conducted over the prior two decades. One finding was that "the number of studies dealing with the acquisition of teaching skills and strategies permitted the development of hypotheses about how teachers acquire teaching skills and strategies, although the number of investigations into how skills are incorporated into the active repertoire continued to be quite small" (Showers, Joyce, Bennett 1987 p 78).

Against a backdrop of increased interest in professional development, the National Staff Development Council continued to grow. By 2009, the NSDC reported a membership over 13,000 strong, with more than 3,000 members attending their national conference each year. At the same time, an emphasis on the outcomes of PD becoming intertwined with outcomes for student learning as a result of PD increased. The NSDC created Standards for Professional Learning for elementary, middle and high school level educators and on September first of 2010, officially changed their name from the National Staff Development Council to Learning Forward. One reason for this name change was the fact that the Council had become international in nature. Additionally, the new name reflected their core purpose, that of professional "learning." In 2010 and 2011, Learning Forward collaborated with 40 other professional educational organizations and published a revised version of their professional development standards. (For a brief history of the organization and the Standards for Professional Development see Shore, 2012 or the Learning Forward website.) The new standards do not offer a prescription for the many challenges facing educators and educational leaders; they focus on a now established core principle that improved learning by teachers in a school building tends to lead to improved learning by the students in that school (Jaquith, Mindich, Wei, & Darling-Hammond 2010).

Today some states license professional positions and universities have developed degree and certificate programs aimed specifically for preparing staff developers in the education field. Some are referred to as Instructional Specialists or Facilitators as examples. Some have designated district level positions for this purpose. At the same time, the role of school principals has broadened to include a focus on developing staff learning at the same time as providing optimum learning environments for their students, based on the knowledge that improving adult learning can lead to improved student learning.

LEARNING THEORIES: A CONCEPTUAL FRAMEWORK

There are a plethora of definitions of what it means to have "learned" something. In one respect, learning is seen as a relatively permanent change in one's behavior due to some experience. It can also be defined as the acquisition of skills or knowledge through various mediums including experience, study, or being taught. Cognitive experiences, emotional responses, and environmental influences, as well as prior experience, can all play a role in how we learn, how our understanding is developed or changed, and how knowledge or skills are retained. Over time, learning theories have emerged and evolved, providing conceptual frameworks in attempts to describe what actually takes place during learning or what

needs to take place to promote or induce learning in a given environment. These conceptual frameworks or learning theories have continued to develop over time and have generally fallen under the subject or curricular content within the field of Psychology.

Behaviorism

An early theoretical perspective through which learning was explained and described is known as Behaviorism. Behaviorism was typically explained in terms of a stimulus and response relationships by which learning was viewed as an aspect or outgrowth of conditioning. Early theories often involved observations of animals. Many are familiar with Ivan Palov's dogs (1849-1936) and B.F. Skinner's rats (1904-1990). Both researchers showed that some principles of learning can apply across species of animals (including humans) and so they studied animals, using their findings to explain some human learning behavior. Perhaps more importantly, their research showed that Psychology could be objectively studied. The Behaviorist learning theory holds some key assumptions:

- Behavior is influenced by the environment. Behaviorists promote the belief that behavior is a direct result of one's interaction with their environment. Specifically, people can become conditioned or molded to respond in predictable ways based on responses such as feedback, rewards, or punishment.
- Learning can be described through stimuli and responses as a behavioral change. Behaviorists studied observable events instead of considering what may be going on inside a person's head. They therefore focus on observable behavior and not thoughts, feelings or beliefs.
- The stimulus and response occurred close together in time. Behaviorists showed that learners had to associate their responses with a particular stimulus and for this to occur, both must happen in conjunction with each other for learning to occur. They were able to determine that a targeted stimulus could produce a predictable behavior in many circumstances.

Cognitive Theory

Eventually, psychologists began to consider that defining learning as simply a change in behavior was too narrow to fully capture all that learning involved. They acknowledged that there were internal mental states or cognitive processes that had been either overlooked or disregarded by the Behaviorists. Non-observable states, such as ones beliefs, desires, or ideas, all influenced how information was perceived and retrieved, processed and stored, or forgotten. Cognitive Theory emerged to study memory, perception, language and other thinking processes. Important cognitive psychologists included Jean Piaget, who developed a theory of cognitive development and stages of development bearing his name, and Lev Vygotsky, known for his sociocultural development theory and the zone of proximal development. Underlying assumptions of Cognitive Theory include:

- Some learning processes may be unique to human beings as cognitive processes are actively involved in the human learning process.
- Objective, systematic observations of people's behavior should be the focus of scientific inquiry; however, inferences about unobservable mental processes can often be drawn from such behavior.

Learning involves the formation of mental associations that are not necessarily reflected in observable behavioral changes.

- Knowledge is organized within the brain as people learn. As children grow, they become capable of increasingly more sophisticated thought.
- The learning process involves relating new information to previously learned information, and new information is more easily acquired when people can associate it with information they have already learned.

Constructivist Theory

In 1964, Jerome Bruner made an important observation that learning could change future learning, and that the capacity of learning in a child could be changed (increased or decreased) through interaction with the environment of the child. Consequently, further investigation into theories of learning over time gave rise to Constructivism. Constructivist Learning Theory states that learning is an active ongoing process of creating meaning from different experiences which occurs in each individual learner. In other words, students would learn best by making sense of learning a skill or concept on their own, with the instructor serving as a guide to help facilitate the process. Since sensory input is ultimately organized by the person receiving the stimuli, it cannot always be directly transferred from the instructor to the learner. This means that a teacher cannot "pour" information into a student's brain and expect that the student will then process it and apply it correctly in settings later on (Brooks & Brooks 1993). So a constructivist approach to learning suggests that a learner's ability to learn relies largely on what he or she already knows or understands and the acquisition of additional knowledge will be a result of individually processing or constructing that new knowledge.

This research on the nature of learning resulted in the notion of a fixed IQ throughout life to become considered disproved by the 1970's. New branches of a constructivist approach to learning emerged in the following decades. In 1983, Howard Gardner proposed the Multiple Intelligences concept, a new definition of learning ability that included areas such as creativity, divergent thinking, interpersonal expertise and problem-solving ability. Gardner suggested that individuals had strengths or preferences in ways to learn and could show intelligences in any of eight areas including bodily-kinesthetic, logical-mathematical, linguistic, interpersonal, intrapersonal, musical, spatial, and naturalist (additional areas have since been added) (Gardner 1983).

Technology Provides a Turning Point

Perhaps the most important finding to influence our approach to learning about learning occurred in 1990; this was the discovery that oxygen-rich blood is repelled by magnetic fields, but oxygen-depleted blood is attracted to magnetic fields. Prior to this time, magnetic resonance imaging (MRI) could primarily be used for locating a tumor or structural problem inside the brain. This new finding gave birth to the concept that "function" could be observed within the living brain by tracking oxygen usage of cells. In other words, the activity between neurons within a particular region of the brain could be observed and measured by blood oxygenation levels-dependent (BOLD) contrast that followed blood oxygen use changes. The fMRI, or functional magnetic resonance imaging, was born, and our ability to view the brain changed from still photos to video (Ogawa, Lee, Kay & Tank 1990).

This ability to see inside the living brain catapulted the neurosciences to the forefront of study on how brains function (which included how they learned). Some educators began to access these findings seeking information they could understand and readily apply in their classrooms in an attempt to improve learning environments. Authors such as David Sousa, Eric Jensen, Rebecca Shore and other educators began attempts to translate these findings into information applicable for educators in learning environments (Sousa, 2009; Jensen, 2005; Shore, 2015).

Scientists' ability to identify the difference in brain activity levels of students engaged in active learning environments verses students involved in more passive environments such as those that involved sustained sitting, listening, reading and writing, ultimately led to adjusting instructional approaches targeting improved learning outcomes. Studies applying principles from the cognitive sciences to entire classrooms of K-12 students found better learning outcomes through more active strategies for learning, such as drawing pictures of concepts or talking with other students about complex vocabulary (Shore, Ray, Goolkasian 2015; Shore, Ray, Goolkasian, 2013). Arts integration was encouraged into core curricular areas and even the boundaries for the ages of children when a free and appropriate public education should begin have been questioned (Shore, 2015).

New knowledge on how the brain learns or constructs knowledge can be readily transferred to adult learning environments as well. We focus on the education field for a look at some evidence of adult learning and find a similar evolution of understanding with respect to creating successful environments for learning. More active environments designed with a constructivist approach can result in improved adult learning (Shore, 2012). This, of course, requires that professional development leaders begin with the desired end result in mind.

Evaluating Professional Development

For decades in the field of education, evaluation was not the systematic investigation of merit or worth that it is in today's era of accountability. In fact, the practice of evaluating professional development training for educators actually had its roots in a model designed to evaluate supervisory training programs in 1950's and 60's United States businesses and industries. A model emerged about the time that a Behaviorist Learning Theory approach began to give way to an approach based on Cognitive Learning Theory. This evaluation model developed by Don Kirkpatrick at the University of Wisconsin became known as the Four Levels Evaluation Model (Kirkpatrick 1959).

The 4 steps of evaluating learning in this context according to Kirkpatrick included:

Step 1: Reaction, or an indication of how well the learners liked the training;
Step 2: Learning, or some measure of the extent to which the learners gained knowledge and skills;
Step 3: Behavior, or what changes occurred in participants' job performances resulting from the training; and
Step 4: Results, or what were the tangible results of the training in terms of reduced costs, improved quality, increased production, or efficiency to the business providing the training.

As can been seen, the focus was on observable behavior as a result of training. The assumption was that changed behavior in the work place was an indication of something learned.

Thomas Guskey, an education professor at the University of Kentucky, built upon Kirkpatrick's Four Level Evaluation Model, and adapted it to use in the education field. Guskey modified Kirkpatrick's four

steps and added a fifth. Guskey's Five Critical Levels of Professional Development Evaluation include (Guskey's Model):

1. Participant Reaction,
2. Participant Learning,
3. Organization Support & Change,
4. Participant Use of New Knowledge & Skills, and
5. Student Learning Outcomes.

Guskey's model is hierarchical moving from simple to more complex and building on levels from one to the next (Guskey, 2000; Guskey, 2003).

The first critical component to Guskey's model asks the question, "Did the participants like it?" In most cases, Guskey was focused on educator professional development so in other words, did teachers express that the time was well spent, was the presenter knowledgeable, and will the information gained be useful. All of these answers were from the perspective of the participants in the training, usually teachers.

The second component addresses the learning of the participants in the training. Possible measures for evaluating this learning include paper and pencil assessments, demonstrations, diagnoses, prescriptions, or personal reflections on the information. Guskey was careful to begin with the end in mind, so that planning for a desired learning result was mandatory if any hope of evaluating that learning could be determined. Clear and precise goals must be articulated from the outset, what procedures would be used, and exactly how success would be determined were essential pieces of the planning puzzle. Attempts to clearly quantify and define the learning that has taken place and the result of that learning throughout an organization and even through resultant student learning is woven throughout Guskey's model. The fourth Level of the model cannot be measured upon the immediate completion of the training. It must be gathered after a sufficient amount of time has passed to see if the participant still both remembers and applies the learning from the PD.

The ultimate outcome of PD in education arenas today is usually student learning. Since the publication of Guskey's model, some large-scale studies have attempted to more clearly articulate what leads to effective professional development of teacher learning in the first place. Researchers from the American Institute for Research analyzed over 1,300 studies designed to address the effects of PD for educators on student learning. Specifically, out of 1,343 studies, only 9 met the standards of credible evidence set forth by the U.S. Department of Education for providing educators and policy makers with scientific evidence about what works in schools (Guskey & Yoon 2007). So one conclusion at that time was that more research was needed to make definitive claims.

More recently, the New Teacher Project (TNTP), published a report of an ambitious 2-year effort to identify what works in teacher improvement (TNTP, 2015). They studied a broad range of activities: traditional one-time professional development, extended development programs, independent teacher efforts, formal and informal peer collaboration, receiving direct coaching, completing university coursework, time with a formal evaluator, peer observations, administrator observations, feedback, technique practice, follow-up support, teacher preparation and mentoring. They collected feedback on these experiences from teachers and principals, considered teacher mindsets and reactions, school leader reactions, and the collective responses from teachers working in the same schools. All in all, their research included responses from 10,507 teachers and 566 school leaders. It was calculated that approximately $18,000 was spent on training per teacher per year. It was disheartening to find that districts were making massive

investments in teacher improvement through both time and money, with most teachers not appearing to improve substantially in any way; "that all this help doesn't appear to be helping all that much." (TNTP p 10) Their research was unable to link any teacher growth to any particular development strategy.

Two additional federally funded experimental studies of job-embedded, content-focused, sustained professional development also found that interventions did not result in long-lasting, significant changes in teacher practice or student outcomes (TNTP, 2015, p 58). The question begs, how can so much time, money, and the best of intentions produce such insignificant changes in learning? Perhaps a more Constructivist approach to professional development should be considered.

A BRAIN-BASED APPROACH TO PD

Important technological advancements have provided new tools by which researchers could more directly analyze a learner's actual engagement in learning. When applied to adult learners, these findings suggest that many traditional approaches to PD may be ineffective largely based on the incapability of both the design and content of the trainings to engage participants. Considering more brain-based strategies generally aligned with a Constructivist approach to learning can help PD be viewed as more meaningful and engaging.

The Unconference: EdCamp

Attending educational conferences to learn new material or a new skill has been a widely used method of delivering PD for decades. Leaders design and structure a period of time, be it an hour or a week, and educators either decide or are encouraged (or mandated) to attend. Some of these conferences may require travelling far distances at sometimes great expense. Others are a school-based PD session after school or on a teacher workday, oftentimes wherein an outside speaker is hired to present. All may be intended to improve adult learning or practice and some are meticulously planned and expensive to administer, not counting the time needed in executing them. In the early days of designing PD, teachers sometimes complained that the training did not apply to them or found the content wanting. This is well documented over the decades as PD efforts evolved (Guskey, 2000). More recent efforts have shown that PD is perceived more successful when content is tailored to educator needs assessments, and there is a conference program or agenda revealing a thoughtfully planned opportunity to learn. In its most basic state, these conferences adhere to a more behaviorist approach to learning wherein if the right speaker is brought in and a sufficient delivery takes place, teachers will learn. Experts toured the country sharing their methods and in some cases their wares for improved student learning (or any number of topics for teachers) and the travelling consultant approach to PD became popular. Over time, the travelling consultant approach became referred to by some teachers as the "travelling insultant" approach and some resented being forced to sit and listen to speakers who were not familiar with the needs or culture of a particular school or district. Feedback revealed that at times even if the speaker was interesting, the method or approach was not conducive to ideal learning environments (Bransford, Brown, Cocking, Donovan, & Pelligrino, 2000).

Imagine a conference or professional development opportunity where all of the participants voluntarily show up to learn, however, there are no set presenters, no set schedules, and every aspect of the learning environment is constructed on the spot the morning that the participants arrive to learn. All that is actu-

ally planned initially is the date, time, and place to meet. These participants arrive and *then* decide what they most want to talk about and study based on who shows up. A scribe of sorts may list topics on a white board or by, for example, having participants place their interests on slips of paper or sticky notes. The slips covering their ideas are then sorted and categorized on a big board or wall for all to see. Topics are chosen by majorities, assigned times, and the teachers are sent into various sized rooms to discuss the topics and learn from one another together. There is no particular leader, and participants can move from topic area to topic area at any time as they so choose based on their interest and prior knowledge.

This more constructivist approach to delivering PD already exists. Rather than a formal conference, the first of these "unconferences" is documented to have occurred in May of 2010 in Philadelphia (Swanson, 2014). It has been named an Edcamp and is considered by many to be a more organic, bottom-up emergence to support adult learning. In a short time, the Edcamp Foundation reports over 500 of these unconferences have been held in a dozen countries in the 4 years following its initial emergence as a form a professional development. Generally characteristics of an Edcamp are:

- They are free.
- They are noncommercial and conducted with a vendor-free presence.
- They are hosted by any organization interested in furthering the Edcamp mission.
- They are made up of sessions that are determined on the day of the event.
- Anyone who attends can be a presenter.
- They are reliant on the "rule of two feet" that encourages participants to find a session that meets their needs.

If one initially chosen does not, the participant walks next-door to another session.

Edcamp in Practice

Four years ago, the University of North Carolina at Charlotte (UNCC) and Charlotte-Mecklenburg Schools (CMS) joined together in a collaborative effort to recruit, train, and support the strongest high school principals to serve the families and children in high schools in the Charlotte-Mecklenburg School system. CMS is a large district in Mecklenburg County which serves almost 150,000 students. The district was experiencing a shortage of principal candidates, particularly at the high school level. The initial Aspiring High School Principal program was designed in collaboration with the highly regarded New York City Leadership Academy, and tailored toward secondary school leaders in particular.

The students in the Aspiring High School Principal program were mostly recommended by CMS principals to attend. Once being admitted through a rigorous selection process, they received master's or doctoral credit from UNCC depending on their level of preparation coming into the program. Most were working to earn Principal Licensure in the state through the program.

As the second cohort of program participants neared graduation from the program and a third group prepared to enter, an idea emerged to provide ongoing professional development for prior cohorts combined with current (and future) participants. It was decided that the program directors would hold a professional development day combining both groups of program participants. Funds from the Wallace Foundation Principal Pipeline Initiative were used to host a professional development day for students from our three cohorts. To ensure that the PD was useful to the participants, the directors decided to experiment with a new model of PD with which they had become aware, the Edcamp Model.

Students were sent the book, *The Edcamp Model: Powering Up Professional Learning* by Corwin, 2014 so they would be familiar with the concept and format of the event prior to attending. The university provided a meeting space for the PD. As students arrived, they were guided to a schedule board on which they listed topics for sessions they felt qualified to facilitate. Facilitate is a key word since session leaders encourage participant participation in the form of conversation. Next, students were given paper dots to signify which sessions they wanted to attend. Sessions with the most interest were written in location and time spaces on the schedule board, and students freely attended the sessions they preferred. A person was designated the role of recorder in each session so that the information could ultimately be shared and all participants could get the poignant information from all sessions.

At the end of the day, participants reconvened for closure in what Edcamp founders have termed a "smack down;" a term coined by Edcamp leaders, to denote a time for Edcamp participants to take 60 seconds each to stand up and share their greatest "take-aways" from the Edcamp experience. In addition, leaders asked if participants would attend a second Edcamp session in the future. Examples from this portion of the smack down session included the following comments:

After experiencing the EdCamp model, I prefer its format over typical PD/workshop formats. The EdCamp model gives participants more control over their PD options; presenters are "right there" (you don't have to contact and coordinate); the discussions seemed to be richer...perhaps because they were more interactive and spontaneous vs. reacting to a prepared presentation.

Yes, this allowed the participants to actually have a say in what they were going to discuss during the event. It gave you choices.

Yes, it gave opportunity to have input on what the focus for the day would be.

I loved this model. Not only did it allow teachers to serve as leaders, having a voice in the professional development of the day was rewarding.

It felt like a living entity; we were a synergistic learning community and it was exhilarating!

When asked if there were any downsides to an Edcamp, comments included:

The organizers have to have a lot of faith that it will turn out ok; that's tough for a control freak like me!

Perhaps we were all too new to the concept, but I didn't see anyone exercising "vote with your feet"

Since the organizers of this Edcamp were university personnel, they also made time for table-talk discussions so that university staff could get feedback from students on the program such as reports on issues from the field that students felt needed to be addressed more thoroughly in coursework. On yet another level, they used the Edcamp professional development day as a recruiting tool by asking our alumni to bring a guest who may be interested in the UNCC-CMS Aspiring High School Principals program to join them for the day. This was successful and several of the next year's cohort were also participants in the Edcamp.

Honoring the personal expertise of the participants is a tenet of the Edcamp model, but setting the stage for a physical community of practice in which participants can construct their learning through shared interests, ideas, successes, or strategies, allows for professional development that can be ongoing, vibrant and meaningful for the participants whether they are students, teachers or school leaders. Unlike former approaches where PD was done "to" teachers, a more constructivist approach through models like the Edcamp can invigorate educators and tap into the innate nature of the brain to constantly engage in new learning. Further research will show if the Edcamp model can also ultimately result in significantly increased student learning as well.

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Chapter 20
An Agile K–12 Approach:
Teacher PD for New Learning Ecosystems

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ABSTRACT

Several schools in the United States are adapting to incorporate 21st century skills, active learning pedagogical approaches, and new technological innovation to advance student learning. Creating physical and virtual spaces and support for creativity, collaboration, critical thinking, and innovation is vital. Yet, designing and offering meaningful professional development to teachers in these new learning ecosystems is a challenge. This chapter explores the application of Agile methodologies to professional development planning, design, and facilitation in a school district that implemented a new learning ecosystem. The Agile approach resulted in customized professional development opportunities that were rigorous, relevant, iterative, and flexible enough to meet district needs. Data were collected on teacher technology efficacy, and initial results indicated success. This has generated an agenda for further research.

THE NEED FOR MEANINGFUL PROFESSIONAL DEVELOPMENT

What is effective professional development for teachers? It has traditionally consisted of an administration-planned in-service on one topic that will meet the needs of all teachers. Guskey (2014) states that these training sessions are often planned without knowing what teachers need to accomplish with the training. Christesen and Turner (2014) report that to gain teacher commitment to professional development, the teacher's desire to be involved in the process is essential. Teachers weigh the cost-factors of professional development to the benefit of a new practice and the relevance to the teacher's classroom practice (Christesen & Turner, 2014, p. 233). Many professional development opportunities planned for teachers may not meet the needs of all the teachers, their school, or the district (Roseler & Dentzau,

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2013). In 2012, Valeria shared that biggest problem with professional development for teachers wass that it wass usually an isolated event with little or no teacher input or connection to daily teaching.

Valeria (2012) suggested that teacher professional development should be an on-going process, imbedded in daily classroom practices with clear knowledge of expectations in their classrooms. Soine and Lumpe (2014) recommended that teachers should have professional development designed in a way they can take control of their own learning (p. 303). DuFour (2014) states five factors important to the best environment for professional development which builds staff capacity to function as high-performing: sustained and on-going; collective; job-embedded; results-oriented; and functions as a professional learning community (Agile Innovation, 2015). Professional development for teachers to include teacher input, be an organizational change process, and a mechanism for continuous school improvement must also embrace the mastery of innovation.

Innovation, collaboration, and improvisations have become the essential forces shaping modern life and have become important for all of society (Morris, Ma, & Wu, 2014). Schools are not exempt from this rapid change. Morris, Ma, and Wu describe as enormous and accelerating challenges that every organization faces today. The questions they ask of business organization can be applied specifically to educational organizations:

- How well can your faculty and school prevailing in the current environment of accelerating change?
- Is your faculty/school positioned to benefit from the countless new opportunities that change is bringing?
- Can your school become agile to succeed?

21st Century Professional Development

Professional development focusing on innovative technology integration for teachers is a complicated landscape. Sykes describes professional development activities for K-12 teachers as "The most serious unsolved problem for policy and practice in American education today." (1996, p. 465). The literature indicates that as the numbers of computers and technology capacity exponentially increase, so does the need for in-service teacher technology integration activities (Jenson, Lewis, & Smith, 2002). Thus, this grant project integrated teacher professional development as a key focus, with a goal of reaching the entire P-12 faculty. "High-quality professional development is central to any education improvement effort, particularly those that seek to integrate technology in support of classroom instruction." (Martin, et al, 2010, p.53). Nationally, teacher professional development opportunities range from traditional "canned" approaches on how to use a tool to rich professional learning group models. The professional learning community model encourages sustainability and accountability across the curriculum. (Jenson, Lewis, & Smith, 2002). The central professional development team goal was to offer professional development sessions to the entire district, while forming an online community of practice to address more individualized needs. The research team for this study therefore investigated various topics, themes, and activities central to teaching in a new learning ecosystem.

There is a distinct need for meaningful professional development and training of in-service teachers regarding innovative technologies. Innovative technology for the purpose of this paper focuses on new instructional media (educational computing, multimedia, furnishings, and technological teaching tools) serving to advance the education of today's students (Istance & Kools, 2013). This challenge is even

more urgent when the classroom environment is fluid and changing. As new learning ecosystems are designed and implemented, so increases the need for teachers be agile with the design, facilitation, and assessment components in the teaching and learning process. More public schools (grades Kindergarten through twelve) are instituting laptop (1:1) or bring your own device (BYOD) initiatives, renovating facilities to incorporate hi-tech active learning spaces, and facilitating innovation and deep learning applications. Professional development for teachers is the key. The classroom is not limited by brick and mortar, but extends beyond. This paper addresses one particular design model for teacher training in new learning environments. It discusses the planning, implementation, and assessment of professional development efficacy.

This chapter discusses one particular implementation project. The state made specialized grant funding available to university and public school partners in 2014 for innovative projects that transformed public schools. The grant program focused on funding programs that directly addressed increased student achievement, fiscal savings, and improved teacher quality. A suburban school district and private university in the Midwest collaborated to develop a program proposal under that grant program focusing on transforming existing building space into 21st century active learning environments. The project also included particular emphasis on meaningful district-wide training for in-service teachers.

Three months later, the partners received notification that the proposal was successful. The school district was awarded $4.6 million, which had to be completely expended within seven months. The specific initiative focused on transforming the learning ecosystem—the entire education environment and relevant support components—within the district by infusing new technologies, reconfigurable innovative furnishings for grades 5-12, and providing transformative professional development to directly improve instruction. Over the next year, the district successfully completed the project with a goal of providing a model for others implementing new active learning instructional spaces. This chapter will chronicle the process, as well as highlight an innovative design model grounded in Agile methodologies for professional development programs.

Study Background

The school district elected to shift the instructional paradigm by changing the school furnishings, technologies, formal/informal learning spaces, libraries, and teacher resources. Traditional classroom spaces in the school district consisted of fixed tables, stationary chairs, heavy tablet desks, and bare hallways. For grades 5-12, the grant transformed all building spaces by integrating new Steelcase Node and Verb™ classroom table and seating solutions. The Node products are rolling individual desk solutions that allow for student movement, storage of materials beneath them, and easy classroom reconfigurations. as well as Steelcase MediaScape furnishings and technologies. The Steelcase VERB solutions consist of mobile tables and chairs that can be easily reconfigured for different student-centered work. The hallways were enhanced to include informal learning spaces, seating clusters, Steelcase Huddleboards™ (mobile dry-erase marker-board stations for informal learning activities), and multiple presentation kiosks consisting of flat-screen monitors and audio speakers. MakerSpaces were added to buildings for student and faculty authoring. This included a large fabrication laboratory (FabLab) featuring a wide array of equipment such as a computer-numerical-controller (CNC) machine, three dimensional (3-D) printing

suites, screen printing equipment, embroidery equipment, large format printer-plotters, computer aided drafting (CAD) work stations, and more.

The former school libraries were re-envisioned and renamed to "Inq Spaces," where "Inq" was short for inquiry. The Inq Space at the secondary school was enhanced to include special work centers for new 21st century activities addressing creativity, collaboration, critical thinking, and life/career skills (Trilling, Fadel, et.al, 2009). To that end, administrators designed and developed several new dedicated spaces. A distance learning lab was built, featuring PolyCom™ video conferencing equipment and high quality audio and video systems for electronic learning and video connections via Internet worldwide. A "Beat Box" music mixing suite offered students and teachers mixing boards, iPads, and sound equipment. A new video editing suite featured a green screen, video editing hardware/software, and cameras/tablets. Lastly, a Tinker Space was developed with multi-purpose reconfigurable furnishings that accommodate various discovery-learning kits and activity sets. The design of these new spaces was based on an extensive review of the literature and surveys of teacher needs. A committee from the local school worked closely with vendors and experts to design, select, purchase, and implement the new, transformed learning ecosystem.

According to Sheskey (2010), "Educators in the 21st century realize that students entering the classroom today are much different from those who have come before." (p. 197). These changes are not just demographic. Rather, students' desires and expectations have changed, demanding classrooms in which they can be actively engaged. It also must be recognized that active learning can take on many forms. According to Meyers and Thomas (1993), the basic tenants of active learning include providing students opportunities to read, write, and reflect as well as talk and listen. More specifically, current literature on active learning notes the four "Cs" that make up these skills: creativity, critical thinking, communication, and collaboration. Yet, many schools lack adequate equipment that can be readily moved, modified, or grouped for these types of 21st century active learning work. The facilities at the public school district were similar to many in the United States- a blend of large, old, heavy tables and chairs or cumbersome stationary tablet desks. Group work and active learning inside and outside classroom spaces was limited.

The public school focused on implementing student-centered, active learning spaces in order to prepare students for the future. "Making education pertinent to K-12 students in the 21st Century is a complex and important pursuit" (Luterbach & Brown, 2011, p.14). Uniquely, this grant focused on providing capacity and meeting many of the International Society for Technology in Education's (ISTE) Essential Conditions (2007). All teachers in grades 5-12 received new active-learning furniture.

Many resources were provided by Steelcase®, who also shared a great deal of their active learning space research from their Steelcase University Facility in Kentwood, Michigan, U.S.A. Steelcase offered significant recommendations and insight on new learning space design, formal and informal learning space configuration, and active learning approaches. Concurrently, the district also adopted a 1-to-1 Chromebook initiative, ensuring that every student would have 24/7 access to their own laptop. Schoology, a learning management system, was implemented for both synchronous and asynchronous educational activities. Ubiquitous wireless was installed to provide appropriate infrastructure for the endeavors. With many changes to the learning spaces, as well as tools and technologies, it was evident that in-service teacher training was critical. Educators needed to explore new tools, share ideas, and discuss ways to maximize the affordances of the new spaces and facilitate dynamic, multi-faceted, rigorous, and relevant instructional opportunities.

Issues and Controversy

The university partner focused on providing professional development addressing active learning strategies in technology-rich environments. During the third week of the grant project, prior to furniture delivery, the district and university piloted their first professional development day, focused on offering training to teachers and paraprofessionals within the district en-mass. Almost 300 educators and school professionals attended this seven-hour mandatory day of training and events regarding new learning ecosystems. The day began with district administrators providing an overview of school district plans for creating the new learning ecosystem and details about the grant funding. Then teachers broke up into various smaller groups moving through four different tracks of sessions designed to initiate conversations about active learning strategies and 21st century skills in new learning spaces. The four tracks were: technology integration, global collaboration, active learning approaches, and formative assessment. Additionally, vendors (such as Steelcase) offered some sessions in the rotation for teachers to see examples of the new furnishings and technologies. Teachers were divided alphabetically into diverse groups for the rotation through each session. Each group varied across buildings, grade levels, subject areas, interest levels, and technological experience levels.

A survey was done at the conclusion of this preliminary event by the school district. Archive data sets were provided to the university (Smart, 2013). The feedback from this large-scale training event was very negative. It became clear that format of the professional development offerings provided did not meet the teachers' needs and expectations. The teachers did not respond favorably about the grouping, tradition professional development offerings, or topics. The research team convened and discussed that the approach to professional development under this grant had to be unique in order to reach all the educators. There were several main concerns identified that in-service teachers cited with regard to the first ("traditional") professional development day.

The one-size-fits-all approach—where everyone heard the same info "how to" information from each category in the hour-long break-out sessions—had failed. Teachers expressed frustration that the information provided did not address their specific classroom needs, grade bands, content areas, interest-levels, technology experience, or teaching style. Secondly, since none of the new furniture/equipment had been installed, attendees reflected that much of the training was viewed as theoretical and impractical. Thirdly, several expressed concerns that the presentations were not relevant and did not integrate enough active learning examples and activities for the attendees. Based on the specific archived data provided by the district, attendees at this first event scored their overall experience as a two out of five on a Likert scale, where five was "extremely helpful" and one was "not helpful at all." It was clear that continuing a traditional professional development approach to assisting teachers with the use of their new learning spaces and equipment would not yield the desired results. This chapter will explore the application of a new theoretical framework for teacher professional development.

ADOPTING THE AGILE APPROACH

Rather than designing and providing traditional professional development workshops, calendars and large-scale presentations, leaders from both the school district and university partnered and agreed that a new model for planning the professional development activities was necessary. Both university faculty and district staff met weekly to plan and adapt the training accordingly. The team found a successful

approach in adapting "Agile" methodologies from software design and project management, and successfully applied them to professional development (PD) planning and training.

Agile methods focus on personal, technical, and organizational success (Shore & Warden, 2008). Chin (2008) defines Agile Project Management as a combination of anticipated uncertainty coupled with bringing together various partners with unique expertise (in this case assessment, technology integration, active learning strategies, and 21st century pedagogical best practices). He wrote out this formula as the:

Agile PM Environment = [Uncertainty + Unique Expertise] x Speed (p.3).

The planning team recognized that uncertainties included, but were not limited to the following:

1. Transformation of existing classrooms and technologies (equipment acquisition, installation, scheduling),
2. Offering professional development for teachers from across disparate buildings, content areas, grade levels, technical and pedagogical skills in order to increase student achievement and success,
3. Developing a sustainable model.

Unique topics were developed and key experts were identified to help facilitate experiences. The team recognized that the teachers themselves each brought specific experiences, skills, and expertise to the table, and it was critical to acknowledge that. As such, the professional development model would not include a "top-down" (one-size-fits-all) training experience, but rather an exercise in sharing through a networked community of practice approach (Hildreth & Kimble, 2004). The online community of practice featured a moderator, online discussion forum, and access for all participants at the schools and university.

In order to address early concerns from initial data that teachers were being asked to design instruction in new spaces that did not yet exist, this methodology permitted PROFESSIONAL DEVELOPMENT planners to integrate the uncertain and changing landscape into the programming. Thus, instead of designing PROFESSIONAL DEVELOPMENT modules that directly addressed each space, piece of furniture, or technology, the planners worked to assess and provide differentiated resources addressing each teachers' needs. The team agreed to accept that the goals would evolve, and much direction would need to come from the teachers and administrators in order to help each educator design and chronicle their own "journey" toward active learning in the new learning ecosystem.

Therefore, designs for training the teachers became iterative. Agile methodologies best apply to initiatives or projects that address high variability in goals and tasks due to evolving requirements in skills of trainees and in the types of technology being used (Nerur, Mahapatra, & Mangalaraj 2005). Interventions and workshops were designed to be rigorous, relevant, and highly-responsive, where multiple facilitators were on-site with very fluid training agendas. This followed basic guidelines from the "What is Agile? 10 Basic Guidelines" website (Waters, 2007) including:

1. Active user involvement is imperative.
2. The team must be empowered to make decisions.
3. Requirements evolve but the timescale is fixed.
4. Capture requirements at a high level; lightweight & visual.
5. Develop small, incremental releases and iterate.
6. Focus on frequent delivery of products.

7. Complete each feature before moving on to the next.
8. Apply the 80/20 rule.
9. Testing is integrated throughout the project lifecycle – test early and often.
10. A collaborative & cooperative approach between all stakeholders is essential.

Active involvement and clear communication from all stakeholders was established. The school district appointed a project manager, as well as key innovation specialists to provide guidance on the in-service teacher training. Although some requirements evolved frequently, based on teacher needs, timetables, and feedback, the timeline was fixed at 12 weeks. Requirements were reviewed regularly, and instructional modules/components for training were developed and released incrementally. Feedback was sought and iterations resulted. The team focused on the end result: Developing a PROFESSIONAL DEVELOPMENT model for new learning ecosystems. And, collaboration and cooperation between all stakeholders was essential. Thus, various professional (formal) and information (social) opportunities for work were integrated (including lunches, receptions/breaks, and collaborative projects).

Overall Design

The main intervention strategy was to focus on developing a key group of teacher "champions" for the project. Thus, a cohort of these "champion" teachers met for six days of full workshops over a three-month period. Each workshop day consisted of working with teachers to develop active learning content, assessment (formative and summative) strategies, educational technology integration, information and communication technology applications, and instructional design. Teachers in this cohort also utilized the Schoology learning management system and blogs to communicate asynchronously online over a 12 week period. A team of both university faculty and school district administrators and innovation specialists (technology support) personnel facilitated all the events collaboratively. The team used the Understanding by Design (UbD) model (Wiggins & McTighe, 2012) for planning and teacher deliverables.

The team recognized that offering professional development en-masse was not an option. Therefore, a a peer-coaching model was adopted. To that end, the leadership team decided to search for a cohort of integration "champions." A call was made to the 300 teachers in the school district. Over 55 teachers (18%) in the district applied for participation as a "champion" through a competitive process. Each applicant completed a form detailing their interests, reasons for planning, and goals for disseminating information to colleagues in the district. Applicants represented all disciplines and grade levels, including special education. School administrators reviewed all applicant materials and made selections. Thirty-two teachers were selected to receive a portion or all of the in-service teacher professional development activities, including training workshops, specialized new technology and furniture support, and workshops provided by vendors such as Steelcase. Ultimately, 27 teachers participated in the Agile professional development partnership with the University and completed the 12 week intensive collaborative experience.

Sound planning and preparation for teacher professional development in the area of information and communication technologies is critical (Law, 2008). Additionally, Ertmer and Ottenbreit-Leftwich (2010) point out that knowledge, confidence, beliefs, and culture intersect. It was critical to develop in-service training that was responsive and appropriate for the district—and no "one-size-fits-all" training approach would work. Taking this into account, there were four facets to the professional development:

1. A face-to-face component with intensive collaborative and hands-on work.
2. An online community of practice.
3. Coaching under the "train-the-trainer" (ASTD, 2008) or "teacher peer coaching" models (Collie, Shapka, & Perry, 2012).
4. Active Learning Resource Library development.

Professional Development Session Design

The timeline for professional development was fixed, as the grant award stipulated a concrete start and end date. However, Agile-based approaches were used to plan sessions. In an effort to minimize inconvenience to teachers, specific face-to-face onsite workshop dates were selected. Teachers attended six collaborative full-day workshops that ran from 8:00AM until 3:30PM. The school district paid for substitute teachers so that each participant was able to attend the sessions during normal school and contract hours. As furnishings and new technologies were not yet fully installed in the public schools, these "champion" training events were hosted by the university in new, high-tech active learning classroom that included rolling, re-configurable furniture, six large-screen wireless video displays, Wi-Fi Internet access, Steelcase Huddleboards™ dry erase marker boards, and a sound system. In order to expose teachers to innovative ways to teach and learn with the new furniture and equipment, each session was carefully designed to provide varying hands-on experience to different seating/grouping configurations, technology applications, and active learning instructional strategies.

Six university faculty members, three school staff members, and a guest speaker comprised the facilitation team for the professional development. From the university, the six faculty members represented expertise in instructional design, assessment, technology integration, eLearning, Universal Design for Learning, and active learning pedagogies. The three staff members from the schools were a district curriculum director and two innovation specialists with extensive expertise in technology, pedagogy, and active learning. The guest speaker was selected because he was a prominent figure experienced in successful implementation of new learning ecosystems and teacher development. He contributed to the experience by serving as a visionary and provocateur from outside the two cultures of the university and school district. This team also worked together serving as the professional development training team.

In the first session of the new Agile-based professional development, in-service teacher participants were surveyed regarding their personal goals. Following that, a presentation on the school district and grant's objectives were shared. Together the teacher participants drafted and subsequently adopted their own key outcomes for the set of Agile professional development sessions as follows:

- Teachers apply knowledge of the Partnership for 21 Century Skills models and best practices.
- Teachers demonstrate knowledge digital age teaching and learning standards from the International Society for Technology in Education (ISTE).
- Teachers transform lessons into active learning using Common Core model curriculum and/or statewide new learning standards.
- Teachers reflect on struggles, caveats, and successes with the process while developing a roadmap for this process that can be shared with peers.

Taking this information forward, the team of professional development planners worked to align all activities and resources to these outcomes. Additionally, teachers were surveyed at the beginning and end of each professional development session in order to gather formative data on expectations, experience, interests, and needs. Quite often this information would result in the planning team varying groupings, seating charts, activities, and interactions in order to sculpt the professional development content into a more tangible, meaningful product for participants.

The planning team met at least twice before each professional development session with the teachers. During these meetings, the group would use Agile approaches to guide each iteration of the professional development design. Using information from the changing schedules for furniture and technology installations, acquisitions, and goals (both professional and district-wide), modules within each training session were vetted through a process of design, review, development, review, revision, and then eventually delivery. Planning team members concurrently closely tracked online discourse from the community of practice, teacher feedback, and recent best practices/trends for cutting-edge technology and pedagogy.

Based on this approach, each session of the professional development initiative was unique. There were generally four university faculty members or school administrators facilitating 3-5 topics in each session. Each session began at 8am with coffee and pastries. From 8-8:30, teachers were able to informally drink coffee and talk with colleagues. For a typical session, the schedule included a mix of opportunities for formal and informal interactions. As an example, the formal sessions began at 8:30 with a review of the day's agenda and then inquiry into teachers' goals for the session. The morning formal professional development activities would conclude by 11:00, when teachers were provided with a catered lunch. The planning team decided to vary lunch locations and options in order to give participants different settings and opportunities to collaborate and discuss their ideas for new learning ecosystems over the break. A session resumed at 12:30pm, with a brief 15 minute coffee/snack break at 2:30pm. At 2:45, time was given to teachers to collaborate in teams, work on deliverables/goals, and discuss comments, concerns, or successes. At 3:30 an exit survey was done. Every effort was made by facilitators to model active learning approaches with the teachers in attendance. Quite often, teachers would provide feedback in the morning that would, based on the Agile framework, result in modifications to the afternoon session plans. For example, initial comments from teachers indicated that there was not enough time to discuss ideas with peers, process or test new information/tools/technologies, or start work on deliverables. Thus, sessions were adjusted to incorporate such opportunities and leverage benefits.

Each session involved a deliverable. Based on goals from the school district, each teacher was asked to produce a variety of artifacts. Each activity topic and deliverable had fixed deadline and aligned to specific outcomes. However, based on the Agile approach, the process and approach varied. Table 1. outlines represents key products and the manner in which they were to be completed.

Concurrently, university faculty members facilitated an additional online community of practice that was developed for teachers to discuss topics outside of training meetings. Using the learning management system Schoology, an online asynchronous communication site was created where teachers could collaborate with grade-level peers, facilitators, national technology experts, and district staff. All teachers participated in asynchronous discussions exchanging ideas across disciplines, grade levels, and technology experience levels. A faculty moderator was designated to develop prompts, share cutting-edge teaching/technology ideas, and assist with finding answers to questions teachers posed.

Both face-to-face and virtual professional development activities were grounded in establishing a community of practice and peer-coaching, with both face-to-face and online across grade levels, school building locations, and disciplines. The blended and agile approach had roots in best practices for teacher

Table 1. Teacher deliverables for face-to-face (synchronous) events

Session	Topic	Deliverable Focus	Format
1	P21; Digital-age teaching, active learning, and assessment	Online discussion questions Select instructional unit for transformation Identify academic content standards Share information on learners, class, and proposed unit	Schoology; Blog
2	Technology, feedback, motivation, engagement in active learning spaces	Select key active learning instructional strategies and present them to your group Write blog on brainstorming and collaboration	Presentation; Schoology Blog
3	Understanding by Design; Assessment Tools in new learning ecosystems	Utilize the UbD template for the lesson being transformed to identify essential questions, outcomes, materials, and resources. Develop an assessment for your unit	Schoology; Discussion
4	Informed practice, learning space design, accommodating learners with special needs, Schoology	Develop a plan for reflective practice and data analysis Further refine unit with active learning strategies, learning space design, groupings, and new technologies.	Discussion; Blog
5	Blended instruction Guest Speaker Apps, tools, and tricks new equipment break-outs	Identify blended activities for physical and virtual student work. Integrate new equipment into your lesson.	Blog
6	Leadership and Peer Coaching	Develop a plan for peer coaching and disseminating information	Blog

technology integration. Cennamo, Ross, and Ertmer (2010), point out that the key to effective new technology integration targeting student learning is for teachers to:

- Identify which technologies are needed to support specific curricular goals.
- Specify how the tools will be used to help students meet and demonstrate those goals.
- Enable students to use appropriate technologies in all phases of the learning process including exploration, analysis, and production.
- Select and use appropriate technologies to address needs, solve problems, and resolve issues related to their own professional practice and growth. (p. 10).

With such a varied population of teacher "champions" attending the training, each planning session included formative feedback from the 27 participant teachers, as well as post-intervention analyses with the school administrators in order to assure that needs were being met in this dynamic process.

Per the Agile Framework, partners from both the university and school district met frequently to review qualitative data, restructure content for upcoming sessions, and address varying individual dynamic professional development needs. Bringing the diverse in-service teacher "champion" group together as a coherent learning community required agile revisions to training plans and methods. Using online discussions and blogs, teacher participants charted and memorialized the "journey" of transforming their teaching and classroom strategies in the new learning environments.

Concurrently, a resource library was developed including a variety of articles, websites, tools, and thirteen key reference textbooks. Each "champion" teacher was provided with a full set of these resources (both hardcopy and electronically). Each school building was also given the collections so that all district teachers could have access to the key materials. The goal was for "champion" teachers to be

Table 2. Resources selected for professional development resource library

Chappuis, J. (2012). Classroom Assessment for Student Learning: Doing It Right -- Doing It Well. Boston: Pearson, 2012.
Doorley, S., & Witthoft, S. (2012). Make space: How to set the stage for creative collaboration.
Greenstein, L. (2012). Assessing 21st century skills: A guide to evaluating mastery and authentic learning. Thousand Oaks: Corwin Press.
Hattie, J. (2012). Visible learning for teachers: Maximizing impact on learning. London: Routledge.
Himmele, P., & Himmele, W. (2011). Total participation techniques: Making every student an active learner. Alexandria, Va: ASCD.
Kipp, K. (2013). Teaching on the education frontier: Instructional strategies for online and blended classrooms, grades 5-12.
Maiers, A. (2012). Classroom habitudes: Teaching habits and attitudes for 21st century learning. Bloomington, IN: Solution Tree Press.
Martinez, S. L., & Stager, G. (2013). Invent to learn: Making, tinkering, and engineering in the classroom. Torrance, Calif: Constructing Modern Knowledge Press.
Marzano, R. J., Boogren, T., Heflebower, T., Kanold-McIntyre, J., & Pickering, D. (2012). Becoming a reflective teacher. Bloomington, Ind: Marzano Research Laboratory.
O'Connor, K., & O'Connor, K. (2009). How to grade for learning, K-12. Thousand Oaks, Calif: Corwin.a
O'Donnell Wicklund Pigozzi and Peterson, Architects Inc., VS Furniture., & Bruce Mau Design. (2010). The third teacher: 79 ways you can use design to transform teaching & learning. New York: Abrams.
Trilling, B., Fadel, C., & Partnership for 21st Century Skills. (2009). 21st century skills: Learning for life in our times. San Francisco: Jossey-Bass.
Wiggins, G. P., & McTighe, J. (2011). The understanding by design guide to creating high-quality units. Alexandria, Va: ASCD.

able to readily access a repository of best practices, ideas, and references in order to develop innovative, engaging activities and share or coach peers. Table 2. identifies key text resources as an example of some materials selected by the Professional Development planning team and "champion" cohort members.

A model was sought to connect the sometimes disparate worlds of technology and pedagogy. According to the Technological Pedagogical Content Knowledge (TPACK) model (Mishra & Koehler, 2006), integration of 21st century technologies should focus on the synergy of technology, pedagogy, and content knowledge—not as discrete concepts. (Mishra & Koehler, 200, p.16). Further, to reach the entire district, planners believed that the teachers could work to educate peers through a peer coaching or train-the-trainer model. Joyce and Showers (2002) discuss the value of peer coaching and modeling of technology within professional development. Such collaboration regarding the integration of technology lessons into teaching increases efficacy by reducing personal and classroom/school barriers, allowing teachers to think outside the box (Wright & Wilson, 2005-2006), and creatively repurpose existing lessons, ideas, or materials for innovative, new applications.

Current literature offers an abundance of information on how technology-focused professional development for teachers must evolve from a "canned" two hour "this is the a piece of technology; here is how you should use it" workshop to a sustainable model from which in-service teachers can 'systemically change instruction.' (Brock, 2009, p. 10). Jenson, Lewis & Smith (2002) go much further by recommending that teachers complete professional development activities in cohorts, collaboratively, as a community of practice-- learning from other educators' failures and successes over a lengthier period of time.

Additionally, the planning team accepted various pieces of feedback from teachers and noted that each professional development session would need to incorporate dedicated time for teachers to share, test, and discuss ideas. "Providing opportunities for teachers to both experiment and to succeed is important." (Ertmer, 2010, p.277). It was critical to support this component and sustain a vibrant culture among in-

service teachers from very different backgrounds, buildings, grade levels, content areas, and skillsets. By allowing in-service teachers time and opportunities to explore and experiment, while making technical and pedagogical support available (Smoekh, 2008), was a key feature. In an effort to provide additional one-on-one support throughout the professional development process, several pre-service teachers (graduate assistants) were brought into the process in order to provide teachers with individualized support. These graduate assistants helped teachers by performing activities such as scanning documents, creating multimedia materials, and assisting with research.

DATA COLLECTION AND ANALYSIS

In order to measure the initial impact of this collaborative P-20 teacher education approach, pre- and post-surveys were developed and administered. The assessment team elected to use digital age teaching and learning self-efficacy surveys based on and aligned with the 2008 National Educational Technology Standards for Teachers (International Society for Information Technology in Education, 2008). While demographic information was collected for comparison and reporting, including sex, race, highest degree earned, subject area, grade level taught and years of teaching experience, an emphasis was placed on operationalizing the ISTE standards for teachers.

The five general standards were pulled directly from the ISTE website and served as the higher-order or latent categories for analysis. These categories were constructed by averaging teacher responses to the specific items in the survey, four items per category also drawn from the ISTE website. Statements were worded to encourage self-reflection, and teachers were asked to responded to each statement using a Likert-scale extending from a value of "1" for strongly disagree to "5" for strongly agree. For example, under the standard of *Facilitating and Inspiring Student Learning and Creativity* were statements such as "I promote, support, and model creative and innovative thinking and inventiveness" and "I engage students in exploring real-world issues and solving authentic problems using digital tools & resources" (these survey items, in their entirety, are available upon request).

Researchers found ittle to no research had been done in which the ISTE standards have been operationalized for use in a survey format. Therefore, it was important to know whether or not the individual items that are included under each larger standard heading fit together and are reflective of the higher-order construct. The test looks for consistency of participant's answers across items in a scale. Reliability analyses are typically performed to assess this, using a measure called Chronbach's alpha. Alphas over .80 are considered good and above .70 are fair and acceptable. Table 3. represent the averages of all items within each standard for the pre- and post-survey as well as the alphas. As can be seen, with one exception- post-survey reflections on promoting digital citizenship, all alphas are desirable, legitimizing the use of the combined average to reflect the larger construct.

Of the original 32 teachers completing the pre-survey, 26 completed the post-survey. For each standard, the average of the 4 items making up the standard are reflected in Table 4. for both the pre- and post-survey. On a scale of 1 to 5, with five representing the idea that teachers strongly believe that they fulfil the standards, pre-test scores ranged from 3.52 to 3.76. By the time the professional development was completed, teachers' ratings of themselves had increased, ranging from 4.39 to 4.63 across the five standards. To test whether or not teachers' self-perceptions of their digital age teaching skills had *significantly* improved after completing the professional development sessions, paired samples t-tests were run. As can be seen in Table 4, all comparisons were statistically significant, showing that the increases

Table 3. Pre- and post-survey standards descriptive statistics

Standard	Means		Chronbach's Alpha	
	Pre	Post	Pre	Post
Facilitate Student Learning and Creativity	3.75	4.51	0.827	0.891
Develop Digital Age Learning Experiences	3.66	4.50	0.767	0.834
Model Digital Age Work and Learning	3.64	4.39	0.847	0.851
Promote Digital Citizenship	3.76	4.63	0.813	0.516
Engage in Professional Growth & Leadership	3.52	4.39	0.772	0.785

for all five standards from the start to end of the training were in fact significant. Follow-up calculations were also run to assess the strength of the association or change, referred to as effect sizes (*d*). All were over 1.00 and as high as 1.70, indicating that there was at least a one full standard deviation increase for all ISTE standards (strong increases), the biggest increase was in the promotion of digital citizenship.

In order to compare teachers who took part in the professional development training (N=20) and those who did not (but were pilot room teachers who had the new furniture; N=6) with regard to increases in perceived skills, a change variable was computed by subtracting the pre-survey means from the post-survey means (see Table 5). Change was consistently positive on average for all five standards across all teachers, ranging from an average increase of .75 to .88. For all five standards, between 32% and 50% of teachers showed at least a full point increase (on a scale of 1 to 5) in their perception of their own skills and abilities over time.

Table 4. Pre- and post-survey paired samples t-tests

Standard	Means		Mean Difference	T-Test	p-Value	D
	Pre	Post				
Facilitate Student Learning and Creativity	3.75	4.51	0.76	5.791	0.000	1.14
Develop Digital Age Learning Experiences	3.66	4.50	0.84	6.034	0.000	1.18
Model Digital Age Work and Learning	3.64	4.39	0.75	5.253	0.000	1.03
Promote Digital Citizenship	3.76	4.63	0.88	8.647	0.000	1.70
Engage in Professional Growth & Leadership	3.52	4.39	0.87	5.528	0.000	1.11

Table 5. Change in Standards Perceptions

Standard	Min	Max	Mean
Facilitate Student Learning and Creativity	-1.25	1.75	0.76
Develop Digital Age Learning Experiences	-0.75	2.25	0.84
Model Digital Age Work and Learning	-0.50	2.00	0.75
Promote Digital Citizenship	0.25	1.75	0.88
Engage in Professional Growth and Leadership	-0.25	2.75	0.87

While all but six teachers surveyed took part in the professional development sessions, they were significantly different than their counterparts in two instances: facilitating student learning and creativity and engaging in professional growth and leadership. Not only did teachers who took part in the professional development have a significantly greater increase in perceived ability, it was these two areas in which the mean increases were the largest of the five. The association was very strong when looking at the effect sizes (*d*). While the professional development teachers had consistently larger change scores on the other three standards in comparison to the pilot room teachers, the difference was not big enough to be significant, though "modeling digital age work and learning" was nearing significance, as evidenced in Table 6.

It was also important to consider whether or not increases in self-perceptions of abilities with regards to the five standards were related to one another. The items within and across each standard as well as the standards themselves shared some ideas in common. This seemed to be reflected in Table 7, which reports the Pearson's r correlations amongst the changes in standards. Facilitating student learning and creativity was moderately associated with both developing digital age learning experiences (r=.564, $p < .01$) and modeling digital age work and learning (r =.462, $p < .05$). Perhaps not surprisingly, the strongest association was between modeling digital age work and learning and developing digital age learning experiences (r =.661, $p < .01$). Modeling digital age work and learning was also moderately correlated with both of the final standards as well, promoting digital citizenship (r =.486, $p <.01$) and engaging in professional growth and leadership (r =.458, $p <.01$). Finally, promoting digital citizenship was also moderately correlated with teacher engagement in professional growth and leadership (r =.535, $p < .01$). Being all positive correlations, for those that are significant, this indicates than an increase in one overtime was related to an increase in the other.

Table 6. Comparison of Teachers Receiving and not Receiving Professional Development Training

Standard	Mean		Mean Differences	T-Test	P-Value	D
	PD	Not PD				
Facilitate Student Learning and Creativity	0.98	0.04	0.93	3.670	0.001	1.71
Develop Digital Age Learning Experiences	0.93	0.54	0.38	1.174	0.252	.55
Model Digital Age Work and Learning	0.90	0.25	0.65	2.035	0.053	.95
Promote Digital Citizenship	0.94	0.67	0.27	1.134	0.268	.53
Engage in Professional Growth and Leadership	1.09	0.17	0.93	2.863	0.009	1.33

Table 7. Correlations Amongst Standards

		1		2		3		4	
1	**Facilitate Student Learning and Creativity**	--							
2	**Develop Digital Age Learning Experiences**	0.564	**	--					
3	**Model Digital Age Work and Learning**	0.462	*	0.661	**	--			
4	**Promote Digital Citizenship**	0.199		0.223		0.486	*	--	
5	**Engage in Professional Growth and Leadership**	0.326		0.298		0.458	*	0.535	**

* $p < .05$, **$p < .01$

It is also worth noting that several other comparisons were run, but no significance differences were found. For example, there was no variation in in the change in self-perceptions of abilities in regards to the standards when comparing male to female teachers. There were also no differences when comparing teachers at the different grade levels or across different subjects. It could also be assumed that a teacher with more experience could differ in their amount of change than teachers with less experience. Correlations showed that this was not the case.

SOLUTIONS AND RECOMMENDATIONS

Agile methodologies provided a useful roadmap for the professional development design. By adapting these principles and applying them to the education field, the planning team was able to select a cohort of "champion" teachers, as well as design, develop, and facilitate professional development activities that were rigorous, responsive, and well-received. The process was iterative, accommodated changing and uncertain timelines/schedules, and responded to specific dynamic needs of the group.

Every teacher who participated in the professional development for this project successfully created innovative new active learning units and components, while chronicling their journey through the process in a series of blogs. In contrast to the preliminary archive data provided to university researchers at the conclusion of the initial "traditional" or "canned" professional development day pilot, where teachers scored the sessions as a two out of five, data from the new Agile-designed professional development activities showed markedly improved scores. Further, data indicated that the Agile-based professional development designs were more responsive and yielded a positive impact on teacher technology efficacy, as measured by the surveys based on the ISTE Standards for Teachers. Feedback from the district administration and in-service teachers indicated that the Agile approach was successful. A longitudinal study is planned.

FUTURE RESEARCH DIRECTIONS

A longitudinal study of the impact is planned with three areas of data collection. The first area is a district-wide survey of teacher technology efficacy, as measured a survey instrument developed based on the ISTE Standards for Teachers. That measure could provide data on the impact of the professional development and peer coaching. The second area of research is student achievement or academic performance. The researchers will collect and analyze various district-wide assessment for specific grade levels. Assessments include end of year course-level district exams and state achievement measures. The third area will be to measure student technology efficacy using a survey tool developed from the ISTE Standards for Students. All of this research will commence once the district has given approval for the study.

CONCLUSION

The landscape of teacher professional development and design has changed as 21st century technologies, skills, and learning ecosystems evolve. Traditional or "canned" training where every teacher receives the

same training no longer meets needs within districts. Rather, teachers benefit from iterative, customized, agile planning and offerings. The Agile methodologies cited offered professional development planners a successful framework for designing iterative learning opportunities to teachers in a timely, rigorous, and responsive manner. And, with the addition and cultivation of a professional learning community both face-to-face and online, teacher technology efficacy and satisfaction improved. This has generated an agenda for further research.

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KEY TERMS AND DEFINITIONS

Agile Methodologies: An approach to planning, project management, or software development that focuses on iterative, responsive approaches in an uncertain environment while meeting a fixed deadline.

Community of Practice: A group of teachers who come together to share ideas, discuss best practices, and collaborate on new methods, activities, and research (action or empirical).

Instructional Innovation: New processes, products, or approaches to learning experience design, delivery, or assessment.

Learning Ecosystem: The physical and virtual learning space, as well as the technology and academic support structures within a school building or district.

Midwest: A geographic and cultural region situated in the central section of the United States.

Professional Development: Training for K-12 teachers on specific topics with goals of improving the teaching and learning paradigm.

Technological Efficacy: Teachers self-reported skill and comfort level with utilizing new and innovative instructional technologies.

Chapter 21
Gamified – Blended Learning Professional Development: A Descriptive Case Study

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ABSTRACT

This descriptive case aimed to examine a new model of job-embedded and on-going professional development using both blended learning and gamification approach as a delivery method. Qualitative and quantitative data collected for the study were from different sources to ensure the validity and reliability of the findings. The quantitative data findings indicated that participating in the PD first module impacted both the teachers learning of effective mathematics teaching, as well as their mathematical content knowledge. Furthermore, they planned to implement what they learned from the PD into their classroom teaching. Qualitative data findings identified three common themes emerging from the data analysis including awareness of high quality resources, students' engagement through the use of games and technology, and tasks to promote students' mathematical thinking.

INTRODUCTION

With schools today facing numerous complex challenges – from working with an increasingly diverse population of students, to meeting rigorous academic standards and goals, to integrating new technology in the classroom – policymakers continue to stress the need for teachers to be able to enhance and build on their instructional knowledge. Under these circumstances, professional development (PD) has been adopted as a policy solution for improving the number of highly qualified teachers, consequently helping all students achieve high academic standards (Colbert, Brown, Choi, & Thomas, 2008). However, contrary to the PD emphasis and expectation of administrators, the latest findings released by the New Teacher Project- TNTP- (2015) discouraged PD advocates. TNTP's study with 10,000 teachers

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from three large districts found that there was no evidence that any particular approach or amount of PD consistently helped teachers improve in their classrooms. In other words, the study posited that PD programs, which cost taxpayers billions of dollars each year, were mainly a waste.

Research in PD specifically shows that "one-shot", "drive-by" training workshops with eight hours or less show no statistically significant effect on student learning outcomes (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009). Aware of what has been reported in the literature, especially the TNTP's study findings, four university faculty created a new model of PD to promote Technology, Pedagogy and Content Knowledge (TPACK) for math teachers in third, fourth and fifth grade levels through a partnership between a university and school district. The model incorporates elements of PD that have been found effective, including being on-going (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007), job-embedded (Darling-Hammond et al., 2009), and connected to the teacher's classroom instruction (American Educational Research Association, 2005; Loucks-Horsley, Stiles, Love, Mundry, & Hewson, 2010), while simultaneously incorporating research-approved instructional methods.

When designing the PD program, the PD team took into consideration that the participants would be adult learners who had different learning needs and motivation than traditional P-16 learners. Merriam (2001) found that adult learners:

1. Had an independent self-concept and who can direct his or her own learning,
2. Accumulated a reservoir of life experiences that is a rich resource for learning,
3. Had learning needs closely related to changing social roles,
4. Were problem-centered and interested in immediate application of knowledge, and
5. Were motivated to learn by internal rather than external factors. (Merriam, p.5)

Since participants in the PD program were practicing teachers with numerous commitments in schools and at home, blended-learning was chosen as the method of delivery. Based on perspectives of more than 80 organizations and 100 instructors engaged in blended learning, Christensen, Horn, and Staker (2013) defined blended learning as a formal education program in which a student learns:

1. At least in part through online learning, with some element of student control over time, place, path, and/or pace;
2. At least in part in a supervised brick-and-mortar location away from home;
3. And the modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience.

The blended learning approach allowed busy teacher participants to break up the assigned online work into shorter blocks of time, versus spending hours in a one shot lengthy PD workshop. While there was some in-person training required, other on-the-go tutorials were available online, which participants could fit into their busy schedule. In a report released by the U.S Department of Education (2010), it was shown that learners in blended learning outperformed their peers in either a face-to-face learning setting or complete online learning setting. A more recent study by Picciano, Dziuban and Graham (2013) also found that using the blended learning classroom model with students could produce significant learning gains.

According to Clayton Christensen Institute (2015), there are four blended learning models including the Rotation model, Flex model, A La Carte model and Enriched Virtual model. In the Rotation model, learners rotate at fixed points in time or at the teacher's discretion between different learning stations, at least one of which is an online learning station. In the Flex model, online learning forms the backbone of what learners can learn. In this model, learners are able to move flexibly through different learning modalities with the goal of optimizing their learning experience based on their specific needs. In the A La Carte model, learners have chances to take entirely online to accompany other experiences that they are having at a brick-and-mortar learning setting. In the Enriched Virtual model, learners are required to take face-to-face learning sessions with their instructor and then are free to complete their remaining coursework remotely. The blended learning model chosen for this PD most closely resembles the Enriched Virtual model.

For this study, the PD team also chose to incorporate gamification in its delivery approach. According to Marczewski (2013), gamification is the use of game metaphors, game elements and ideas in a context different from that of the games in order to raise participants' enjoyment and engagement through capturing their interest and inspiring them to continue learning. There is a well-established body of literature about the effectiveness of using gamification in training and/or learning to provide participants with opportunities to act autonomously, display competence, and learn in relationship to others (Attali & Arieli-Attali, 2015; Erenli, 2013; Goehle, 2013; Villagrasa, Fonseca, Redondo, & Duran, 2014). However, the majority of those studies were conducted with students in either P-12 or higher educational settings. Since adult learners are mainly intrinsically motivated, extrinsic motivation mechanisms from a gamification approach may not work in a PD environment. Nonetheless, since one of the main PD goals was to introduce new technology-integrated instructional methods to participants, the PD team decided to expose the participants to the new instructional teaching strategy of gamification.

Therefore the PD's combined approach in this study was loosely tagged as Gamified- Blended Learning (GBL) Professional Development. The use of both the gamification and blended learning as the delivery method was expected to not only promote teachers' TPACK, but also introduce these instructional approaches to teachers so that they could use and implement them in their classrooms.

RESEARCH METHOD

This is a descriptive case study. As Tobin (2010) described,

[T]he power and promise of a descriptive case study lie in its potential for mining for abstract interpretations of data and theory development. The main goal of the descriptive case study is to assess a sample in detail and in depth, based on an articulation of a descriptive theory. This theory must respect the depth and scope of the case under study, which is conveyed through robust propositions and questions.

The descriptive case study was chosen for this study for two primary reasons. First, one of the goals of most case study research is to look for an understanding of the targeted subject. The primary goal of this study was to seek an understanding of how a GBL professional development model was developed and operated. Second, a descriptive case study often answers questions based on theory. The descriptions of gamification and blended learning developed throughout the research process will help to define the theoretical constructs on which the professional development was built.

Case Description

The PD model introduced in this study was a collaboration among four faculty members at a midsize public university and a public school district that was identified as a "High-Need Local Educational Agency." In terms of content delivery, this PD model did not treat content, pedagogy and technology as separate components, as commonly conducted in other PD programs; the PD team in this study used the TPACK framework (Koehler & Mishra, 2009) to design the program. Koehler & Mishra (2009) argued that effective technology integration for teaching specific content or subject matter required understanding and the ability to negotiate the relationships between these three components. The PD team included one faculty member serving as a content expert in math, two faculty members serving as pedagogy experts, and one faculty member serving as technology expert.

The participating school district was chosen based on location and the district's identification as being a "High-Need Local Educational Agency." In fact, four elementary schools in the district were also identified as Tier III Persistently Low-Achieving Schools (PLAS). Research participants were 28 third, fourth and fifth grade teachers who applied and were selected to participate in the PD. All of the teacher participants were white, female teachers with teaching experience spanning one to 30+ years.

The math coach of the partner school district was invited to join the PD team to serve as a liaison between the PD team and the teacher participants. The coach provided feedback to the team based on what she was viewing in her work with teachers, led components of the workshops, and continually ensured that the PD content was connected to the district's curriculum and goals. The PD team also had one undergraduate assistant to keep track of teacher participants' learning activity submissions.

As mentioned in the introduction section, the PD team in this study was well aware of what has been reported in the literature in regards to what works and what does not work in PD programs. Therefore, research-supported elements of effective PD such as on-going, job-embedded and connected to the teachers' classroom instruction were included into the GBL professional development model. Specifically, instead of offering a one-shot PD training, the team designed a nine-month on-going PD program integrating four face-to-face workshops with three online learning modules. The four workshops were purposefully staggered throughout the school year, with one workshop taking place prior to the start of school, two during the school year, and the final workshop taking place at the conclusion of the school year. With the help of a grant, teachers received stipends to attend the one-day workshops prior to the school year and again at the conclusion of the school year. The PD team's grant also funded pay for substitute teachers so the teacher participants could attend the two one-day workshops during the school year. As a side note, the school district administrator allowed the teachers to apply these PD hours towards required district professional development growth points.

The online learning modules, which were presented using the Versal learning management system, were completed during the approximately three months between each face-to-face workshop. This is the primary component of the PD program in which gamified-blended learning was utilized. Specific tasks related to the ideas presented in the corresponding workshop were assigned for each module. Upon the completion of each task, the teacher participant earned a badge to be viewed on the accomplishment board. This gamification component not only helped teachers keep track of what had been completed, but also encouraged completion in a positive way.

Phase 1 of the PD program, which included the initial workshop and Module 1, emphasized mathematical number sense. At the first workshop, which took place prior to the start of the school year, teacher participants were introduced to the structure of the PD program and then engaged in a variety

of activities focused on their own number sense and strategies for building their students' number sense. The workshop was viewed as a launchpad for Module 1. To complete Module 1, teacher participants implemented one lesson, one game, and one technology resource, all of which were focused on number sense. The PD team provided the list of high-quality, recommended number sense games, lessons, and technology resources from which the teachers could choose. These resources were selected by taking into consideration the teachers' curriculum, mathematical areas of weakness identified by the district math coach, and ease of resource availability/usability. The approximately 70 resources also supported key elements of effective math instruction such as conceptual understanding, connections among mathematical ideas, and the use of concrete and pictorial representations. After implementing each of the three resources, teacher participants completed a resource follow-up in which they reflected on details of each implementation and how their students' learning was impacted.

Phases 2 and 3 are still being developed since the GBL program is currently in the implementation stage. The primary emphasis for Phase 2, approximately midway through the school year, is delivered using a flipped classroom model and focuses on building strategies for mathematical discourse. The final phase, Phase 3, will use the face-to-face workshop and module 3 to focus on teaching for conceptual understanding with the support of number sense and mathematical discourse. The concluding workshop at the end of the school year will serve as a way to summarize and reflect on learning that occurred throughout the entire PD program.

FINDINGS

The purpose of having a variety of data sources was triangulation to ensure the reliability and validity of the data. According to Maxwell (2005), the triangulation process of collecting information from different sources reduced the risk that conclusions would reflect systematic biases and allowed a broader understanding of the study's issues. The comparison of data gathered supported the triangulation process and therefore enhanced internal validity. Efforts to control any threats to theoretical validity were also conducted by collecting and drawing attention to any discrepant data or alternative explanations.

To prevent the risk of theoretical validity and systematic biases, data collected in this study were from different sources including participants' reflections and artifacts/documents. In addition, quantitative data and qualitative data were treated separately and triangulated to ensure the reliability and validity of the data. Ultimately, the goal is to find the answer to our leading question of the impact of the GBL Professional Development model.

Data in this chapter centers around participants' reflections and artifacts/documents collected throughout Phase 1 of the PD program. This data was collected after the completion of the first workshop and the online Module 1. Although this preliminary data does not encompass the entire GBL approach, important findings can be gleaned from this juncture of the study.

Quantitative Data

Twenty-six out of 28 participants, accounting for 93% of the teachers, completed a survey that examined the GBL PD model at the conclusion of Phase 1. (See Table 1.) The survey had two parts including eight Likert-scale statements and one open-ended question. The 26 teacher participants ranked each Likert-

scale statement on a scale from 1 to 5, in which 1 is the lowest and 5 is the highest. Within this section, only quantitative data in the eight Likert-scale statements were analyzed.

Overall, as shown in Table 1, the 26 participants in the PD had positive perceptions toward the first phase of the GBL professional development model. On the scale from 1 to 5, the mean of all of the statements is above 4.0 out of 5.0. According to the teachers, participating in the PD first module impacted both their learning of effective mathematics teaching, as well as their mathematical content knowledge. Furthermore, they planned to implement what they learned from the PD into their classroom teaching.

Table 1. Participants' perceptions on learning module 1 of the PD program

	N	Min	Max	Median	Mode	Mean	S.D
Participation in Module 1 allowed me to gain a stronger understanding of number sense-related resources aligned to my standards	26	1	5	5	5	4.46	0.69
How likely are you to implement other resources from those listed on the Module 1 list of *technology* resources?	26	1	5	5	5	4.69	0.53
How likely are you to implement other *games* from the Math Games for Number and Operations and Algebraic Thinking book provided at Workshop 1?	26	1	5	4	4.5	4.23	0.79
How likely are you to implement other *lessons* from those listed on the Module 1 list of NCTM Illuminations resources?	26	1	5	4.5	5	4.3	0.73
Having access to recommended resources is helping me learn how to teach mathematics more effectively.	26	1	5	5	5	4.6	0.62
Having access to recommended resources is helping me learn the mathematics I need to know for teaching.	26	1	5	4	4	4.1	0.82
Having access to recommended resources is impacting student learning in my classroom.	26	1	5	5	5	4.7	0.45
The number of resources provided was adequate	26	1	5	5	5	4.6	0.62

Qualitative Data

Qualitative data was collected from two different sources. The first source came from an open-ended question in the survey and the second source was from participants' reflection papers. Four researchers conducted independent coding processes to find common themes, which emerged from participants' answers for the open-ended survey question and from responses on their reflection papers. To ensure the validity and reliability of the findings, the researchers compared their individual data coding results. Emerging themes were discussed and elaborated upon by the research team until consensus was reached. The three common themes emerging from the data analysis included a*wareness of high quality resources*, *students' engagement through the use of games and technology*, and *implementing tasks that promote students' mathematical thinking.*

The first theme "a*wareness of high quality resources"* was the most common theme identified by the researchers. This theme was mentioned directly and repeatedly in the participants' responses to the open-ended question in the survey and their reflection papers. One of the participants replied to the open-ended question on the survey,

The Illuminations math website was a great resource for supporting my students' need to build and increase number sense. Seriously, I can't believe I didn't stumble upon this resource earlier. I shared it with my integration specialist, who shared it with other teachers.

In a reflection paper, one participant wrote,

There are so many wonderful resources that engage kids and that they can learn from. It's good to step outside our "comfort zone" and try new things. I can't wait to explore more technology games that will motivate my students to practice their math more.

In another reflection paper, the participant said,

I love the Math Games book, [Math Games for Number and Operations and Algebraic Thinking], because it has a wide variety of games/resources that align with several different chapters taught in our Math curriculum/resource. I also like that all the activities in the book and on the NCTM website are aligned with standards at specific grade levels. The Illuminations website is a "gold mine" for interactive games that build and support number sense. I also appreciate that the prep time for each of these activities is minimal. I will be using all of these resources next year when I teach the same skills/concepts.

A final quote from a participant really showcased the importance of exposure to new, high-quality resources,

My biggest take-away is that I need to remember to bring in more outside activities into my lessons. I am guilty of getting so caught up with the textbook and following it lesson by lesson that I forget to look for other ways to teach/practice the same skills.

The second theme was **"***students' engagement through the use of games and technology."* The frequency of games and technology influencing student engagement being mentioned in the participants' answers to the survey and reflection was very high and received a high consensus among researchers. In the survey responses, one of the participants noted, "I need to make time for fluency games. Students

love them and get a lot out of them." Another participant remarked that, "The students were so excited by the incorporation of games and technology that the learning was engaging and effortless for them." In the same vein, one of the participants highlighted the value of using games and technology in the classroom in her reflection paper stating that her biggest take-away was there were a lot of resources to make math more engaging and fun for students. Yet another participant elaborated, "Specifically, the games seemed like great ways to get students actively engaged in the learning and allowed students to really enjoy themselves."

The last theme was "*implementing tasks that promote students' mathematical thinking."* One participant added in her response to the open-ended question, "*My kids really enjoyed the math games from the book [Math Games for Number and Operations and Algebraic Thinking*]. *I didn't realize how those games can really deepen their thinking while playing them."* Similarly, in her reflection paper, another teacher participant noted, *"Using games can help increase student understanding of various concepts. Students need practice with fluency for concepts and the games can give them a fun way to do this."* In line with that quote, another participant remarked,

I really think the students built stronger problem solving and mental computation strategies. After using these resources they were solving problems more than one way. They also learned strategies from other students in the class during whole group and small group opportunities. I loved the resources!

DISCUSSIONS AND CONCLUSION

The findings of this study were based on preliminary data collected from the first phase of the PD model. Due to the nature of the descriptive case study, the implications of this study may be limited yet insightful as to how a new model of PD may be facilitated and whether or not it was effective. In summary, both the quantitative and qualitative data indicates that the GBL model impacted the teacher participants' ability to teach mathematics more effectively and impacted student learning.

One finding based on the quantitative data was the overall, positive perceptions of the on-going, job-embedded, long-term GBL model. This reinforces earlier findings of the positive effect of the PD being on-going (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007), job-embedded (Darling-Hammond et al., 2009), and connected to the teacher's classroom instruction (American Educational Research Association, 2005; Loucks-Horsley, Stiles, Love, Mundry, & Hewson, 2010). With means ranging from 4.1 to 4.7 on a 5.0 Likert scale, participants were obviously satisfied with this type of PD. In contrast to one-shot, drive-by types of PD models, participants indicated that they were highly likely to revisit and implement high-quality resources similar to those provided in Module 1. Moreover, when asked about how Phase 1 of the PD model impacted student learning, teacher responses marked this as high (mean = 4.7).

The three main themes that emerged from the qualitative data were a*wareness of high quality resources, students' engagement through the use of games and technology*, and *implementing tasks that promote students' mathematical thinking*. With these in mind, participating teachers responded positively to being exposed to high-quality lessons, games, and technology resources through the on-line portion of the GBL model. In turn, they found their students showcased enthusiasm for learning and greater engagement when given the opportunity to make use of these same high-quality resources. Additionally, the engagement that resulted from utilizing high-quality lessons, games and technology resources

provided opportunities to promote students' mathematical thinking. Much of the enthusiasm of these qualitative findings are in line with

These preliminary findings differ from what TNTP (2015) concluded about PD in its research. Our study shows that PD can impact teacher and student learning, which more closely align with findings in the previous studies on effective elements of PD such as being on-going (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007), job-embedded (Darling-Hammond et al., 2009), and connected to the teacher's classroom instruction (American Educational Research Association, 2005; Loucks-Horsley, Stiles, Love, Mundry, & Hewson, 2010). Further research is needed to examine why a gap exists between what this study found and what TNTP (2015) concluded. In addition, identifying variables and the role other elements of PD models play on teacher learning (i.e. gamification) need further investigation. Our PD program also takes into consideration the literature on adult learners, allowing the participants to self-direct their learning, apply their life experiences and immediate application of their new knowledge (Merriam, 2001). Research on the correlation between adult learning literature and effective components of PD can be further considered. As we complete Phase 2 and 3 of our PD program, we will be gathering and analyzing further data to more closely investigate these factors, along with the influence of specific elements of the GBL method of PD.

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Chapter 22
Studying Infrastructures of Implementing Organizational Excellence of Model of EFQM at Education Department of Golestan Province

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ABSTRACT

To examine the infrastructures of implementing EFQM excellence model in the field of abilities of education department. This is descriptive-survey research and the statistical society of this research is deputies, in charge experts, experts of education department of Golestan province, that total number of 38 persons were elected by classification sampling method. The collected data was analyzed by using descriptive statistics. Research findings show that infrastructures of implementing EFQM model at policy and strategy sector of education department is at maximum level and at partnership and resources section is at minimum level. The present research has attempted to finding out the infrastructures of implementing organizational excellence model of EFQM at education department. Therefore, education organization through focusing on sectors having less infrastructures, attempts to pave the way for implementation of EFQM model.

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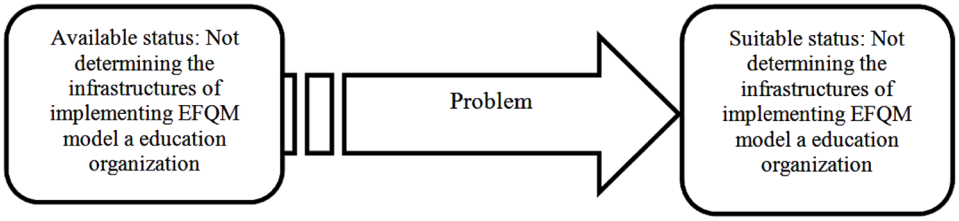
INTRODUCTION

The accelerating process of economic, social and technologic evolutions either at a national and international level has led to instability of organizations and this issue with inability of organizations to be arranged with these evolutions, has endangered many large global organizations with collapse and liquidation. In this way, the most important managerial challenge in organizations is obtaining organizational stability and excellence, i.e. organizational stability depends on moving toward excellence and improvement and obtaining organizational excellence depends on stability and survival of organization. Therefore, moving toward excellence is inevitable necessity and requirement for today's organizations. Without obtaining required knowledge from level of obtaining to the goals regardless of recognizing challenges of organization and obtaining feedbacks and being informed of execution of prepared policies and recognizing items that needed to be improved seriously, the performance of organization may not be improved. Thus, it is necessary to obtaining the tangible requirements of each organization. In this way, the organizational excellence model is regarded as a strong tool for responding to the requirements of organization and is applied for improving the process of accessing to excellence of human resources. Through application of these models in addition, that organization may be able to evaluate its success at different time periods; it is possible to compare its performance with other organizations. As we knew in today's dynamic world that range of science is all-inclusive without any limitations, most of the tools and techniques are very complicated. So that if human beings as part of human society do not receive permanent education, and their knowledge is not compatible with environmental changes, they may have faced with many problems even for meeting their requirements; which, shows importance and status of education on human life. Education organization is one of the institutes of public sector by focusing on excellence of knowledge and public culture and with respect to the importance of this organization on meeting the requirements of people, it is needed to examine this organization to recognize the strong and weak points of available status and suitable status and obtain strategies for solving the problems and improving the weakness. EFQM is a model proposed for determining growth and excellence of organization and a non-prescribed frame for organizations for obtaining to excellence and advancement. In this research, the infrastructure of implementing EFQM model at education department is analyzed and according to the results of research, some recommendations are offered for paving the route toward implementation of this model at education department.

Quality has been the goal of an eternal through the corridors of history. It has been the driving force for all human endeavors. Quality is the inspiration for transcendence from the mundane to the higher realms of life. It is the source of craving behind the unfolding civilization through ages immemorial. However, it has successfully eluded the dragnet of definitions proving the inadequacy of human intelligence. Quality stares at you. You recognize it. Even so, you cannot define it. Any length of description of the anatomical details of a beautiful flower- its petals, color, shape, size, fragrance, softness, all put together- falls short of conveying its beauty fully. Quality lies in the perception of the consumer. What is "great" for one may not be good enough for another (Mukhopadahyay, 2006)? There are various well-known definitions of quality. Crosby (1979) defines quality as "conformance to requirement" while Juran and Gryna (1980) define quality as "fitness for use." Deming (1986) defines quality as "a predictable degree of uniformity and dependability at low-cost and suited to the market." It is more towards quality in operation. Many organizations found that the old definition of quality, "the degree of conformance to a standard," was too narrow. Consequently, they used a new definition of quality in terms of "customer

Figure 1. Necessity and importance of research



focus." It is reported that many companies had initially concentrated all their efforts on improving internal processes with little or no regard for the relationships between those processes and the organization's ultimate customers (Brigham, 1993).

This failure to include the customer focus resulted in companies struggling hard to survive. In the context of higher education, due to the intangible nature of its processes, there is a considerable discussion on the notions of educational quality (Harvey, 1995). Harvey and Green (1993) in their seminal work pointed out that quality is a relative concept. Instead of having a single definition of quality, Harvey and Green provide five discrete but interrelated notions of quality. Quality has a variety of meanings and its range of meanings does cause confusion, as each individual's perception of quality differs (Shields, 1999). In the following figure, the necessity and importance of research are shown:

In this topic, the principal questions are as follows:

- What are infrastructures of implementing EFQM model at Education Organization with respect to abilities?

And the subsidiary questions are as follows:

- What are infrastructures of implementing EFQM model at Education Organization with respect to policy and strategy?
- What are infrastructures of implementing EFQM model at Education Organization with respect to employees?
- What are infrastructures of implementing EFQM model at Education Organization with respect to leadership?
- What are infrastructures of implementing EFQM model at Education Organization with respect to processes?
- What are infrastructures of implementing EFQM model at Education Organization with respect to companies and resources?

Total Quality Management

Total Quality Management (TQM) is a management approach that originated in the 1950s and has steadily become more popular since the early 1980s. Total quality is a description of the culture, attitude and organization of a company that strives to provide customers with products and services that satisfy their needs. The culture requires quality in all aspects of the company's operations, with processes being done

Figure 2. Eight elements of TQM

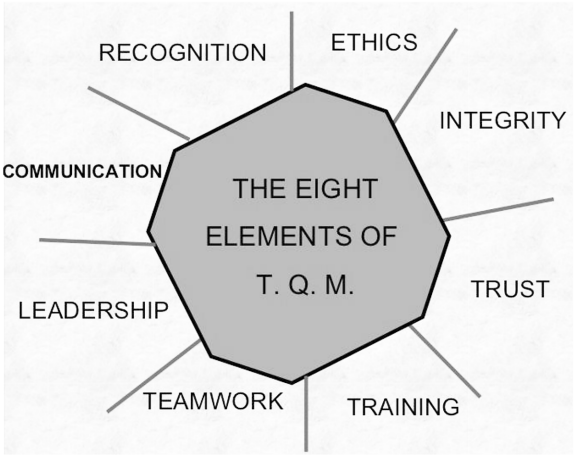
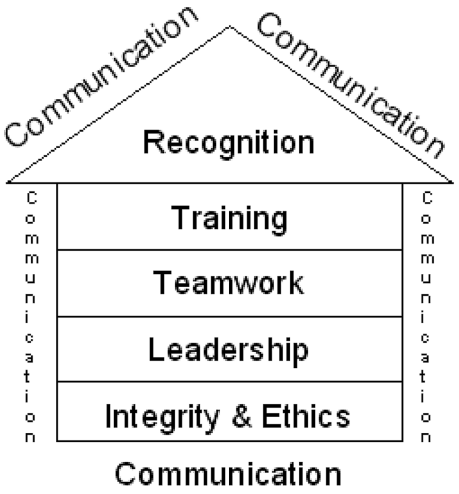


Figure 3. TQM house (http://www.isixsigma.com)



right the first time and defects and waste eradicated from operations. To be successful implementing TQM, an organization must concentrate on the eight key elements: (http://www.isixsigma.com)

Figure 2 shows TQM house, Including Eight Key Elements in another point of view. Actually in these concepts elements of TQM are simulated as a house.

TQM has been coined to describe a philosophy that makes quality the driving force behind leadership, design, planning, and improvement initiatives. For this, TQM requires the help of those eight key elements. These elements can be divided into four groups according to their function. The groups are: (http://www.isixsigma.com)

1. Foundation – It includes: Ethics, Integrity and Trust.
2. Building Bricks – It includes: Training, Teamwork and Leadership.
3. Binding Mortar – It includes: Communication.
4. Roof – It includes: Recognition.

Foundation

TQM is built on a foundation of ethics, integrity and trust. It fosters openness, fairness and sincerity and allows involvement by everyone. This is the key to unlocking the ultimate potential of TQM. These three elements move together. However, each element offers something different to the TQM concept:

1. **Ethics:** Ethics is the discipline concerned with good and bad in any situation. It is a two-faceted subject represented by organizational and individual ethics. Organizational ethics establish a business code of ethics that outlines guidelines that all employees are to adhere to in the performance of their work. Individual ethics include personal rights or wrongs.
2. **Integrity:** Integrity implies honesty, morals, values, fairness, and adherence to the facts and sincerity. The characteristic is what customers (internal or external) expect and deserve to receive. People see the opposite of integrity as duplicity. TQM will not work in an atmosphere of duplicity.

3. **Trust:** Trust is a by-product of integrity and ethical conduct. Without trust, the framework of TQM cannot be built. Trust fosters full participation of all members. It allows empowerment that encourages pride ownership, and it encourages commitment. It allows decision making at appropriate levels in the organization, fosters individual risk-taking for continuous improvement and helps to ensure that measurements focus on improvement of process and are not used to contend people. Trust is necessary to ensure customer satisfaction. So, trust builds the cooperative environment essential for TQM.

Bricks

Basing on the strong foundation of trust, ethics and integrity, bricks are placed to reach the roof of recognition. It includes:

4. **Training:** Training is very important for employees to be highly productive. Supervisors are solely responsible for implementing TQM within their departments, and teaching their employees the philosophies of TQM. Training that employees require are interpersonal skills, the ability to function within teams, problem solving, decision making, job management, performance analysis, improvement, business economics and technical skills. During the creation and formation of TQM, employees are trained so that they can become effective employees for the company.
5. **Teamwork**: To become successful in business, teamwork is also a key element of TQM. With the use of teams, the business will receive quicker and better solutions to problems. Teams also provide more permanent improvements in processes and operations. In teams, people feel more comfortable bringing up problems that may occur, and can get help from other workers to find a solution and put into place. There are mainly three types of teams that TQM organizations adopt:
    a. **Quality Improvement Teams or Excellence Teams (QITs):** These are temporary teams for the purpose of dealing with specific problems that often recur. These teams are set up for a period of three to twelve months.
    b. **Problem Solving Teams (PSTs):** These are temporary teams to solve certain problems and also to identify and overcome causes of problems. They are generally last from one week to three months.
    c. **Natural Work Teams (NWTs):** These teams consist of small groups of skilled workers who share tasks and responsibilities. These teams use concepts such as employee involvement teams, self-managing teams and quality circles. These teams generally work for one to two hours a week.
6. **Leadership:** It is possibly the most important element in TQM. It appears everywhere in organization. Leadership in TQM requires the manager to provide an inspiring vision, make strategic directions that are understood by all and to instill values that guide subordinates. For TQM to be successful in the business, the supervisor must be committed in leading his employees. A supervisor must understand TQM, believe in it and then demonstrate their commitment through their daily practices of TQM. The supervisor makes sure that strategies, philosophies, values and goals are transmitted down throughout the organization to provide focus, clarity and direction. A key point is that TQM has to be introduced and led by top management. Commitment and personal involvement are required from top management in creating and deploying clear quality values and goals

consistent with the objectives of the company and in creating and deploying well defined systems, methods and performance measures for achieving those goals.

Binding Mortar

7. **Communication:** It binds everything together. Starting from foundation to roof of the TQM house, everything is bound by strong mortar of communication. It acts as a vital link between all elements of TQM. Communication means a common understanding of ideas between the sender and the receiver. The success of TQM is demanding communication with and among all the organization members, suppliers and customers. Supervisors must keep open airways where employees can send and receive information about the TQM process. Communication coupled with the sharing of correct information is vital. For communication to be credible, the message must be clear and receiver must interpret in the way the sender intended.

There are different ways of communication such as:

a. **Downward Communication**: This is the dominant form of communication in an organization. Presentations and discussions basically do it. By this, the supervisors are able to make the employees clear about TQM.
b. **Upward Communication**: By this the lower levels of employees are able to provide suggestions to upper management of the effects of TQM. As employees provide insight and constructive criticism, supervisors must listen effectively to correct the situation that comes about through the use of TQM. This forms a level of trust between supervisors and employees. This is also similar to empowering communication, where supervisors keep open ears and listen to others.
c. **Sideways Communication**: This type of communication is important because it breaks down barriers between departments. It also allows dealing with customers and suppliers in a more professional manner.

Roof

8. **Recognition**: Recognition is the last and final element in the entire system. It should be provided for both suggestions and achievements for teams as well as individuals. Employees strive to receive recognition for themselves and their teams. Detecting and recognizing contributors is the most important job of a supervisor. As people are recognized, there can be huge changes in self-esteem, productivity, quality and the amount of effort exhorted to the task at hand. Recognition comes in its best form when it is immediately following an action that an employee has performed. Recognition comes in different ways, places and time such as:
   a. **Ways**: It can be a by way of personal letter from top management, award banquets, plaques, trophies, etc.
   b. **Places**: Good performers can be recognized in front of departments, on performance boards and also in front of top management.
   c. **Time**: Recognition can be given at any time like in staff meeting, annual award banquets, etc.

Generally, the available models for evaluating the performance are not able to examine comprehensively the organization. For example, Peter Canger has focused on the process or Canji evaluates the financial aspects of organization by traditional model. The theoretical frame of EFQM consists of 2 fields and 9

criterions that were established in the year 1980. This model was established in late 1990s in Europe and was finally revised in the year 1999. Benefiting from EFQM model is regarded as one of the most valid European evaluation models that in spite of limitations has created many valuable opportunities for learning, balance evaluation and improvement of opportunities for organization; so that not only at applicant companies and organizations for receiving the quality certificate in Europe, but also at many Asian and American organizations, the EFQM model is applied for improvement of performances. This model is a comprehensive pattern that each of the 9 criterions is consisting of part of activities of organization, and the basic values are divided into 2 classes, including: enabling factors and results. The present research attempts to find the impediments for implementation and required infrastructures for implementing the aforesaid model at education department.

Organizational Excellence Models

Quality and effectiveness are among concepts of management science that are considered for evaluation of organizations and managers. The best index for showing attention and concentration of demands of customers is "quality." In fact, quality is regarded as a comprehensive form, a mixture of marketing elements, research and development, design, manufacturing product and offering after sale service. TQM tries to create quality in organizations, and the main instrument of TQM is organizational excellence models. The organizational excellence models are all established based on concept and philosophy of quality management, and the goal of all these models is obtaining to comprehensive quality, and this philosophy may be true for all organizations regardless of situation, size or sector (mele and colurico, 2006). A short review to the list of quality prizes in world and their formation reveals that they are based on three important models, including:

- Deming model
- Malcolm Baldrige model
- EFQM model

Deming Excellence Performance Model

The origin for the first-quality prize all through the world was Japan. The union of scientists and engineers of Japan in July 1950 invited from Professor Edward Deming for appear at Japan. Deming through appearing at Japan held many courses at different levels for activists in the field of industry, including: leaders, managers, engineers and researchers. His teachings had great influence on partnership ideology and moving toward quality control in Japan, which was at the beginning process. These were the oldest quality and productivity prizes all through the world that according to the theories of new management and new economic conditions for improving the export status of Japan was applied through improving quality of products, promoting all-inclusive control over companies and comprehensive quality control among industry and recognizing successful strategies for quality and improving awareness in relation to importance and methods of management (Hillmer and Karney, 2001).

Performance Excellence Model of Malcolm Baldrige

Upon determining the significant influence of Deming prize on improving performance of Japanese organizations and improving quality of their products and finally controlling the international markets,

the governmental authorities and managers of different industries examined the studies of Malcolm Baldrige as Ministry of Commercial Affairs of USA, proposed the recommendation of establishing prize to the US congress and finally in the year 1987 the national quality prize of Malcolm Baldrige was ratified as a Legal Act in commemoration of Malcolm who died before its ratification. Since the year 1988 this prize was offered to progressive and active organizations in the field of industry, service, health and education (Collier, 1992).

Excellence Model of EFQM

Organizational excellence may lead to growth and improvement of organization at different levels, so that organization can meet satisfaction of beneficiaries through their achievements, methods of obtaining such achievements and the future achievements; in which, performing this task even at the most appropriate condition is very difficult. In the condition that global competition is increased, technologic innovations are quickly happening, and the processes are changing; the continuation of this process is very problematic. Thorough understanding this challenge, the EFQM was established. EFQM is a non-profit making organization that was established in the year 1988 by 14 valid European companies and support of EU, and at the moment it has more than 800 members of European companies. The mission of this organization is establishing a progressive force for improving performance and perspective of European organizations all through the world. The head of EU while undersigning the agreement for establishment of EFQM announced that: The attempt for improving quality is among prerequisites of success for single companies and competitiveness of all people in a group. The EFQM has 9 criterions consisting of 5 criterions dealing with enabling and 4 others dealing with results.

- **Enablers:** The enabling criterions are including:
  - **Leadership:** It is specified that how the leaders of organization are able to obtain the mission and perspective of company, how the values are prepared for long term success of organization and how the leaders of organization may become partners at development and execution of managerial systems of organization.
  - **Policy and Strategy:** Supreme organizations obtain to their missions and perspectives through focusing on beneficiaries, market considerations and area of their activity. Policies, plans, goals and processes are developed with strategies (European Foundation for Quality Management, 2003(. The policy and strategy shall become practical through developing key processes, strategies and appropriate management of employees and establishment of a partnership system (Winn and Camron, 1989).
  - **People:** Supreme organizations manage the development and freedom of complete potentials of their employees at individual, team and organizational level; they promote justice and equity and enable their employees with specific powers. They are aware that their communication, diagnosis and bonus shall motivate the employees and based on their knowledge and skill; they are bounded to obtain benefits for organization. (EFQM, 2003).
  - **Partnership and Resources:** Supreme organizations attempt for planning and administering outer commercial partnership and domestic resources for supporting from their policies and strategies and effective execution of processes.
  - **Process:** Supreme organizations design and administer processes for obtaining complete satisfaction and increasing values to gain the satisfaction of customers and other beneficiaries (EFQM, 2003).

- **Results:**
  - **Customer Results:** Organizations are not existence without customer and meeting the customer requirements is one of the criterions of organizational excellence.
  - **Personals Results:** Supreme organizations measure important results of their people to obtain satisfactory results.
  - **Society Results:** Supreme organization measure related results to society and attempt to put them into practice.
  - **Key Results of Performance:** The obtained result by organization is determined in relation to pre-designed plans.

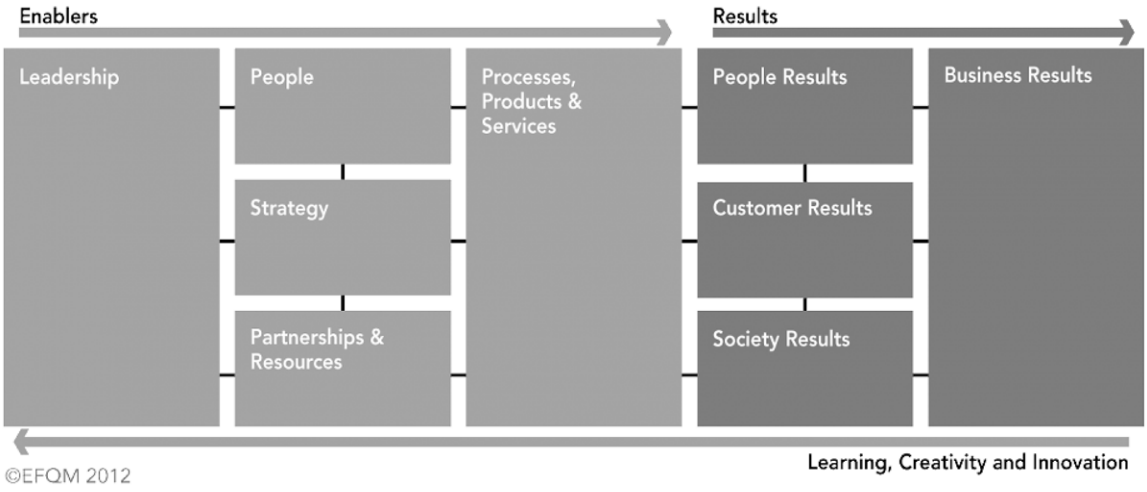
General scheme of criterions and elements of EFQM is shown in Figure 4.

RESEARCH BACKGROUND

In a study with title of "EFQM and elementary and secondary education of Greece" that was carried out by Sofia D Anastasiadou et al, (2014) the higher-education system of Greek was examined. In this research, it was benefited from EFQM and 1000 teachers of elementary and secondary school was evaluated that most of them had negative or neutral attitude toward this model. Therefore, it is revealed that for improving and obtaining to standards of quality at elementary and secondary education studies of Greek (Anastasiadou and et al, 2014).

In a research with title of "solutions for organizational excellence of Portugal officially recognized by EFQM" by Maria Araujo & Paulo Sampio (2013) by examining 7 Portugal companies benefiting from EFQM model and results of this research is completely compatible with results of other researchers at suburb countries of Europe. For example, "domestic motivation" is regarded as the key factor for implementing EFQM model and outbreak of governmental organizations by investment authorities from

Figure 4. General scheme of criterions and elements of EFQM (www.efqm.org)



national capital, reveals the key role of senior managers and execution of ISO 9001 and important role for successful implementation of EFQM model (Araujo & Sampio, 2013).

In another study with title of "effect of implementing EFQM model for performance of organizations" that was carried out by "Mohammad Najem Aldin Ebrahim Esmaeil" (2015), 5 main questions about the topic of implementing this model on system and work procedure, organizational culture, management and recognition of employees, and influence of producing, designing and cost was raised. Finally, the results of research showed that more than 90% of participants of this research believed that this model has positive influence on performance of organization (Ismael, 2015).

In another research with title of "Structural analysis of EFQM model, evaluation for the role of mediators at management of procedure" that was carried out by Eva Suarez and et al, (2014) based on comments of 116 participants as a statistical sample, had 4 general results. 1st Result: EFQM model is a dependable and valid frame for assessment of results obtained by organization. 2nd Result: For effectiveness of a system, it is necessary to consider main factors of this model, including: Leadership, processes and strategies of organization. 3rd Result: A scale shall be considered for general results of organization and assists us to obtain general index for organizational excellence. 4th Result: Management of procedure as the mediator between superiority of leadership, unity and resource management (Suarez and et al, 2014).

In a research with title of "An EFQM model for integrated government of health care system" that was carried out by Carlo Favaretti and et al, (2015) the experience of 10-year implementation of EFQM model (2000 to 2009) at Trento health care organization was examined. Results showed that in the year 2001 the average point obtained by organization was evaluated as 290 (out of total 1000 points) and this amount in the year 2008 was increased to 610. This organization at customer satisfaction sector, results of society and offering key services had appropriate progress (Favaretti and et al, 2015).

In another paper called "Improving organizational performance by using EFQM model" that was carried out by Flavia Fechete and et al, (2014) the component of the process by using 9 criterions of EFQM model in a factory of producing sugar was studied. In this study, the economic aspect was mainly examined, and the result showed that component of criterion (process) can analyze the work procedure and offer criterions for improvement (Fechete and et al, 2014).

In a research with title of "Is EFQM model has capacity of recognizing and improving information" that was carried out by Marta Zarraga-Rodrigueza & M Jesus Alvarezb, (2014) it seems that there is significant relationship between capacity of information and TQM models, and meanwhile it is focused on importance of values and related behaviors to EFQM by effective application of information as part of organizational culture (Zarraga-Rodrigueza & Alvarez, 2014).

In a research with title of "Excellence model of EFQM and TQM, an empirical comparison" was carried out by Joaquin Gomez Gomez and et al, (2015) it was announced that whereas empirical documents and evidences reveal that EFQM and TQM are not synonyms; nevertheless, most of organizations are directly applying from EFQM excellence model and indirectly applying TQM model. Results of this study enables us to infer that although EFQM and TQM are not equivalent, they follow up equal path and organizations benefiting from EFQM excellence model have higher chance of successful implementation of TQM. Moreover, both systems prepare a tool for improving performance based on EFQM mode (Gomez Gomez and et al, 2015).

Through studying research background in order for having better viewpoint, the previous completed researches (results of reviewing research review) according to year of research respectfully are offered in the following table.

Table 1. Summary of the previous recent researches Sorted by year of research

ID	Year of Research	Researcher(s)	Result of Research
1	2013	Maria Araújo, Paulo Sampaio	Recognizing 4 keys influencing factors on implementation of EFQM model.
2	2014	Marta Zárraga-Rodríguezа, M. Jesús Álvarez	There is significant relationship between capacity of information and TQM model.
3	2014	Sofia D. Anastasiadou, Poulcheria A. Zirinoglou, Giannoula S. Florou	For improving and obtaining standards of quality at elementary and secondary education of Greek, it is necessary to take many actions.
4	2014	Flavia Fechete, Anisor Nedelcu, Maria Popescu	The criterion of the process may be analyzed, and some criterions may be offered for improvement.
5	2014	Eva suarez, jose L. Roldan, Arturo Calvo-Mora	The EFQM model is a valid and dependable frame for assessment of results of organization and management of procedure as a mediator between superiority of leadership, unity and management of resources.
6	2015	Mohammed Najem Aldin Ibraheem Ismael	Implementation of this model has positive influence on performance.
7	2015	Carlo Favaretti, Paolo De Pieri, Emanuele Torri, Giovanni Guarrera, Fabrizio Fontana, Franco Debiasi, Luciano Flor	Studying experience of implementation of EFQM model for 10 years at Trento health care organization reveals progress and organizational excellence upon its implementation.
8	2015	Joaquín Gómez Gómeza, Micaela Martínez Costa, Ángel R. Martínez Lorente	Although EFQM and TQM model are not synonyms, they follow up equal path.

RESEARCH METHODOLOGY

The present research with respect to objective is classified as applied and with respect to methodology is classified as descriptive-survey research. It is applied since the results pave the way toward implementation of EFQM model in organization, and it is descriptive since it offers an image of present status and is a survey since data is collected through a field research.

Statistical Society, Volume Sample, and Method of Data Collection

In order to be certain of information, the statistical society of this research is all deputies, in charge experts and experts of the education department of Golestan province that is the total number of 129 persons. In the present research, it is applied from classification sampling method. first of all the homogenous provinces were divided and then a random sample was taken from management of largest city and the volume sample was calculated by using Cochran's formula and sample balance formula as follows:

$$n = \frac{n}{1+\frac{n}{N}} = \frac{96}{1+\frac{96}{129}} = 55$$

Volume of statistical society N is 129 persons and volume sample based on Cochran's formula n is 96 persons. Nevertheless, some deputies and experts were inaccessible and reluctance of some of them for completing questionnaire, only 38 questionnaires were completed and collected.

Validity and Reliability of Questionnaire

Whereas it was benefited from the extracted questionnaire of Rad (2005), and it was confirmed by expert professors, the validity of the questionnaire was confirmed. In the questionnaire of this research, the respondents had 4 choices that were determined by A, B, C, D. A referred to question (variable) that was confirmed by 5 factors of ability field and was completely obtained. B referred that the related issue was obtained; nevertheless, it is not complete and shall be developed. C referred that the issue is very limited and unofficial and is remained at beginning phase, and D referred that the issue is not begun yet and there is no planning for it. The respondents had to elect of the choices, and the scores were classified as 1 to 4 (the highest score related to A, and the lowest score related to D). For approval of reliability of the questionnaire, it was benefited from Alpha Cronbach and SPSS software version 0.80, which showed that the questionnaire has the acceptable level of reliability. The following figure shows the output of SPSS software upon calculating reliability of the questionnaire.

Data Analysis Method

In this research in order to analyze data, it was benefited from descriptive statistics. Therefore, the frequency table of organizational position and education of respondents was designed. Then the average and standard deviation of questions separated by different fields of enabling was calculated and evaluated.

Research Findings

In This part, before analyzing research findings, a descriptive analysis of information of questionnaires is done.

Information of Respondents

In this research 38 questionnaires completed by deputies, responsible experts and experts of the education department of Golestan province were collected, and the personnel were distributed according to their organizational position as follows:

Figure 5. The output of SPSS software

Case Processing Summary

		N	%
Cases	Valid	38	100.0
	Excluded[a]	0	.0
	Total	38	100.0

Reliability Statistics

Cronbach's Alpha	N of Items
.800	22

Table 2. Distribution of personnel based on organizational position

Organizational Position	Frequency	Percentage
Deputies	2	5.2%
In charge expert	6	15.8%
Expert	30	79%
Sum	38	100%

Table 3. Distribution of personnel based on education

Education	Frequency	Percentage
Associate Degree	1	2.6%
Bachelor's Degree	16	42.1%
Master's Degree	21	55.3%
Sum	38	100%

Figure 6. Diagram of distribution of personnel based on organizational position

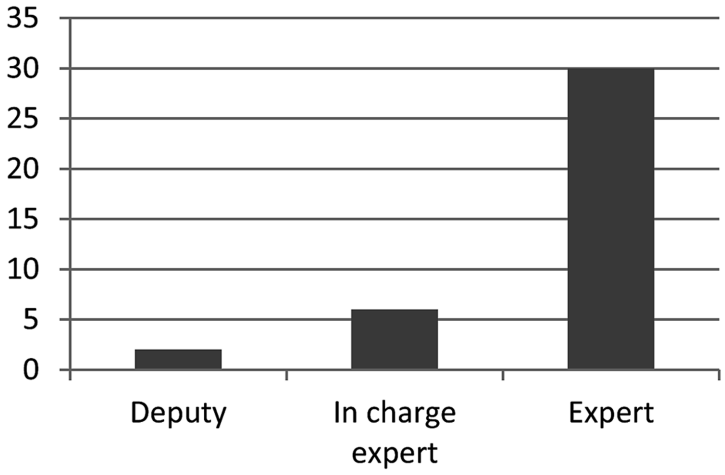
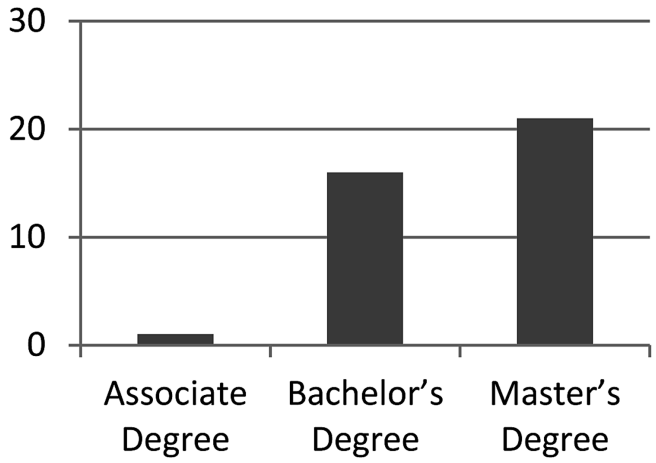


Figure 7. Diagram of distribution of personnel based on education



In this research 7.9% of personnel were female and 92.1% of personnel were male.

Descriptive Analysis of Obtained Information

The questionnaire of this research is designed for the purposes of recognizing infrastructures of implementing EFQM model and for each section of enabling and infrastructures of implementing this model at the education department the related questions are designed. Therefore, at strategy and policy section, there are 5 questions, employees section, 6 questions, leadership section, 4 questions, processes, 3 questions and resources section, 4 questions and according to the comment of scholars, these issues are impediments for implementation of these models in organization. Then the point of each question is determined from 1 to 4 based on average to show that which infrastructure based on comments of respondents was already examined and which of them were not gone under planning. Moreover, to specify that at which section of enabling, it is required for more planning. In the following section, the questions of the questionnaire with the average response for each question and its percentage are offered. It is to be noted that method of offering point is as follows: A (grade 4) B (grade 3) c (grade 2) and D (grade 1) that all respondents were informed about this issue. Here we intend to know that which infrastructures of implementing organizational excellence and EFQM model are considered and are accessible. The questionnaire of research with the obtained information for each question is offered at the following table.

RESULTS OF RESEARCH

On the contrary, of other researchers intend to find out the main reason of problems at organization, including: educational problems, the present research is carried out based on collected comments of experts and their analysis by offering result for either existence or non-existence of infrastructures of implementing EFQM at the education department of Golestan and according to the findings and description of research. It is observed that some components of enabling at EFQM model are focused and some other item that does not have suitable performance is due to lack of having correct information in relation to the necessity of infrastructures. In the following section, the description of results of research based on enabling fields and related results for each question is offered.

- At strategy and policy sector, organization obtains the average score of 3.18 out of total score of 4 i.e. education management offers infrastructures of implementing EFQM model at strategy sector up to 79.5%.

There is a comprehensive plan at education department called document of fundamental delivery; therefore, this infrastructure is created as introduction for implementation of EFQM model. According to the comments, the organization has recognized and prioritized exact definition of requirements at the acceptable level, i.e. organization has suitable performance. In relation to offering appropriate plan for communication with customer, the organization has very good performance, i.e. according to the available feedbacks in organization most of the referents have left the organization with partial satisfaction; consequently, this infrastructure is suitable concerned for implementing the original model.4) In relation to having good strategy for communicating with suppliers, organization had acceptable performance that prepared suitable grounds for implementing the original model.

Table 4. Research questionnaire with analytical analysis of research questions

Classification	Row	Evaluation Question	Average (1-4)	Mode	Standard Deviation	Percentage (Point)
Policy and strategy	1	Are there any comprehensive plans for improvement of organization at education department?	2.95	3	0.65	73.68%
	2	Employees have enough understanding of improvement plans of organization?	3.18	3	0.26	79.61%
	3	Education department has exact definition of realities and recognizing requirements?	3.55	4	0.25	88.82%
	4	Organization has good relationship with customers and can meet their expectations?	2.97	3	0.30	74.34%
	5	Is there good relationship between organization and surround environment specially suppliers?	3.26	3	0.47	81.58%
People	6	Is the goal of organization is obtaining enough understanding from plans from improvement plans?	2.79	3	0.44	69.74%
	7	Are employees of education department having prejudice over work conditions and reluctance toward changes in organization?	2.45	2	0.63	61.18%
	8	Is there positive understanding from improvement plans (transferring forces from a city to another city within the frame of the improvement plan)?	2.63	2	0.78	65.79%
	9	Is their belief among employees for usefulness of improvement plans?	2.18	2	0.75	40.61%
	10	Is there any education for increasing knowledge and skill among employees of education department?	2.87	3	0.50	71.71%
	11	Education department has the recruitment process (based on knowledge, working skills and creativity)	2.16	2	0.51	53.95%
Leadership	12	Is there the ability of innovation among senior managers of organization?	2.55	2	0.74	73.82%
	13	Is there any commitment among senior managers of the education department for execution of the improvement plan?	2.79	3	0.39	69.74%
	14	Are the leaders of education organization benefit from high level of knowledge and understanding?	3.11	3	0.31	77.63%
	15	Are successful experiences for improvement plans available in mind of leaders and employees executed? Employees have successful experience of improving organizational?	2.74	3	0.36	68.42%
Contracts	16	Are there any mechanisms for continuous improvement (research and development) at supplied organizations?	2.58	3	0.63	64.47%
	17	Are there any exact mechanisms for collecting and analyzing data?	2.82	3	0.59	70.39%
	18	Are there any appropriate assets (building, equipment and materials) for performing improvement plans of organizations?	2.21	2	0.79	55.26%
Resources	19	Is there any certainty of suppliers of educational equipment (table and bench) for long term production and estimation of company's requirements?	2.39	2	0.89	59.87%
	20	Is there financial planning for organization, especially for improvement projects?	2.37	2	0.51	59.21%
	21	Is there financial support (subsidy, budget and legal support) on behalf of government for quality improvement programs of organization?	2.50	2	0.42	62.50%
	22	Are the macro policies in relation to improvement programs?	2.08	2	0.94	51.97%

Most of the experts during discussions and according to the results of the questionnaire agreed that the goal of organization from receiving the quality certificate is implementing organizational excellence models, real improvement of organization and improving quality of organization.

- In the section of people, organization by obtaining the score of 2.51 out of total score of 4 scores (63%) revealed that in this section, the infrastructure was not prepared and the observed program in this field is not executed with suitable quality.

People do not have enough perceived of improvement plans and due to not having the strong belief this plan is not suitably executed. People due to static culture of work and prejudice over current condition are reluctant for executing excellence plans of organization and the infrastructures for implementing the original model shall be prepared. People do not have been positive perceive in relation to improvement programs of organization, and this is one of the problems for implementing the desired model.

People believe that the improvement plans are not effective and may not influence on increasing quality of organization, and this issue shall be considered as one of the main problems of implementing the desired model. According to the comment of experts, the training that is offered for increasing quality of performance of people at education department is called as the service recorded training; nevertheless, its effectiveness shall be considered.

According to the comment of experts, the organization did not have the suitable recruitment process to employ experts and whereas experts may better implement the improvement plan at their own working fields, this issue shall be considered. At leadership section, the score of organization is 2.80 out of total score of 4 i.e. infrastructures at 70% of this section was available. It seems that according to the comment of experts, managers do not benefit from high level of creativity to establish new ideas for improvement of organization.

Managers up to acceptable level are obligated toward execution of the improvement plan. Senior managers of organization have the acceptable level of knowledge and perceive, and this is regarded as the suitable point for implementing the original model. People have limited experience of executing improvement plans; nevertheless, whereas useful results are not mentioned they do not have a strong belief in this issue. In process section, the score of organization is 2.54 out of score of 4 i.e. the infrastructure at this sector is at 63%, including:

Organization has offered mechanisms for continuous improvement. Organization has offered exact mechanism for collecting and analyzing data. According to the comment of experts, organization has a problem in relation to implementing the improvement plan (regarding part of organization for research and development). In resource section, organization obtained the score of 2.33 out of total score of 4 i.e. infrastructures of this sector at 58% of cases was already available, and it is stated that in this sector, there are most of the impediments for implementing improvement plans.

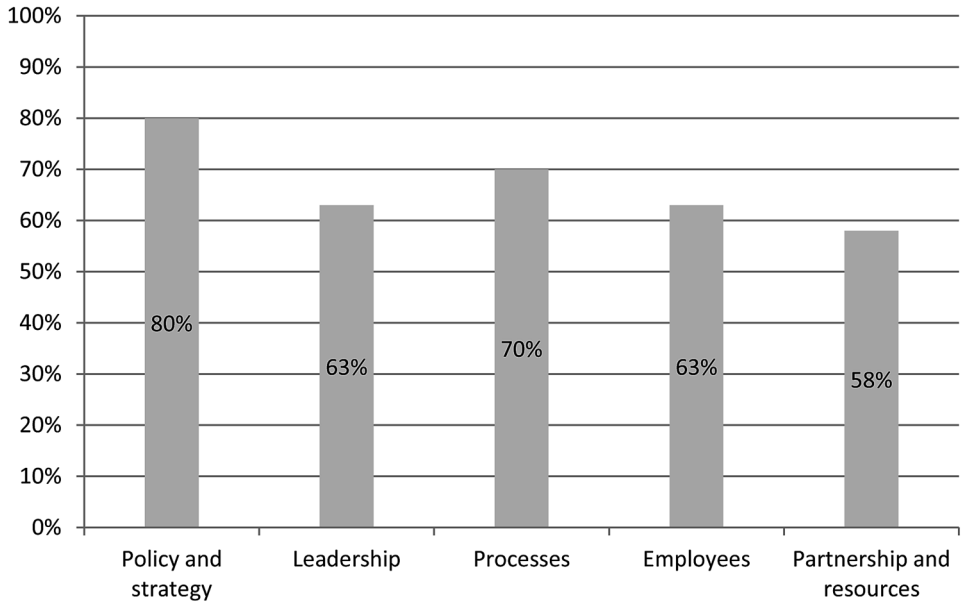
Organization does not have required certainty for long-term improvement plan. There is no suitable planning in organization for execution of the improvement. Financial support on behalf of government for execution improving plan is not an acceptable level. The macro policies of state for execution of the improvement plan do not have enough stability.

According to the aforesaid results, it is stated that the required infrastructure for implementing the organizational excellence model of EFQM at strategy and policy sector is prepared at higher and at resource section it is prepared at the lower level. The level of available 5 criterions of infrastructures in the field of enables based on percentage for obtaining to a general conclusion is offered in the following table.

Table 5. Percentage of infrastructures based on 5 variables in the field of enabling

Row	Items of Enabling Field	Percentage of Obtaining Infrastructures
1	Policy and strategy	80%
2	Leadership	70%
3	Processes	63%
4	**Employees**	**63%**
5	**Partnership and resources**	**58%**

Figure 8. Diagram of percentage of infrastructures based on 5 variables in the field of enabling



DISCUSSION

Ali Mohammad Mosadegh Rad (2005) in a research with title of "A survey of total quality management in Iran, Barriers to successful implementation in health care organizations" performed a descriptive and cross-sectional research via two questionnaires (TQM success and its barriers). He found that TQM success in Isfahan health care organizations was high. In correlation analyses between the success of TQM and its principles, success, process management and focus on employees had a positive and the greatest effect and focus on material resources and on suppliers had a lower effect. In correlation analysis between the barriers to TQM and the problem dimensions, human resource, strategic and structural problems were the most important obstacles and barriers to TQM successful implementation respectively (Rad, 2005).

K. Subrahmanya Bhat and Jagadeesh Rajashekhar, (2009), in another research with title of "An empirical study of barriers to TQM implementation in Indian industries" performed an extensive literature review to understand the barriers to TQM implementation. They found that the most important TQM barriers in Indian industry are: "no benchmarking of other company's practices" and "employees are

resistant to change". Factor analysis of the 21 potential barriers to TQM implementation revealed the following five underlying constructs: lack of customer orientation, lack of planning for quality, lack of total involvement, lack of management commitment, and lack of resources (K. Subrahmanya Bhat Jagadeesh and et al, 2009).

However, in this study, we examined the infrastructure for the implantation of the organizational excellence model EFQM, in Golestan province (Iran). The results of this study will help the education organization to find out how far it is prepared to implement this model. The results showed that the programs of excellence in the education, is almost identical to the EFQM model and organizations can use this model to move towards excellence in a specific framework.

APPLICATIONS OF THIS STUDY

It seems that in addition to the role of managers and leaders of organization, the government and policy makers may play an effective role for implementation of the improvement plan; therefore, each of them offers separate recommendations.

1. Senior Managers and Leaders of Organization
    a. More attention to organizational excellence and its importance
    b. Attempt for attracting scientific scholars and using their comments for studying improvement plans in organization
    c. Attention to the research and development sector in organization
    d. Attention for justifying employees in relation to improvement plans of organization and offering results of implementing these plans
    e. Being certain of effectiveness of related training to improvement plans of organization
    f. Being certain of authenticity of offered data to organization for its planning and analysis
    g. Establishing committee of organizational excellence and electing a director for this sector
2. Government and Policy Makers
    a. Allocating of enough budget to organization for planning in the way of implementing organizational excellence models
    b. Attempt for increasing stability of macro policy makers
    c. Offering opportunity to senior managers to implement their plans and ideas

Limitations of Research

Normally, any research is faced with some limitations that some of them may change the process of research altogether. Some of the limitations of the present research are including:

- Lack of familiarity with main concepts of the organizational excellence model of EFQM that may be effective on results of research; nevertheless, through offering description while responding and completing the questionnaire, this problem may be solved.
- Reluctance of some experts in relation to completion of the questionnaire
- Limitations for carrying out research

RECOMMENDATIONS FOR FUTURE STUDIES

According to the results of research, in order to recognize completely the infrastructures of implementing organizational excellence models, it is recommended for researchers to carry out research on the following issues:

- Studying infrastructures of implementing organizational excellence models at education organization.
- Infrastructures and impediments of the organizational excellence model of EFQM at other Iranian organizations and companies shall be examined for obtaining to better results and solutions through comparing results of these researches with the present results.

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Chapter 23
Lessons Learned from Designing and Implementing a Three-Year Professional Development Program

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ABSTRACT

This chapter highlights a process of creating, revising, and evaluating a professional development (PD) program for in-service upper elementary teachers (grades 3-6), titled the Central New Jersey Partnership to Enhance Mathematics Achievement (CNJ PEMA). Beginning with the research base that informed the initial design of the multi-year program, a description of the program components and implementation, a discussion of the revision process, and lessons learned from formal evaluation (daily feedback forms) and teacher reflections are provided. In particular, attention is focused on how the program sought to include teachers as partners in the creation and revision process as a way to provide them with a voice and choice in their own professional learning.

INTRODUCTION

The report from the National Mathematics Advisory Panel (NMP, 2008) calls for more research using direct measures of teacher knowledge, rather than numbers of courses taken, or the types of certification or professional development (PD) programs attended. Baumert et al. (2010), pursuing this recommendation, define content knowledge as "a profound mathematical understanding of the curricular content to be taught," (p. 142) and use the three-part definition of Krauss et al. (2008) for pedagogical content knowledge (PCK): "knowledge of mathematical tasks as instructional tools, knowledge of students' thinking and assessment of understanding, and knowledge of multiple representations and explanations

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of mathematical problems" (p. 142). Earlier research has established the positive relationship of teachers' knowledge of content and pedagogical content knowledge and student learning. This particular type of knowledge can be measured through the validated Learning Mathematics for Teaching (LMT) instrument; its scores have correlated with students' achievement measures (Hill, Rowan, & Ball, 2005; Hill et al., 2008; NMP, 2008). Baumert et al. confirm the substantial positive effect of PCK, mediated by individual learning support.

Thus research on effective PD for mathematics teachers points toward specific mathematical knowledge important for pedagogy, beyond what is generally learned in present pre-service programs (Birman et al., 2007). Research further suggests the nature of successful PD models. They include learning that takes place in professional learning communities (PLCs), i.e., interactive activity with colleagues that includes feedback from practice (DuFour et al., 2008; Wei et al., 2009); sustained, coherent activity occurring over time (ideally a full year) and connecting PD with students' learning and retention processes (Darling-Hammond, 2010; Garet et al., 2010; Clements & Sarama, 2004, 2009); and, an emotionally supportive environment encouraging conjecture, discussion, and exploration (Philipp, 2007). As Darling-Hammond summarizes this research,

Effective professional development is sustained, ongoing, content-focused, and embedded in professional learning communities where teachers work over time on problems of practice with other teachers in their subject area or school. Furthermore, it focuses on concrete tasks of teaching, assessment, observation, and reflection, looking at how students learn specific content in particular contexts. It is often useful for teachers to be put in the position of studying the very material that they intend to teach to their own students. (Darling-Hammond, 2010, pp. 226-227, quoted inLarson et al., 2012).

This research base informed the project's design, and the authors here present a qualitative case study to complement that research. This chapter describes the process and implementation challenges presented in designing a three-year mathematics PD program for upper elementary teachers. The authors include lessons learned and solutions addressing these challenges, as well as recommendations for the design of future multi-year PD programs.

BACKGROUND

Responding to a three-year math science partnership grant opportunity administered through the New Jersey Department of Education (NJDOE), a partnership between Rutgers University and two neighboring school districts was formed. This partnership included district curriculum leaders, university mathematics faculty, and mathematics education faculty and was designed to create a supportive, collegial environment for the participating teachers. All members of the institute of higher education (IHE) team[1] were experienced teacher PD facilitators. The team included faculty and staff in the fields of mathematics, mathematics education, adult learning and numeracy, and STEM (science, technology, engineering, and mathematics). Keeping in mind that each year was contingent upon funding, each year of the PD proposal was designed as a stand-alone program. Initial design of the CNJ PEMA program was informed by previous professional development collaborations between mathematics teachers and researchers, with grant specifications requiring a collaborative partnership.

The program described herein was a deliberate collaborative effort to incorporate as many components of effective professional development as was feasible within the requirements of the grant opportunity offered by the state. The three-year grant-funded PD model--a year-long program of graduate coursework, participation in a PLC, and job-embedded classroom support--incorporated PCK, grades 3-6 mathematics content, and the Common Core State Standards in Mathematics (CCSS-M), which includes the Standards for Mathematical Practice. Each program year was designed to stand alone in order to have a mechanism for accommodating new teachers recruited each year.

THE THREE-YEAR CNJ PEMA PROGRAM

Program Components and Implementation in Year 1

The overall goals of the PD model were: deeper mathematical knowledge for teaching; deeper understanding of children's mathematical reasoning and ways to enhance that reasoning; and a wider repertoire of classroom practices to enhance student engagement in mathematics. Thus, each year-long program was also explicitly connected to instructional practices. Mathematical topics of study were selected based on identified needs of the participating school districts, as well as data collected using a needs assessment (LMT) prior to the start of the first year (and each subsequent year when new teachers were added to the program). A sample of 25 volunteer grades 3-8 teachers participated in the needs assessment during the initial recruitment phase for Year 1. Fifteen middle school math teachers completed the Middle School Number Concepts and Operations assessment, while 10 teachers of grades 3-5 completed the Elementary Number Concepts and Operations assessment. The mean scaled score[2] of the middle grades teachers was 0.402 sigma below the national mean. To interpret this score, note that these teachers were teaching only math, and were volunteers taking the assessment. Thus the sample mean was likely to be higher than the population mean for all middle grades math teachers in the districts. Upper elementary teachers obtained a mean scaled score 0.358 sigma above the national mean. Note that only teachers of grades 3-5 completed the assessment; but this LMT is normed in grades 1-5. The spread was wide; half the scaled scores were below 0. These generalist teachers volunteered, suggesting that they felt more confident of their math skills than some colleagues. Thus, the sample mean was likely to be higher than the population mean. These statistics suggested substantial needs for teachers' development of their math PCK.

Analysis of items that were most often missed suggested gaps in mathematical and pedagogical content knowledge, informing the content and design of our program proposal. For example, four items, which were answered correctly by three or fewer grade 3-5 teachers, assessed pedagogical knowledge in the arithmetic of whole numbers and rational numbers: specifically, the interpretation and evaluation of alternative solution methods, the use of manipulatives to represent and reveal the meanings of procedures, and the selection of problem examples most beneficial for teaching a mathematical concept. This suggests that even when teachers seem familiar with the content, their understanding may not be sufficiently deep to enable them to interpret student reasoning, provide scaffolding through concrete representations of mathematical ideas, or to be able to choose the most effective instructional strategies. Similar analyses apply to the middle school assessment items, where we identified high needs in algebraic thinking and its precursors. Additional pre-planning included identifying faculty and support staff, discussing perceived areas of need with teachers and their district math supervisors, and confirming logistical details.

In the first year Cohort 1 teachers, coaches, and paraprofessionals, called Fellows throughout the program, earned six graduate credits and a $2,000 stipend, by completing a two-week summer *Seminar in Mathematical Ideas* course and a fall mathematics education course, and accruing a minimum number of 164 PD hours within the networked PLC throughout the fall and spring. As shown in Table 1, the original program plan anticipated teachers of mathematics from both elementary and middle grades. However, no middle grades teachers were confirmed for the program at the start of the first year. Therefore, Fellows were grouped into two sections for the two-week summer course (70 PD hours, three graduate credits)--grades 3 and 4 or grades 5 and 6--and teachers and coaches from a single school building were grouped together as well.

One important overarching goal of the summer course was to put the Fellows in the position of learners of mathematics as a way for them to experience what their students might experience during the school year. Therefore, each of the ten days included exposition and exploration of math content, discussion of pedagogical implications during an hour-long classroom connections session, facilitated group work on open-ended math problems related to the day's content, and group presentations on assigned workshop problems. Classroom connections sessions were facilitated by two teacher peer mentors who were chosen because of their backgrounds in special education and culturally relevant pedagogy. Mathematical content from the Year 1 summer course included: number systems and place value, operations on the integers, fractions, and mathematical models/modeling. Two mathematics graduate students provided additional support to instructors, peer mentors, and Fellows.

While the summer institute concentrated on mathematical understanding, activities during the school year were intended to focus on connecting the mathematical content and the pedagogical methods modeled to actual classroom practice. In the fall course (47 PD hours, three graduate credits), there was a major focus on students' reasoning about and understanding of fractions[3]. This focus was chosen in response to districts' and Fellows' concerns about persistent student difficulty with this topic. The original course outline for the fall included components of a lesson study approach (Lewis, Perry, & Murata, 2006; Hart, Alston, & Murata, 2011), such as implementation of a common mathematics task (including videotaping

Table 1. Year 1 program

	Upper Elementary (Grades 3-5)	**Middle Grades (Grades 6-8)**
Summer 2013 2-Week Institute	Seminar in Mathematical Ideas	
Fall 2013	Lesson Study on Mathematical Reasoning: Algebraic Thinking	
Spring 2014	Professional Development	
Summer 2014 2-Week Institute	Number, Operation, and Algebra	Geometry and Measurement
Fall 2014	Lesson Study on Mathematical Reasoning: Algebraic Thinking in Geometry	
Spring 2015	Professional Development	
Summer 2015 2-Week Institute	Topics in Mathematics for Teachers: Algebraic Thinking in Context	Topics in Mathematics for Teachers: Pre-Algebra and Algebra
Fall 2015	Lesson Study on Mathematical Reasoning: Algebraic Thinking in Applications	
Spring 2016	Professional Development	

the task implementation and collecting student work), release time to observe colleagues' implementation of the same task (within and across districts), and debrief and discussion immediately following these observations. The final course syllabus, activities, and format reflected extensive revision that addressed Fellows' concerns with the amount of additional classroom time and requirements for lesson study as described above. A hybrid course format was adopted and weekly class meetings were conducted via 2-½ hour webinars and four monthly in-person meetings at Rutgers University.

In the spring of Year 1, the program consisted of two monthly webinars (ranging between one and two hours as needed). Fellows also received one-on-one individual and small group job-embedded classroom support from the authors. Because some schools in the two districts included more than one CNJ PEMA Fellow, there were opportunities for smaller PLCs to form and meet within the respective districts. Fellows had successfully completed the program if and when they met the total minimum of 164 PD hours (summer, fall, and spring) and received a $2,000 stipend upon doing so.

Important features of the evaluation plan included daily feedback forms during the two-week summer course, university-mandated course evaluations at the end of the fall course, interviews with members of the IHE team, and Fellows' responses from surveys and focus group interviews conducted by the external evaluator, Research for Better Schools (RBS). Responses from these various data collected illustrate aspects of teacher growth in Year 1 of the program. The evaluation report notes:

Almost half of CNJ PEMA participants had limited prior coursework in mathematics, with about one-fifth having completed no classes in mathematics at the undergraduate or graduate level (most had completed mathematics teaching methods classes). At the start of the program, half of the respondents (51.4%) felt confident that they could skillfully teach all the concepts covered in the mathematics curricula at their schools. Even fewer (37.1%) believed they could explain to students how to do complex mathematics problems... At the end of the academic year, most participants felt that the training they received had been consistent with their personal goals (74.3% of participants thought so to a great extent or nearly a great extent). The same proportion of participants agreed that CNJ PEMA helped them to a great extent with fostering their understanding of how students learn mathematics. The vast majority of respondents (79.4%) reported that they developed their knowledge of students' mathematical thinking. (RBS, 2014, pp. i)

Program Components and Implementation in Year 2

In Year 2 the program components and implementation were revised to reflect both fiscal and programmatic constraints. Table 2 presents Year 2 at a glance, incorporating these changes.

Recruitment of additional teachers from a third school district[4] (Cohort 2) was necessary to achieve the target number of 45 Fellows. This was due to some teacher attrition from Year 1 to Year 2. Teacher Fellows who did not continue expressed dissatisfaction with changes to the program as it was initially planned and presented to them during recruitment for Year 1. As a result of the cost of graduate course tuition and fees at Rutgers University, it was only possible to offer the two-week grant-funded summer institute for credit to Fellows, instead of two graduate courses as was the case in the first year. The two-week summer course remained because it was a required component by the NJDOE for Year 2. In addition, teachers who chose not to continue felt that the minimum number of PD hours required to complete the program were a burden on their professional and personal lives.

Table 2. CNJ PEMA year 2 program

Summer 2014 (70 hours)	
2 Week Institute **Aug 4-15**	3-credit Graduate Course *Topics in Mathematics: Algebraic Thinking*
Fall 2014 and Spring 2015 **Professional Development (50 hours)**	
A) October 23rd & 24th **AMTNJ 25th Annual 2-day Conference** *"Entering a New Century Under the Common Core Standards and PARCC Assessments"* **B) On-line and Face-to-Face events:** 1. Monthly webinars and optional webinars 2. Meetings in district (monthly TBD) 3. District scheduled math PD dates 4. (3) full-day Meetings at Rutgers University *(Thursday Nov. 6th and two other school days TBD)* Topics include: Clinical interviews; Common Core and PARCC assessments (open-ended responses, examining student work); Formative assessments; Recognizing student achievement and progress	

In Year 2, Cohort 1 and 2 Fellows were responsible to accrue the minimum required 148 PD hours through participation in program activities during the 2014-2015 school year. In lieu of tuition for the second graduate course, grant funds were used to provide Fellows with a year-long membership to the Association of Mathematics Teachers of New Jersey (AMTNJ); this also included covering registration fees for all Fellows to attend AMTNJ's annual two-day conference. At this conference, the authors co-presented with two Cohort 1 Fellows in a session titled "Diving Deeper Into Students' Mathematical Thinking Via Clinical Interviews". This presentation was meant to highlight some of the work Fellows had completed during their fall graduate course from Year 1. Specifically, Fellows presented details and reflections from their clinical interview assignment from the fall 2013 graduate course.

Additional PD activities for Fellows became part of the Year 2 program components. Four optional Saturday sessions were scheduled and a list of relevant mathematics, science, and/or technology webinars from other organizations[5] was provided for Fellows. These activities were added in response to Fellows' concerns about accruing the required 148 PD hours. Similar to Year 1, the authors also scheduled consultations, lesson planning sessions, in-class support, and co-teaching appointments throughout the school year. Cohort 1 Fellows mentored the Cohort 2 Fellows, contributing to a supportive collegial learning context that fostered ongoing professional collaboration.

Program Components and Implementation in Year 3

Of the 44 Fellows in Year 3, 21 were Fellows that had participated in CNJ PEMA since Year 1 (Cohort 1), 12 were returning Fellows from Cohort 2, and 11 were new to the program. In Year 3, all Fellows were offered two separate "tracks" to guide their Year 3 activities (see Table 3). Track 1 allowed Fellows to receive graduate credit for the two-week summer course, while Track 2 provided Fellows with funds to attend STEM conferences of their choice in lieu of graduate tuition for the summer. The required 2-week summer course was delivered in two sections: one for Fellows who had been in the program since the first year, the other for Fellows who had joined the second year and new Fellows.

Both tracks required Fellows to continue accruing PD hours throughout the 2015-2016 school year. This programmatic change was in response to Fellow's feedback, which included concerns about the summer

Table 3. CNJ PEMA year 3 program

<table>
<tr><th colspan="3">Summer 2015 (70 hours)</th></tr>
<tr><td>2 Week Institute
Aug 3-14</td><td>TRACK 1
3-credit
Graduate Course
Algebraic Thinking: Applications in Geometry, Measurement, and Real-world Problems</td><td>TRACK 2
Non-credit Seminar
Algebraic Thinking: Applications in Geometry, Measurement, and Real-world Problems</td></tr>
<tr><td colspan="3">Fall 2015 and Spring 2016
Professional Development (approximately 78 hours)

A) On-line and Face-to-Face events:
7. Monthly webinars and optional webinars
8. Meetings in district (monthly or TBD)
9. District scheduled math PD dates (TBD)
10. (2) full-day Meetings at Rutgers University (Thursday Nov. 6th and 1 other school day TBD)
11. 2-days conference attendance required (non-credit seminar teachers only)
12. Additional activities (subject to management team approval)

Topics include: Developing understanding and fluency with fractions, developing algebraic thinking; Clinical interviews; Common Core and PARCC assessments (open-ended responses, examining student work); Formative assessments; Recognizing student achievement and progress</td></tr>
</table>

course and year-long program requirements. In particular, Fellows described feeling pressure to complete final exam requirements and feeling overwhelmed with nightly homework assignments when taking the two-week summer course for graduate credit. Fellows choosing Track 2 appreciated having funds made available for conferences, as they saw the value of this activity for their professional growth after their experience(s) in Year 2. Additional changes in Year 3 included more Saturday sessions (monthly instead of sporadically) and more time for Fellows to accrue the required PD hours (beginning with webinars in the summer before the school year began). Throughout the year, Cohort 1 Fellows continued to mentor Cohort 2 Fellows, and all in turn mentored new colleagues in the third year. This reinforced the authors' goal to provide Fellows with a supportive context that fostered ongoing professional collaboration.

SOLUTIONS AND RECOMMENDATIONS

Much has been learned during the three years of CNJ PEMA, and there has been a marked learning curve from the authors' first year to the third and current year. Budget constraints, as well as teacher needs and professional goals required extensive revision of the original three-year plan with innovative approaches to the PD experiences and opportunities offered as program components. Requirements of the grant and expectations of both the authors and Fellows presented issues directly related to budget constraints. In the first year, tuition and fees for two graduate courses at the IHE were covered by the grant. However, in the second year the grant funds available covered only one graduate course in order to maintain the $2,000 stipend for all Fellows. This proved disappointing to Fellows who had hoped to complete two graduate courses in their second year. While most Cohort 1 Fellows continued on to a second year, this situation did contribute to some teacher attrition. Our solution to this funding issue was to provide Fellows with a year-long professional organization membership and registration to attend a two-day conference in lieu of tuition for a second graduate course. The professional organization (AMTNJ) was strategically

chosen, since the authors felt it was important for Fellows to be immersed in the mathematics education community. As general education teachers, teaching all subjects including mathematics, opportunities such as these are not always available or valued. In the third year, the authors extended the list of eligible conferences to include science and technology conferences for which Fellows in Track 2 could use their funds. The authors also encouraged and provided space for Fellows who attended these conferences to share out with the rest of the CNJ PEMA community, via webinars or in-person meetings.

When funding and budget issues arise that require changes in program design, the authors recommend involving teachers in the revision process. This serves to empower teachers and recognize their role in designing a meaningful professional development experience. The most significant change in the CNJ PEMA program occurred in Year 3, when the projected budget would only support tuition for 30 Fellows. Fellows were presented with the budget dilemma and given a choice as to whether they would receive graduate credit for their summer course. As a result of their participation and feedback during this revision process, the authors created two 'tracks' (as described above) for Fellows to choose from. This helped to accommodate Fellows with differing professional goals. At the same time, the creation of the two tracks within the program presented summer course instructors with the challenge of creating a rigorous course for all Fellows, regardless of which track they chose. It was important to provide the same learning experience for all Fellows, and so the expectations for the amount of coursework to be completed during the two weeks were about the same for all Fellows. One of the only components that differentiated Fellows in each track was the need for Track 1 Fellows (those receiving graduate credit) to complete a university-mandated final examination for the course.

As mentioned previously, CNJ PEMA included Fellows from two to three different school districts (depending on the year) in the central New Jersey area. Within each district, there were at least four participating schools, with CNJ PEMA Fellows coming from a variety of grade levels and/or positions (e.g., both general and special education teachers, coaches, and paraprofessionals). Because of the differences in school calendars, scheduling face-to-face meetings in which all Fellows could be present became problematic. Webinar technology as a means of communication proved to be a useful and cost-effective solution to have all Fellows gathered in one location at the same time. The authors were able to schedule webinars at a day and time of the week that accommodated a variety of school and personal schedules. Webinars also helped to sustain the PLC throughout the school year when in-person meetings were not possible. In addition, the authors were able to use this same mode of communication to provide access to CNJ PEMA programming at times when Fellows were unable to join an in-person meeting due to illness or other reasons. Despite the affordances of webinars, the authors caution that virtual professional development cannot and should not happen in the absence of face-to-face meetings with teachers. It is necessary to build a relationship with teachers, as well as with the schools and districts. In the case of CNJ PEMA, the two-week, face-to-face summer course was intended to kick off the year-long program and PLC and to build this relationship. The authors contend that a combination of face-to-face and virtual meetings is an integral part of a complete professional development package.

Teachers who participated in all three program years felt that the graduate courses, professional learning community activities, and opportunities to participate in a professional organization met many of their instructional needs and professional goals. While the leadership team and authors pre-planned the mathematics and pedagogical content, the needs of classroom teachers continuously informed group activities (e.g., monthly webinars and meetings), as well as in-class coaching, co-teaching, and mentoring by the authors. This was critical for meeting both collective and individual needs of the classroom teachers. Fellows who were mathematics coaches in their building gained valuable strategies for design-

ing and implementing grade-level meetings, and for coaching and mentoring teachers. Some teachers and coaches have gained salary increments, and several intend to pursue a master's degree or other certification, building on graduate course credits accrued from participating in CNJ PEMA. Meeting both instructional needs and professional goals contributed to the success of CNJ PEMA. The authors recommend that professional development programs include pathways for participants to realize professional and career goals.

Much of the success of the CNJ PEMA program is also due in part to the strong partnership between the IHE and district liaisons, as well as other administrators from the districts. Often times, the liaisons (district supervisors of curriculum and instruction) were able to advocate for release time for Fellows to meet with the authors in-district during the school day. When school calendars were released after approval by school boards, the authors would meet with district liaisons to try to utilize the pre-planned PD days in the school calendar as times when CNJ PEMA Fellows could meet. The support of other district administrators was also key in contributing to a supportive environment for Fellows. For example, during the two-week summer course, there would often be a visiting school principal who would join their teachers in the mathematics they were engaged in. A similar sense of support was also felt by Fellows who were fortunate to have their building mathematics coaches as Fellows in CNJ PEMA. This provided an extension of the work that the coaches were already doing in their school buildings, and helped to foster a true sense of a mathematics learning community amongst all regardless of position.

FUTURE RESEARCH DIRECTIONS

CNJ PEMA was not designed as a research study when it was first proposed to the NJDOE. However, the authors' experience in planning and revising the PD program described in this chapter has led to questions for future research that would be valuable to the teacher PD community, and can add to the education and mathematics education teaching and learning literature. For example, what models of PD can address teachers' multiple concerns that may include anxiety and confidence to teach mathematics, graduate coursework and content certification/endorsement, or career advancement?

The authors learned that participants valued the opportunity to complete college coursework in mathematics and mathematics education. This validated the authors' decision to include some form of graduate coursework in all three years of CNJ PEMA, and, as stated by our external evaluator, is in line with research findings suggesting the need for elementary teachers to participate in PD that offers such opportunities:

Participants' demographic characteristics and reported attitudes are consistent with research findings that show that most elementary teachers exhibit high levels of mathematics anxiety and have completed little college coursework in mathematics (Hamilton, 1996). (RBS, 2014, p. i)

At the end of program year 1, teachers suggested that the activities designed for Fellows to accrue spring PD hours could have been "put into a three-credit course" (RBS, 2014, p. 18).

The CNJ PEMA program was made possible through grant funds and sustainability is a significant challenge--how can such PD programs be replicated in the absence of outside funding, and which components are the most important when such funds are not available or are limited? These questions are particularly important when considering whether or not to include credit-bearing coursework as a

component of the PD program. If teachers value the coursework as a means for future career advancement, in addition to furthering their content knowledge, then finding a way to keep this component so that the PD program remains an attractive option becomes key. Often times, working closely with partner school districts to collaboratively finance coursework may help, keeping in mind districts' own budgetary constraints.

Additional questions that arose from the authors' work with CNJ PEMA teachers centered around opportunities for teachers to capitalize on their involvement in PD programs such as CNJ PEMA. More specifically, what place do PD models like CNJ PEMA have for professional improvement plans offered by school districts and as a vehicle for promotion and teaching assignments, or for career advancement such as instructional leadership and administration?

CONCLUSION

This chapter has outlined how the CNJ PEMA program was created, implemented, and revised over the course of three years. The authors began with a one-year program meant to establish a mathematics PLC of grades 3-6 teachers from two neighboring school districts. During the course of the year, changes needed to be made to accommodate programmatic constraints and teacher concerns. Maintaining flexibility (from both the authors and the Fellows) was key in order to make these changes and continue to provide Fellows with a supportive learning environment. Listening to the concerns of teachers and working with changes to program requirements helped to foster a true partnership between the university and school districts. As the program evolved in the second and third year, it became more personalized and tailored to the individual professional goals of the Fellows. The authors utilized innovative approaches, such as webinar technologies, to provide access to professional activities for all Fellows.

Although data collected from focus groups with all Fellows (during November of the third program year) have not been completely analyzed by the external evaluator, some initial themes that emerged can inform future PD programs designed to enhance mathematics teachers' effectiveness, to provide responsive professional development for career advancement, and to ultimately improve students' learning of mathematics. Specifically, Cohort 1 Fellows commented that they feel like different teachers from when they first entered CNJ PEMA, and are confident they are making an impact on their students. They are also receiving commendations from principals, supervisors, and others pertaining to their questioning skills and the amount of time/guidance they provide students who are explaining their thinking. While these same Fellows expressed some frustration with the differences in program implementation over the program's three years, they appreciate the changes as responses to their concerns and needs. In addition, they feel both validation and pressure from the expectation that they can be used as school-based and district resources because of their participation in CNJ PEMA.

End-of-program surveys and focus groups will provide additional insight about the three-year program's mathematical and pedagogical content, and the program's effectiveness to address professional and career goals. The authors applaud the commitment and engagement of all teachers who participated in CNJ PEMA during the three-year program, and the school district principals and supervisors who made it possible for teachers to participate.

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KEY TERMS AND DEFINITIONS

AMTNJ: Association of Mathematics Teachers of New Jersey.

Clinical Interview: A type of formative assessment that can be used by teachers to collect information on how a student is thinking about a particular mathematical topic. Often referred to as a diagnostic interview.

CNJ PEMA: Central New Jersey Partnership to Enhance Mathematics Achievement.

Formative Assessment: Periodic measurement of a student's growth as they progress towards mastering a mathematical skill.

NJ DOE: New Jersey Department of Education.

Professional Learning Communities (PLC): Groups of teachers who utilize online tools and face-to-face meetings to engage with colleagues on mathematics content and pedagogy.

STEM: Science, Technology, Engineering, and Mathematics.

Webinars: Online meetings used by PLCs that occur within a platform which includes a chat room, shared interactive whiteboard, polling, and other media-sharing capabilities.

ENDNOTES

1. The authors are members of the IHE team.
2. Scaled scores are reported with national mean 0 and in units of 1 standard deviation (sigma).
3. We acknowledge the materials made available to us by the University of Michigan School of Education and their Dev-TE@M project (http://www.umich.edu/~devteam/index.html).
4. Addition of the third district was made possible thanks to this district's existing/previous relationship with the IHE through a different grant-funded program.
5. The authors tried to find relevant webinars on STEM topics that supported the work Fellows were engaged in through CNJ PEMA. These webinars came from organizations such as edWeb, Discovery Education, Texas Instruments, REL Mid-Atlantic, and McGraw Hill Education, to name a few.

Chapter 24
Aligning Effective Professional Development and Online Learning: A Conceptual Stance

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ABSTRACT

The focus of this chapter is an exploration of the intersection between widely acknowledged and implemented research-based practices for effective PD and a conceptual framework for effective online learning and engagement called the Community of Inquiry (CoI) (Garrision, Anderson, & Archer, 2000). A social constructivist perspective is used to align the characteristics of effective PD (e.g., duration, collaborative participation, active learning, coherence, and content focus) with the three CoI presences (e.g., teaching, social, and cognitive presences). Beyond the alignment of these two conceptual frameworks, practical examples of online tools are discussed for both synchronous and asynchronous online learning contexts within this chapter.

Online learning is not the next big thing; it is the now big thing. (Abernathy, 1999, p. 36)

INTRODUCTION

As indicated by the quote above, online learning is not a futurist approach for continued education, but instead an already widely used platform for teachers and other educators to continue to develop their

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skills. Upon completion of formal teacher preparation courses and after securing employment in schools, teachers are required to participate in ongoing professional development (PD) opportunities throughout their careers. There are many ways teachers can engage in professional learning, such as book studies, student data conversations in professional learning communities, and graduate coursework. Given the variety of formats in which teachers can participate in professional development, research on PD has focused on the characteristics to establish common themes nested within effective PD (Anders, Hoffman, & Duffy, 2000; Authors, 2010, 2011; Dillon et al., 2011; Penuel, Fishman, Yamaguchi, & Gallagher, 2007; Taylor, Raphael, & Au, 2011; Taylor et al., 2005; Walpole & McKenna, 2004).

It has been over 15 years since Abernathy (1999) touted online learning's presence, in the quote opening this chapter; online learning opportunities in education are still more available than ever to support teachers' professional learning. Various online professional development opportunities include for-profit institutional and organizational offerings, non-profit higher education institutional offerings (i.e., traditional coursework and non-credit granting work), state mandated and operated experiences (Zygouris-Coe, Yao, Tao, Hahs-Vaughn, & Baumbach, 2004), and district and school level offerings.

As schools struggle to design and implement high-quality, meaningful, cost-effective professional development experiences, the traditional models of professional development seem not only dated but in most cases ineffective. School level planners are wise to look to online options for delivery of strategic, content -focused professional development. Further, as additional options outside of traditional school-based professional learning emerge, teachers who want personalized experiences are able to choose from a wide range of experiences online, both to fulfill mandatory school requirements or to fulfill more intrinsically inspired learning needs.

The focus of this chapter is an exploration of the intersection between widely acknowledged and implemented research-based practices for effective PD and a conceptual framework for effective online learning and engagement called the Community of Inquiry (CoI) (Garrision, Anderson, & Archer, 2000). Our goal in writing this chapter is to present a model to guide online professional learning as a promising practice for teacher growth and thus, student achievement as well.

LITERATURE REVIEW

Effective PD

Substantive research on teacher learning and PD is available in the field. The focus of the body of research on PD is quite varied, including topics such as workshop implementation, peer-coaching, and book study groups. Regardless of the type of PD, there is robust research in the field focusing on specific characteristics associated with effective PD. According to Desimone (2009) PD opportunities must have:

1. Strong content focus,
2. Active learning opportunities,
3. Provide coherence across the curriculum,
4. Occur over a duration of time, and
5. Allow for collective participation among participants.

The characteristics of effective PD described by Desimone (2009) are repeated in the body of research across the field (i.e., Anders et al., 2000; Authors, 2010, 2011; Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Dillon et al., 2011; Taylor et al., 2011; Taylor et al., 2005). A primary condition of effective PD opportunities is a strong content focus. For example, professional development is more effective when teachers are interested in the topic and when the content is a targeted research-based practice, which can readily be incorporated into the participants' classroom instruction. In addition, active learning opportunities during the PD are essential. Teachers should have opportunities to engage in their learning, rather than act as passive recipients of information. Teachers need to recognize how the learning constructed through PD is relevant to their instruction (i.e., coherence). Further, participants in PD benefit the most when they engage in the PD for multiple hours over a long duration of time. Finally, collective participation suggests that teachers need to be able to discuss what they learn with their colleagues and engage in reflective feedback throughout the duration of the PD.

Along with understanding the characteristics of effective PD, there must be knowledge of how PD impacts students' learning. Desimone's (2009) presents a conceptual framework on the cycle of teacher change through PD and how this change may impact student learning. This fluid framework for teacher change consists of four components: teachers engage in PD activities, which causes an increase in teacher knowledge. This increase in knowledge changes teachers' beliefs about teaching and learning, which may cause teachers to modify their instruction. Because of the change in instruction, student learning is positively impacted. This conceptual framework is recursive, in that all four of the components are continually influenced by the context, culture, leadership, and current policy. It is important to recognize that the five critical features of effective PD (previously described) are nested within the first piece of Desimone 's conceptual framework: teachers engage in PD activities. It is here, that PD providers must be cognizant of the content focus, active learning, coherence, duration, and collective participation.

Online Learning

Online learning opportunities are abundant. The Online Learning Consortium (2015) states that over the past two decades the Internet has made it possible for adults to continue learning in order to stay productive in their fields. Further, research indicates that online student enrollment in higher education rose by 3.7% in 2014 (Babson Survey Research Group & Quahog Research Group LLC, 2015). Online learning opportunities may be structured in two ways: synchronous or asynchronous. A synchronous learning opportunity is one that engages users through live meetings, either text-based or video-based. This requires all participants to be present at a designated time to engage in the learning opportunity. An example of a synchronous learning opportunity is when members of a group join a GooglePlus Hangouts video call to discuss a specific topic. In contrast, an asynchronous learning opportunity allows participants to engage in their learning at different times and can use both text and video components. Text based discussion boards are a good example of how PD group members participate in asynchronous online learning. Regardless of the whether or not the PD opportunity is set up with synchronous or asynchronous activities, deepening knowledge is the desired outcome of the PD. Therefore, when thinking about the effectiveness of online instruction, Means, Toyama, Murphy, and Baki's (2013) meta-analysis suggests that students in online learning environments "performed modestly better than those receiving traditional face-to-face instruction" (p.1).

Research demonstrates a possible link between teachers' engagement in online PD and student learning. Shaha and Ellsworth (2013) state that when teachers are actively engaged in online learning opportuni-

ties (in both quality and quantity) student achievement increases. While, Fishman, et al. (2013) report no significant difference in teacher learning when comparing online and face-to-face PD; learning occurs in both contexts. Further, this research team indicates that both teachers participating in the PD and the students of these teachers made significant gains in content knowledge. Moon, Passmore, Reiser, and Michaels (2014) responded to Fishman et al.'s findings by stating that while this information comparing online and face-to-face learning opportunities is an important asset to the field, more research is needed to closely explore the intricacies of online opportunities and teacher learning. Moon et al. suggests that online PD be aligned with the literature on effective PD, reiterating that subject matter is important, active participant engagement is necessary, and the learning must be connected to teacher practice.

Instruction in Providing PD in Online Contexts

Providers of PD have the same professional learning needs as the learners with whom they work. Steinert, McLeod, Boillat, Meterissian, Elizov, and Macdona (2009) suggest that those providing PD require professional learning that supports growth in professional and personal areas, provides relevant information in regards to their professional needs, and encourages collegial environments and represents contexts where the PD members value learning. Clearly, instructors who teach online should not be expected to design and implement effective online instruction without participating in professional learning opportunities (Palloff & Pratt, 2013).

Online instruction is most effective if done through research-based pedagogy (Means, Toyama, Murphy, & Baki, 2013). Online PD providers can benefit from opportunities to engage as learners in instructional environments that replicate their teaching environments; this provides them with both learner and instructor perspectives (Elliott, Rhoades, Jackson, & Mandernach, 2015). Online PD providers ought to have an understanding of the CoI framework in order to effectively design and implement effective online instruction (Paquette, 2016).

SOCIAL CONSTRUCTIVISM

Social constructivists assert that knowledge is gained through interactions with others by integrating new information with existing information (Gunning, 2010). Social interactions in online learning contexts may vary from traditional modes of interaction. Traditionally, social constructivism implies being with others; however, this is not necessary in an online environment when activities may also be completed asynchronously. It is because of this absence of physical presence that Garrison and colleagues explored and developed the Community of Inquiry (CoI) (Garrison, Anderson, & Archer, 2000).

Community of Inquiry

The CoI is a process model that focuses on online learning communities. Specifically, Garrison et al. (2000) developed the CoI model to support the pedagogy of online discussion boards. The researchers recognized a need to understand the interactive elements within online discussion board conversations. The elements identified in this model include social presence, cognitive presence, and teaching presence. Social presence describes how participants in an online community relate to one another (i.e., feeling connected). Cognitive presence is defined as, "the extent to which learners are able to construct and

confirm meaning through sustained reflection and discourse" (Swan & Ice, 2010, p. 1). Finally, teaching presence suggests that learning is impacted by the design of the course and the instructor's facilitation of the other two presences. This model proposes that it is the interaction of these three presences that allows for learning in online environments to occur.

OUR EXPERIENCES

As professionals in higher education, we have all led and participated in online learning opportunities. Collectively we have taught online graduate and undergraduate courses, participated in statewide online learning, and led school and statewide online PD. Our experiences have varied across these different opportunities and these variations are what piqued our interest in the intersection of the characteristics of effective PD (Desimone, 2009) and the conceptual framing of the CoI (Garrison, et al., 2000).

CONNECTING CHARACTERISTICS OF EFFECTIVE PD WITH THE COI

Because of our varied online experiences, we explored the alignment between effective PD and CoI through a critical lens focused on increasing teacher knowledge (Figure 1). We examined the alignment of Desimone's (2009) five characteristic of effective PD (e.g., duration, collective participation, active learning, content focus, and coherence) with the CoI's three presences (teaching, cognitive and social). Specifically, we reviewed the five characteristics of effective PD to better understand how these characteristics supported the presences in online learning communities. As displayed in the figure, the teaching presence of an online learning community provides structure of the learning community; therefore, it allows for social and cognitive presences be established and supported. We view teaching presence as the over-arching presence, with the social and cognitive presences being nested within the teaching presence (Figure 1). Teaching presence provides the structure for the online learning and therefore, establishes the meeting timeline and requirements (i.e., duration). Further, the PD element of collective participation is best supported within social presence. Content focus and coherence are aligned with developing a sense of cognitive presence given the focus of understanding and knowledge building in these three characteristics. Finally, active learning straddles social and cognitive presence since this characteristic supports both of these presences.

Now that we have drawn theoretical and research-based connections between the CoI and the characteristics of effective PD, it is important to consider practical applications for each presence and the effective PD characteristics associated with it. Further, given that there are a variety of ways to engage in online learning, it is necessary to think of these practical applications with both synchronous and asynchronous online activities. Below we will explore practical synchronous and asynchronous examples (see Table 1) for each of the three presences while also considering the 5 elements of effective professional development.

Teaching Presence with Duration

Teaching presence, which supports social and cognitive presence in the conceptual model presented in this chapter, includes active participation by the instructor and instructional design elements. According

Figure 1. Aligning effective PD characteristics and CoI framework

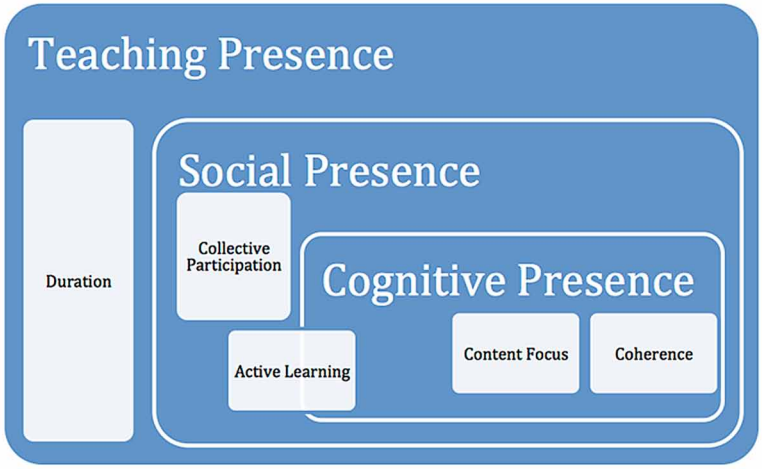

Table 1. Practical examples within CoI presences and containing PD characteristics

Presence	Practical Examples
Teaching Presence with Duration	Synchronous Community Meetings Asynchronous Discussion Boards
Social Presence with Collective Participation and Active Learning	Synchronous Video-Conferencing Meetings. Asynchronous Audio Chats
Cognitive Presence with Coherence Active Learning, and Content	Synchronous Facilitated Lectures. Asynchronous Voiced Lectures

to research, when the instructor actively engages in the course (i.e., is present in the online community) student participation increases (Blackmon, 2012). This is important to the CoI's concept of "teaching presence" because the instructional design, including learner responsibilities, of the online learning situates how the instructor facilitates the other two presences (e.g., social and cognitive) and dictates the learning within an online community. The instructional design of the online community supports the types of interactions the instructor has with the students and the peer interactions that will occur over time. When teachers engage in multiple hours of learning over a length of time, they are more likely to gain knowledge.

It is important to note that Rockinson-Szapkiw, Baker, Neukrug, and Hanes (2010) found no statistical difference for students using asynchronous and synchronous technologies in the area of teaching presences. This is important for PD providers to recognize as they organize and structure online learning opportunities. Two examples of teaching presence are synchronous community meetings and asynchronous discussion board participation:

- **Synchronous Community Meetings:** This example allows the participants in the PD to meet with the instructor in a one-on-one session. These meeting times may be predetermined at the beginning of the PD (i.e., office hours) or be facilitated through an as-needed basis (i.e., individual

meeting requests). Either way, these sessions occur live between the instructor and participant and occur over the length of the PD opportunity.

- **Asynchronous Discussion Boards:** Discussion boards are tools often used in online learning communities (Garrison et al., 2000). A discussion board allows for a prompt to be posted and then for participants to respond to the prompt. These responses are completed through a typed response. The use of discussion boards allows topics to be revisited as needed throughout the duration of the PD. Also, participants are able to generate thoughtful responses to prompts because they have time to think through their response versus "shooting from the hip" in a live conversation. The instructors of the PD are also afforded opportunities to craft thoughtful responses to participants; this can further engage the participants in the conversation and clarify any misunderstandings.

Social Presence with Collective Participation and Active Learning

Social presence in the CoI supports collective participation; a characteristic of effective PD. In terms of the CoI, when students feel more connected to one another learning increases (Garrison, et al., 2000). Similarly, research on effective PD suggests that teachers learn more when they feel they are part of a group, because their learning is supported (Desimone, Porter, Garet, Yoon, & Birman, 2002; Desimone, 2009). Both social presence and collective participation focus on participants' need to be members of the online learning community. Research indicates that social presence was the only presence where using a combination of asynchronous and synchronous technologies demonstrated a statistically significant difference in learning (Rockinson-Szapkiw, Baker, Neukrug, & Hanes, 2010). This makes sense given that social presence focuses on creating a sense of community for the learners. Using a variety of online tools allows for the PD participants to engage with their peers and the PD facilitator in multiple ways; thus, creating multiple paths of communication. Social presence requires participants to be active members in the learning community. Active learning calls for the participants in the PD sessions to be engaged in the learning process, and not act as passive recipients of information (Desimone et al., 2002; Desimone, 2009). When they engage in the PD activities they are actively learning. The following online tools provide examples of how to engage online learners in collective participation activities and strengthen social presence in the PD:

- **Synchronous Video-Conferencing Meetings:** Video conferencing tools are available in both paid and free-to-use platforms. Using live video-conferencing allows the instructor and participants to not only engage in real-time conversations but to also observe the social cues of facial expressions and body language within a conversation. These live attributes are helpful when working to create a structured and supportive online learning environment.
- **Asynchronous Audio Chats:** This online tool may not be as well-known or used as other tools in online learning communities. An audio chat works in basically the same manner as a text-based discussion board; however, instead of typing a response the participant makes an audio recording of his/her response and then posts this in the online forum. Everyone in the group is able to hear and respond to the recorded posting. Again, this tool allows the participant to add additional details that they may not include in a text-based discussion. To further develop the social presence in an online learning community, the voice recordings allow the participant to make postings that include different expressions, such as enthusiasm for a topic, in their responses.

Cognitive Presence and Coherence, Active Learning, Content Focus

Cognitive presence really is a deepening of background and newly learned knowledge (Swan & Ice, 2010). This component of the CoI aligns with coherence, active learning and content knowledge in the research on effective PD. Coherence is described as the relevance and value of the information to the teacher; in other words, how the teacher sees the information aligning with work in his/her classroom, school, district/county, community, and own professional learning goals (Desimone et al., 2002; Desimone, 2009). As previously mentioned, Desimone (2002, 2009) suggests that active learning must be an aspect of the PD for true engagement and knowledge growth to occur. In addition, the content knowledge within effective PD research suggests that the participant must value the content of the PD to engage in the learning opportunity (Desimone et al., 2002; Desimone, 2009). All three of these PD characteristics lend themselves to the idea of cognitive presence through the construction of meaning. While both synchronous and asynchronous tools are available to support teacher learning, Rockinson-Szapkiw, Baker, Neukrug, and Hanes (2010) indicate that there is no significant difference in the level of cognitive presence when using a combination of these tools:

- **Synchronous Facilitated Lectures:** Facilitating participants' learning by providing information on the topic is the instructor's role. When an instructor holds a live session (with or without video capabilities) they aim to deepen the participants' knowledge and support cognitive presence. Live lectures of material can be an interactive method that enables the instructor to actively engage the participants through questioning during the lecture. Further, as the instructor describes the content information he/she may integrate examples from the group member's individual professional backgrounds. When the instructor knows the participants well, then he/she can successfully suggest connections between the content and participants' professional experiences. This creates coherence within the online learning community.
- **Asynchronous Voiced Lectures:** Another way to provide content in an asynchronous online community is by creating voiced lectures. These voiced lectures include the content on the lecture slides with commentary that provides additional information about the topic. Just as in synchronous lectures, instructors can provide content that is relevant to the group by tying the topics to specific professional experiences of the participants. This requires the instructor to be well-informed regarding the participants' professional experiences, especially since all of the content and connections to the participants must be planned in advance since the voiced lectures are reviewed independently. Active participation is encouraged in voiced lectures through guided prompts and intentional pauses to allow time for reflection.

DISCUSSION

I applaud Dr. XXX on her knowledge base, the organization of this course, her ability to create a safe learning environment for each of her students where she was able to build a community of learners by supporting us, encouraging us to engage in reflection about best practices as well as our own current practices, and helping us think critically about important topics in regards to teaching reading. I LOVED this course! It wasn't a chore to complete the assigned tasks but rather a true blessing knowing that the information learned will be (and already has been!) applied in my own classroom. Thank you! Thank you! Thank you! (Personal communication, December 2014)

As we think about different conceptual frameworks when offering and engaging in online PD, we must keep the end goal in mind: teacher learning that results in student learning. As social constructivists we believe that teacher learning is deepened through opportunities to engage with one another about content and experiences. Online learning communities provide these engagement opportunities so that teacher learning and teacher change can occur.

The quote above, from this online community member, demonstrates how the social constructivist underpinnings of one particular literacy focused online graduate course created a space for learning to be supported through conversations with the instructor and her peers. Further, this response provides some context of how each of the CoI presences impacted the learning of this participant. If we dissect this participant's response further, it is evident that the characteristics of effective PD are also present in this response. Indeed, this participant discusses the organization of the course (teaching presence/duration), the creation of a community of learners (social presence/collaboration), and her engagement in reflection of best practices along with application to current classroom practices (cognitive presence/active learning, coherence, and content). This online learning community participant was supported in her learning and therefore she states that change in her practice did occur. This particular response aligns well with Desimone's (2009) fluid conceptual framework on teacher change. In this response, the participant indicates that she engaged in the online PD activities, increased her knowledge, her beliefs about reading instruction were impacted and she changed her instruction because of new knowledge and understanding of the content. While it cannot be determined from this quote whether student learning was positively impacted, it seems likely that this would be the case.

Given the popularity and possibilities, professional learning opportunities will continue to be offered online. Therefore, PD providers must think critically about the characteristics of effective PD and the online presences in the CoI that support the deepening of teacher knowledge in order to continue to develop teachers as learners through new and existing technologies. That said, even in the best-designed online experience, developers may still struggle with issues of evaluating participants' engagement and participation, growth and application to daily classroom teaching. When we think about the next steps in online learning PD, we categorize these steps into two tracks: research and practice.

IMPLICATIONS FOR RESEARCH

There are many directions that research in online instruction could take; however, based on our experiences we feel that there are some specific topics that most impact online instruction. First, research needs to focus on more finite details of online learning such as access and instructional design of online PD. Wilson (2013) suggests that research on online PD needs to focus on scale issues (i.e., providing effective PD to broad audiences in various timeframes). Next, research should focus on the features and instructional design of the PD opportunities so that teacher learning is impacted (Moon et al. 2014). Another area of research to consider is how educators (e.g. classroom teachers) who engage in online instruction feel supported in their learning (Elliott, Rhoades, Jackson, & Mandernach (2015). Finally, more research is needed in all of the presences (i.e., teaching, social, and cognitive) in regards to online learning in both synchronous and asynchronous contexts (Paquette, 2016).

IMPLICATIONS FOR PRACTICE

In addition to the implications of this work for research, we also suggest the following implications for practice; we advocate for the continued publication and discussion of research on online learning and PD so that PD providers are current in effective practices. This information will support PD providers as they consider the conceptual frameworks from both online learning research and effective PD research. Both of these areas must converge when online learning opportunities are planned for teachers. Various online tools (e.g. including those using independent activities, live streaming, etc.) must be explored to support the social constructivists stance and the facilitation of the information by providing participants opportunities to actively engage in their learning. PD providers who incorporate online learning communities into their PD efforts must be vigilant in their efforts as life-long learners to keep abreast of new and emerging technologies and research in order to offer teachers meaningful experiences. One tool for aligning effective PD and online learning opportunities for teachers is the Learner-Centered Professional Development (LCPD) (Polly & Hannafin, 2010). This framework provides PD facilitators with an outline to use focusing on the strengths, needs, and beliefs of participants. In addition, Polly and Hannafin state that technology can support this approach to effective PD.

Another practical implication of this work is the acknowledgment that online PD providers have different challenges and learning needs as they continue to grow as professionals (Elliott, et al., 2015). PD providers must continue to learn as well, so that they are able to design and implement the most effective professional learning opportunities for the participants with whom they work.

Finally, it is notable to consider that some PD providers are transitioning their face-to-face content to online environments. It is imperative that throughout this transition that they understand the three presences of the CoI and garner the support they need to make this change. As this transition occurs, Gregory and Salmon (2013) suggest adapting the content where possible, contextualize the information so that it is authentic, provide mentoring opportunities for those involved in this process, and encourage those who are effective at providing online learning opportunities to advocate and support others who are entering this type of learning context.

We believe that online professional development is a useful mode of professional learning for all educators. It is important for PD providers to understand research-based characteristics of PD and theoretical underpinnings of online learning in order to conceptualize, create, and deliver effective professional learning experiences.

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Section 5

Professional Development Pedagogies, Resources and Strategies

Chapter 25
Project-Based Learning Integration with Teachers Immersed in a Professional Development Initiative

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ABSTRACT

This chapter focused on the effectiveness of a professional development initiative on the planning, designing, and implementing project-based learning in mathematics, science, and special education classrooms. The purpose was to highlight project-based learning and the development of a professional development learning community that provided unique ways in which teachers engaged with a variety of learning tasks, assessments, and resources while practicing vital mathematics and science skills with diverse students. Attention was given to the importance of teacher attitude and confidence, collaboration, school support, barriers, and increasing student engagement. The case study method was used to amass and probe data. The results indicated valuable suggestions about the effectiveness of professional development for active engagement in project-based learning through networking, differentiating instructional strategies, creating new assessment tools, and gaining content knowledge and pedagogical skills.

INTRODUCTION

Teacher professional development in project-based learning advanced service to the profession by creating effective and scalable teacher supports, resources, and tools while cultivating and improving knowledge, leadership, and accountability with other educational professionals. Through a state grant initiative for project-based learning, the University faculty were able to provide twenty mathematics, science, and special education teachers with five to ten years of teaching experience with tuition-free graduate course credits. The overall goal was to expand the professional skill set designed to teach how to effectively incorporate project-based learning into a classroom setting, giving schools, districts and students the competitive edge.

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The professional development learning community included University faculty, University librarians, and teachers of mathematics, science, and special education. The expansion of the professional development learning community was imperative to successful planning and implementation of project-based learning. The purpose of this study was to insure that teachers, through a professional development initiative, gained knowledge about:

1. The project-based learning process,
2. Investigate, select resources, develop assessments, and experience teaching with project-based learning and differentiation, and then,
3. Design, implement, and assess project-based learning in the classroom to increase student learning within a professional development learning community.

A sequence of three courses was offered to prepare the mathematics, science, and special education teachers in grades four to eight to implement project-based learning. The introductory online course investigated the components of an exemplary project-based learning experience, finding resources, and planning and a tentative project-based learning experience to be implemented. The second course was a week-long, face-to-face summer seminar, where teachers created a driving question, collaborated, and formalized the project to be implemented. The third course focused on the theory and philosophies of Project-Based Learning, observation of the implementation of a project within the teacher participant's classrooms, and reflection and analysis by the classroom teacher on student achievement. The teachers had the opportunity to earn a total of seven semester-hours of graduate credit for completing the program that could be applied to license renewal and to a Master's degree.

BACKGROUND

Project-based learning (PBL) is an instructional model based on having students confront real-world issues and problems that they find meaningful, determine how to address them, and then act in a collaborative fashion to create solutions to problems (Barell, 2010). Herron, Magomo, and Gossard (2008) maintained that project-based learning can be defined as an individual or group activity that proceeds over a period of time, resulting in a product, presentation, or performance. Newell (2003) described PBL as emphasizing depth over understanding. Bender (2012) indicated two advantages of Project-based learning that stand out prominently in research:

- Project-based learning increases students' motivation and interest in completing the work required.
- Given this increased engagement with learning and content, research has shown that student achievement increases in Project-based learning.

Chu, Chow and Tse (2011), ascertained that project-based learning is an instructional strategy that, via participating in a project, appeals to students due to learning by way of problem solving, data collection, and discussion, as well as the presentation of the results as reports. Traditional teaching focuses on increasing knowledge through the memorization of facts and the retention of this new knowledge. Some will argue that there is disconnect between the daily lives that students live and the way they learn. In particular, educators are challenged with a new generation of students expecting a learning environ-

ment that accommodates their lifestyle that is global, multidisciplinary, inquiry-based, and reflective. The Partnership for 21st Century Learning, a leading advocacy organization focused on infusing 21st century skills into education endorsed helping students master core subjects and become skilled at communication, problem solving, critical thinking, global awareness, financial literacy and technology. Other constituents offered that mastering those skills means learning how to think critically and creatively, work collaboratively, use technology for research, and communicate clearly, and effectively. Yuen (2009) contended that students became motivated when taking learning in their own hands and using many different skills such as reading, writing, mathematics, science, and interpersonal interactions without realizing.

Research has shown that inquiry-based learning promoted cooperative learning among students from different ability groups in science classroom (Jimenez, Browder, Spooner, & Dibiase, 2012). Teachers placed greater attention on differentiating lessons and using accommodations within the project-based learning project. In addition, the teachers were able to reflect in a more meaningful way, to realize what different types of information were important and to ask questions that would help to create effective individual and cooperative learning.

Vega and Brown, (2013), disclosed when implementing project-based learning on their campuses, administrators and teacher leaders alike referred to both the structural and curricular changes they had to make. Furthermore, the development of an effective instructional strategy for conducting project-based learning activities has become an important and challenging issue, (Woods, 2010). Therefore, it is vital to provide quality professional development for teachers in the formation of projects to be directly implemented in their own school. Vega & Brown, (2013), also concluded that even though teachers and administrators indicated that many of their students have responded favorably to project-based learning, they indicated a number of students lacked specific skills needed to be successful while using project-based learning.

Professional Development and Design

The content of the first online, three credit graduate course offered in the spring was an Introduction to Project-Based Learning (PBL). In this course, the definitions of PBL were explored using specific project-based learning scenarios; participants considered the characteristics and benefits of project-based learning experiences. Throughout the course, participants reflected on the application of project-based learning in their own teaching.

The teachers requested assistance from the University reference librarians who maintained an up-to-date, relevant, and accessible collection of reference materials, including print and electronic resources. University librarians were significant providers of information literacy and helped the teachers discover how to find information using library databases and how to evaluate that information so that they produced better resources and projects (Cunningham & Lanning, 2002). The University Library staff offered exceptional service to the teachers by providing support with in-depth research and reference assistance, course-integrated instruction, and assistance with identifying new resources available.

The second three credit graduate course was the intensive summer seminar. First, teacher participants created an effective driving question and sub questions that were, open-ended, from real-life, and consistent with curricular standards and frameworks. Then, the teachers in the professional development learning community reflected on their knowledge of project-based learning designs and developed team projects for implementation during the Fall that were centered on national and state standards for

mathematics and science and utilized district pacing guides, unit outlines, and other leveled materials. Projects included a plan for community collaboration, increased differentiated instructional strategies, the creation of formative and summative assessment tied to the standards, and an implementation plan that includes a timeline. The University education faculty, mathematics faculty, science faculty, intervention specialist faculty and librarians participated in the intensive summer seminar.

The University faculty during the third course were onsite at least once to observe and concentrated on offering teachers feedback and conversation about the project work. Teachers and University faculty engaged in reflection, sharing, brainstorming, and study through the established professional development learning community, communicating through online discussions, face to face consultations in the schools, and on-campus meetings. A report out session was held at the University, where teachers shared their project implementation results from the fall, as well as supply an overview of their next project. All of the sample project-based learning units illustrated key concepts, strategies, implementation and evaluation.

To support the investigation of the impact of professional development on the planning and implementation of project-based learning the following research questions were addressed:

1. What were the important factors in teacher attitude and confidence in their ability to design a project-based learning project, and perceived school support for innovation toward using PBL during the professional development initiative?
2. What changes were generated to integrate project-based learning into teaching and instructional activities based on what was instilled during the professional development initiative?
3. Was there an increase in your student's engagement and achievement based on the greater attention to differentiation and accommodations discussed during professional development to improve the delivery or effectiveness of the project-based learning?

MAIN FOCUS OF THE CHAPTER

Issues, Controversies, Problems

Educators endeavoring to integrate project-based learning into teaching cope with an array of challenges. Institutional barriers are depicted as the need for professional development for project-based learning, teachers withdrawing from the professional development courses, the lack of access to resources and databases, inadequate technological support, and resistance from other teachers or administrators due to intrinsic beliefs about teaching and learning. In addition, using project-based learning can be time-intensive for both the student and teacher.

The need for professional development was evident when teachers spoke of the essential scheduling and organizational redesign. A growing realization for teachers encompassed the support they would require to redesign instructional methods to incorporate project-based learning. It was clear that the necessity of a dedicated administrator for the implementation of project-based learning was desired. In order to allot enough time for the project-based learning project, attention was given to cope with shortened daily schedules, or rotating class schedules due to school-wide activities. The managing of class periods and adjustments in the daily schedule required some coordination on the part of the teachers and willingness of administrators to make minor changes.

Initial recruitment of the twenty teachers proceeded smoothly. One teacher participant withdrew by the end of the first week in the first course due to a change in that teacher's employment for the upcoming year. Efforts were made to secure additional teachers. A replacement teacher participant was found and agreed to enroll, however, that teacher was unable to continue do to personal responsibilities. At that point in time, too much of an interval had passed for another participant to join the course. Prior to the beginning of the second course another teacher gave notice due to family commitments and there was one last teacher departure, prior to the third course due a reappointment in another school with new duties. A recurring challenge was retention with only sixteen out of twenty teachers completing the professional development three course sequence.

Another issue was student access to multiple supports for research because school resources and budgets varied from school to school. The local school district is the fifth largest in the state. However, fifty-seven percent of the students are economically disadvantaged and come from homes where adults do not have the educational background or resources to support student learning. Teachers during the concurrent professional development courses focused on locating and collecting electronic resources to reinforce the project-based learning activities and support student research. Onsite library media support staff increased their contact with students, so that the students could obtain necessary resources and materials to complete their project-based learning project. A major deterrent was that acquiring the essential resources was time-consuming for teachers.

Teachers collaborated to redesign district assessments and individualized assessment rubrics to reformulate assessment tools for project-based learning. The teachers chatted about how project design can be incorporated into activities that use scientifically-based research instructional strategies and highly effective practices for professional development for grades 4-8 learning. The student data was gathered, measured, and analyzed to inform the project by the self-reporting of participating teachers. Even with professional development related to project-based learning assessment, teachers struggled to convert data into usable databases to monitor and analyze student progress. The teachers used the district-approved assessment tools and adapted the district-approved assessment forms for project-based learning. A few of the teachers created their own databases to help them monitor student learning but yearned for more time to analyze the data more fully.

A central issue was the uneven technological resources and technology support in the schools to engage students in project-based learning. Teachers' facilitated scaffolded project-based technology learning that provided concrete evidence of performance through specific learning goals. However, some schools had limited or no access to iPads, tablets, and laptops. In addition, some teachers were just beginning to understand how technology could be infused into instructional methods and were not in total agreement about the use of technology for advancing learning.

Prior to the professional development, there was minor resistance to the idea of planning and implementing project-based learning in the district schools by teachers and administrators. Overall, at the time of the first professional development course, there was 85% support from administrators and other teachers. Credit must be given to the teachers who participated in the professional development graduate courses for project-based learning, who were committed and had a positive attitude. The teachers made a point of sharing what they were learning during the professional development course, demonstrated the direction of the project, and encouraged others to come and view the project-based learning design. After the second course, at least 95% of administrators and teachers were interested in observing the implementation of project-based learning in the classroom.

SOLUTIONS AND RECOMMENDTIONS

Project-based learning is a powerful tool to engage teachers and students in authentic, relevant projects that requires them to solve a challenging question. The professional development initiative provided effective project-based instructional strategies, so teachers could build projects that begin in science and mathematics and expanded to include additional disciplines. In this way, diverse students discovered standards–based content from across the disciplines, while building and refining 21st century skills through student leadership and collaboration with each other along with facilitation from teachers. The focus was on developing professional development that was replicable and scalable, across mathematics, science, and special education in grade levels from four to eight by aligning new state learning standards, project-based learning methods and guided by the state professional development standards.

Solutions and successful outcomes are measured in a variety of ways that are based on numerous factors. There are no easy solutions because every classroom environment is different. However, practitioners may benefit from five key recommendations and solutions for success offered by the author.

Need for Professional Development to Foster Confidence in the Ability to Design Project-Based Learning Projects and Maintaining a Positive Attitude

The professional development opportunities furnished the teachers with the knowledge, skills and disposition to be successful. The results from strengthening project-based learning through professional development for teachers were positive and showed growth. Teachers had a sound understanding of the fundamental core content in the disciplines but perceived increased confidence in their ability to design project-based learning projects through professional development. The teachers recounted that they had greater comprehension of new state learning standards in math and science. The professional development initiative heightened the teachers' interest in networking with other teachers and educational professionals. The teachers were excited to be teaching in the subject area and have the support of their administrator to differentiated instruction in the classroom for core content in the discipline.

A robust professional education environment existed for the teachers and University faculty to learn from one another. Teachers presented recommendations for future implementation of project-based learning experiences that revolved around implementing the project the second half of the year and a longer prescribed timeframe for completion. Other teachers advised going through the project and do it yourself before starting so that you can find any complications before the students begin the project. However, teachers disclosed that even with these recommendations, they discerned that they were working towards what they were trying to achieve. Additionally, teachers pursued the opportunity for a professional development learning community and made systematic efforts to plan and implement project-based learning with insight from other educators.

Improve Access to Technology and Secure More Resources through Partnerships

Most teachers had a good grasp of the necessary technology involved for the project-based learning teaching and moved forward to locate the technological resources necessary for their project. Teachers wanted the technology websites to focus on teaching and learning while all technology resources were vetted for merit and alignment to content standards. Some of the teachers were able to supplement the

school technology with personal computers and cell phones. Many teachers wished for a technology expert who would donate their time to set up a database to collect data.

The teachers and University professors discussed contacting the immediate community to draw on community reserves of knowledge for the future. Community partners can be a significant part of school advancement by providing expertise, financial contributions, and resource materials. The administrators and teachers compiled a list of possible partners by asset mapping the local resources based on the needs assessment for the project-based learning project. Efforts are being made by the administrators and teachers to establish and promote more local community partnerships for the upcoming school year.

A suggestion was made by a University professor to view the webpage for an educational foundation that was launched more than ten years ago in a neighboring school district. The purpose of this educational foundation is to promote educational initiatives undertaken by teachers and support personnel in the district. There is a general contribution page for donations, volunteering, and a page for an Adopt-a-Classroom or Fund-A-Project. This online website allows parents, grandparents, businesses and other interested persons to volunteer, to adopt or fund specific classrooms or provide content expertise. Interested individuals or businesses go online, click volunteer or select the class or select a particular project to fund and help provide resources that may be consumable or reusable that teacher may otherwise purchase with personal funds. An option for submitting grant proposals is also available. The educational foundation board is comprised of residents, parents of local school district students, business leaders and other community leaders. The board determines the awarding of the grants.

Increase Collaboration among Teachers and Administrators

The teachers communicated that fundamental scheduling and organizational redesign in planning and implementing a project-based learning project in the classroom was less complicated and demanding with the input of a group of teachers. A growing realization for teachers encompassed the support they would require to redesign instructional methods to incorporate project-based learning. It was clear that the necessity of a dedicated administrator for the implementation of project-based learning was desired and essential. The teachers made every effort to gain administrator support by increasing the administrator's knowledge about project-based learning and the educational impact. The teachers met with the administrator and shared what they were learning in their classes, discussed possible project ideas prior to the summer workshop, spoke with support personnel about the upcoming project and tentatively planned the project. In order to allot enough time for the project-based learning project, attention was given to cope with shortened daily schedules, or rotating class schedules due to school-wide activities. The managing of class periods and adjustments in the daily schedule entailed some coordination on the part of the teachers and willingness of administrators to make minor changes.

Effective implementation of project-based learning included active commitment by all teachers, support personnel, and administrators. The teachers made a point of sharing and demonstrating the direction of the project, and encouraged others to come and view the project-based learning design. Prior to the beginning of the project-based learning project, the teachers in the professional development initiative met with the special education or general education teachers to complete specific planning for their students. Additionally, planning meetings occurred throughout the first weeks of school and intermittently during implementation. If the expectation is for everyone to embrace project-based learning, then training is necessary in project-based learning methods with opportunities for coaching from the teachers who have already successfully completed professional development and implemented projects.

Allocate Sufficient Time for Planning and Implementing

The teachers emphasized that they planned for additional time to organize project-based learning instructional materials because this was a new venture. The teachers increased collaboration with other teachers implementing PBL during the summer seminar and that teamwork continued throughout the year. Quality time was devoted to researching and selecting new resources for project-based learning in mathematics and science. Teachers collaborated and developed more effective, authentic assessment tools based on district-wide assessments for project-based learning instructional activities as a group rather than as individuals. The input from teachers in the professional development initiative generated instructional activities that focused on more 21st Century skills such as problem solving, teamwork, communication, and application of technology.

Teachers implemented their project-based learning projects in their classrooms during the fall. Instructional activities were organized around the national and state standards with particular emphasis on differentiation and standards identified by the districts as troublesome. As teachers created projects with their students, they explicitly utilized the standards in order to shape the project to align with their own curriculum. The standards for mathematical and scientific practice described varieties of expertise that mathematics and science educators at all levels should seek to develop in their students. Students' ability to make sense of problems and persevere in solving them, to reason abstractly, to construct viable arguments and critique the reasoning of others, to model with mathematics, use appropriate tools strategically and attention to precision are all crucial for success in project based settings.

The activities identified in each project allowed teachers to carefully examine the standards and map these to their own curriculum. This was accomplished by teachers and University faculty discussing the interpretations of the various standards, the incorporation of prior knowledge, identifying required learning experiences based on these standards, needed information search skills, matching instructional strategies and materials to identified student learning experiences, and by selecting or developing appropriate assessment strategies and items. The collaboration within the professional development initiative increased the ease of addressing content standards. The activities utilized throughout sanctioned a clear articulation of the designed projects into the curriculum and afforded guidance for possible changes in the course of study as more project-based learning is developed and applied in the curriculum. The application of project-based learning has compelled teachers to acquire and internalize new instructional practices and identify a wide range of resources to meet the needs of diverse abilities and competencies. The professional development courses granted the opportunity for teachers to have project-based learning experiences that advocated reflective practice and demonstrated working collaboratively in learning environments that immersed them in solving problems collaboratively with a focus on differentiation. The value and benefit of preparing teachers through professional development for project-based learning empowered teachers to use real life applications and invest in critical reflection to increase student inquiry and learning.

Concentrate More Attention on Differentiation and Accommodations

Project-based learning empowered students while the teachers facilitated and the learning environment was transformed. Greater attention to differentiation and accommodations improved the delivery and effectiveness of project-based learning. Teachers disclosed that without differentiating or accommodations, the students in the classes would not have been able to complete the tasks assigned with the proj-

ect. Several teachers provided students with a guided information sheet asking for specific information that would help them complete future project assignments. Other teachers created a working timeline in a graphic organizer to plan daily work. Overall, teachers developed assorted options for the student learning modalities that included reading to self, lecture, hands-on, pictures, research and video. These options proved to be valuable by addressing the different ways students learn.

The teachers conveyed the following successful aspects of focusing on differentiated instruction and accommodations for diverse students:

1. An increase in student engagement and enthusiasm during project-based learning in mathematics and science was visible;
2. Observed expansion of collaboration among diverse students including English language learners and inclusion students;
3. Stated that students acquired some influence not only about the direction of learning but enhanced self-confidence, so that the student could do more and be more than originally expected; and
4. Monitored student understanding through assessments and provided constructive feedback through project-based learning criteria.

There are many pedagogical advantages such as motivating students, supporting higher-thinking and extending scope, and facilitating authentic learning across disciplines. Teachers were able to emphasize certain project-based learning concepts to create different learning targets for diverse students in mathematics and science. The teachers differentiated learning for all learners by reviewing new and challenging content terminology. Furthermore, the teachers scaffolded student learning by creating multiple pathways for choice making and use of their time by reducing the tasks into manageable learning segments. A bonus was that there was minimal financial cost to integrated project-based learning in most of the classrooms. The inclusive nature of project-based learning allowed teachers to differentiate instruction more easily for a wide-range of student abilities.

As teachers, we need to reflect on our instructional methods and approaches. Having an open mind, coupled with experience and knowledge of our student population allows us to assess and see if our students are growing and learning. Through collaboration, we can support one another in continuing the process and share what has worked well with one another. The value of experience in conjunction with professional development opportunities often leads to significant gains in student achievement, teacher and learner motivation, and an open attitude towards discovery.

FUTURE RESEARCH DIRECTIONS

This partnership with local school district teachers and University faculty has launched new discussions about what extent the professional development initiative improved the project-based learning planning and implementation in the classrooms and student engagement. A professional development learning community provided unique ways in which teachers engaged with a variety of learning tasks, assessments, and resources. Further research is needed to explore collaboration and active engagement in project-based learning through networking, differentiating instructional strategies, creating new assessment tools, and gaining content knowledge and pedagogical skills. The idea of co-teaching initially and later mentoring or coaching other teachers in project-based learning project planning and implementation would be

beneficial to cultivating local school district experts. The connotation of this research targets the need for frequent, high-quality professional development opportunities to address coaching and development of teachers who will implement the project-based learning and transform their teaching practices with techniques that will increase student participation, investigation, and how to think critically and creatively. Continued research in the area of project-based learning within a professional development learning community that collaboratively provided support and assisted in construction of effective lessons to equip students in low socioeconomic and underserved communities with the knowledge and skills necessary for a project-based learning project can be invaluable.

CONCLUSION

There is a limited amount of current research that supports planning and implementing project-based learning in the classroom and much work remains for researchers. Therefore, this book chapter contributes considerably to the questions of how to effectively plan and implement project-based learning in the classroom, what administrative support is necessary, and what professional development resources are mandatory for success. The immersion into project-based learning professional development community was just the first step for the teachers to examine their own beliefs and to be actively engaged in project-based learning. More research needs to be accomplished to explore the application of project-based learning in order to determine the advantages or disadvantages of using project-based learning for mathematical and science instruction of diverse students.

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Chapter 26
Middle School Teachers' Sensemaking of Job-Embedded Learning

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ABSTRACT

The purpose of this chapter is to discuss a multi-case study on how middle school teachers constructed understandings of their job-embedded learning experiences. The aim of the study was to explore how teachers made sense of and gave meaning to their learning experiences that occurred during the school day as they engaged in the work of being a teacher. Job-embedded learning experiences referred to any formal or informal learning opportunity that was grounded in the context of the school day and characterized by active learning and reflection. This chapter includes a detailed overview of the literature on effective professional development and the characteristics of job-embedded learning as each relates to the middle school context; the background and significance of the study; a description of the research design, methods, and procedures; a discussion of the research findings and subsequent implications for educators; and suggestions and recommendations for practice and future research.

INTRODUCTION

Scholars contend that the improvement of professional learning is critical for transforming schools, improving teacher quality, and increasing academic achievement (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Guskey, 2009). Furthermore, scholars assert that by enhancing the knowledge, skills, and practices of teachers through embedded, ongoing, and intensive professional learning within the context of the teacher's work environment, the achievement of students and teachers will be greater (Darling-Hammond et al., 2009; Guskey & Yoon, 2009; Jaafar & Earl, 2008; Leithwood & Earl, 2000; Wills & Sandholtz, 2009). However, most of the professional development in which teachers engage follows the traditional format of one-stop workshops in which little opportunity is given for collaborative planning and implementation of knowledge and skills learned in the teachers' work context (Birman, Desimone, Porter, & Garet, 2000; Butler, Lauscher, Jarvis-Selinger, & Beckingham, 2004;

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Garet, Porter, Desimone, Birman, & Yoon, 2001; Guskey & Yoon, 2009). These traditional forms of professional development have been widely criticized as shallow, top-down, and ineffective (e.g., Birman et al., 2000; Butler et al., 2004; Garet et al., 2001) while ultimately lacking the follow up and support necessary to deem such forms of professional development effective (Guskey & Yoon, 2009; Zepeda, 1999, 2006, 2011a, 2011b, 2012b, 2015). Thus, the professional learning of teachers is a task that must be assumed and revised if teachers are expected to improve their professional practice and ultimately increase student achievement and growth.

Consequently, little research has been conducted on alternative forms of professional development that include the key features of effective practice (Garet et al., 2001), the context and form of professional development in which teachers engage (Wei, Darling-Hammond, & Adamson, 2010), and the processes teachers use to make sense of professional development (Coburn, 2001). Greater attention to how teachers make sense of their professional learning experiences might offer ideas for revising current professional development practices as well as initiating changes in how teachers are supported during the school day. Therefore, the purpose of this chapter is to examine a study on how middle school teachers construct understandings of their job-embedded learning experiences. In particular, the aim of this study was to explore how middle school teachers make sense of and give meaning to their learning experiences that occur during the school day as they engage in the work of being a teacher.

BACKGROUND

Professional Development

Numerous scholars have studied what constitutes effective professional development (Darling-Hammond et al., 2009; Desimone, 2011; Garet et al., 2001; Guskey, 2003; Guskey & Yoon, 2009; Hirsh, 2009; Wayne, Yoon, Zhu, Cronen, & Garet, 2008; Wei et al., 2010). Collectively, these scholars agree that the key features of effective professional development include a focus on content, an emphasis on active learning, attention to coherence, consideration of duration, and the encouragement of collective participation (Borko, 2004; Elmore, 2002; Wayne et al., 2008; Yoon, Duncan, Lee, Scarloss, & Shapley, 2007; Zepeda, 2011b, 2012b). Understanding what makes professional development effective is critical to improving both teacher and student learning (Darling-Hammond & Richardson, 2009; Desimone, 2009; Garet et al., 2001). Furthermore, a focus on effective professional development not only increases the transfer of new knowledge and skills into practice, but it also encourages refinement of teaching and a sense of renewal (Pate & Thompson, 2003).

In addition, numerous research studies explicate the relationship among effective professional development, teacher quality, and adult learning. For instance, for professional development to have a positive influence on teacher learning, it should:

- *Incorporate hands-on activities (Borko, 2004 ; Glickman, Gordon, & Ross-Gordon, 2009)*
- *Meet the needs of the teacher (Fenwick, 2004 ; Zepeda, 2011b , 2012b)*
- *Be sustained, embedded, and ongoing (Darling-Hammond & McLaughlin, 2011 ; Garet et al., 2001 ; Hirsh, 2009 ; Yoon et al., 2007 ; Zepeda, 2011a , 2011b , 2012b)*
- *Be learning centered, knowledge centered, assessment centered, and community centered (Coggshall, Rasmussen, Colton, Milton, & Jacques, 2012 ; Hawley & Valli, 1999)*

- *Encourage collective participation (Garet et al., 2001 ; Murphy & Lick, 2005 ; Guskey, 2003 ; Penuel, Fishman, Yamaguchi, & Gallagher, 2007)*
- *Be content centered (Banilower, Heck, & Weiss, 2007 ; Borko, 2004 ; Cohen & Hill, 2001 ; Garet et al., 2001)*
- *Be longer in duration (Cohen & Hill, 2001 ; Supovitz & Turner, 2000)*

Certainly, additional features or factors may contribute to the overall effectiveness of a professional development program, such as leadership, resources, organizational features, school climate and culture, or community (King & Newmann, 2000), but the situated nature of professional learning cannot be ignored if professional development is to be effective in the future. Opportunities for job-embedded learning offer a viable avenue for educators to transform their beliefs, knowledge, and practices within the context of their schools while adhering to the key features of effective professional development.

Job-Embedded Learning

Wood and McQuarrie (1999) defined job-embedded, or on-the-job, learning as "learning by doing, reflecting on the experience, and then generating and sharing new insights and learning with oneself and others" (p. 10). Likewise, Croft, Coggshall, Dolan, Powers, and Killion (2010), Desimone (2011), Redding and Kamm (1999), Wood and Killion (1998), Wynne (2010), and Zepeda (2011a, 2011b, 2012b) agreed that job-embedded learning is grounded in the daily practice of teachers and, as such, presents a viable way to foster both formal and informal learning. Job-embedded learning aligns with and connects learning to teacher practice as it facilitates the application and adaptation of new skills (Coggshall et al., 2012; Sparks & Hirsh, 1997; Zepeda, 2000, 2006). Hence, job-embedded professional learning maintains a focus on student learning and encompasses the key features of effective professional development.

Job-embedded learning typically occurs informally, although more formal opportunities exist. Formal learning opportunities are those that are planned, structured, and generally focused on a predefined topic (Ginsberg & Wlodkowski, 2010; Merriam & Brockett, 2007; Pate & Thompson, 2003). Formal learning opportunities include activities such as conferences, certification courses, or graduate coursework. In the context of job-embedded learning, formal learning might refer to Critical Friends Groups (coordinated by the Harmony School Education Center), book studies, lesson studies, or learning circles (Zepeda, 2011a, 2012b). Conversely, informal learning refers to loosely structured, continuous learning that is often the result of collaboration and interaction (Ginsberg & Wlodkowski, 2010; Marsick, Watkins, Callahan, & Volpe, 2006; Merriam & Brockett, 2007; Pate & Thompson, 2003). Informal learning can occur anytime or anywhere. Specific to job-embedded learning, informal learning may take place during peer coaching, mentoring, lesson reflection, and collaborative meetings.

Several scholars have expanded our understanding of job-embedded learning by describing the essential conditions or attributes necessary for successful implementation (Darling-Hammond & McLaughlin, 2011; DuFour, 2004; King & Newmann, 2000; Zepeda, 2011a, 2011b, 2012a, 2012b). For example, job-embedded learning follows adult learning principles, relies on collaboration, occurs within the context of school, and is supported by sufficient resources. Finally, Zepeda (2012a) identified three attributes that help facilitate job-embedded learning: Successful job-embedded learning is relevant to teachers, includes feedback, and encourages the transfer of new knowledge and skills into practice.

Job-embedded learning has many noted benefits. Empirical studies have found that job-embedded learning "enhances reflection, promotes collegiality, combats isolation, makes learning more relevant to

each teacher, increases transfer of newly learned skills, supports the ongoing refinement of practice, and fosters a common lexicon that facilitates dialogue and improvement" (Zepeda, 2012b, pp. 126–127). In addition, Wood and McQuarrie (1999) reasoned that job-embedded learning decreased the amount of time spent away from the job, encouraged immediate application of new knowledge and skills, typically cost less, and considered more fully how adults learn best. Finally, Coggshall et al. (2012) noted that job-embedded professional development was useful to both teachers and evaluators because it provides "multiple opportunities for teachers to document and evaluators to collect evidence to determine the extent to which teachers analyze the impact of their instruction, reflect appropriately on that analysis, and actively collaborate with colleagues" (p. 20). Undoubtedly, job-embedded learning is essential in an era that underscores the importance of teacher and school accountability.

Professional Development in the Middle School

Middle school scholars recommended that professional development should be ongoing, focused on student outcomes, aligned with standards, and embedded in the work of teachers (Hirsh, 2004; Jackson & Davis, 2000; National Middle School Association, 2010; Pate & Thompson, 2003). For instance, the National Middle School Association's seminal position paper titled *This We Believe: Keys to Educating Young Adolescents* (2010) recommended professional development focused on student learning and grounded in data, reflection, and collaboration. Furthermore, the National Middle School Association, now known as the Association for Middle Level Education, reasoned that professional development should be continuous and based on the identified needs of teachers. Similarly, Jackson and Davis (2000) argued for professional development that is "results-driven, standards-based, and embedded in teachers' daily work" (p. 110). Finally, Pate and Thompson (2003) provided a list of seven recommendations for professional development in the middle school that mirror research on effective professional development. Consequently, professional development in the middle school should be focused on content, offer opportunities for active learning; encourage collective participation embedded within the context of practice; include ongoing support with follow up; and align with federal, state, and local expectations.

Sensemaking

Sensemaking is a process of meaning making and interpretation via negotiation and co-construction of knowledge (Glynn, 1997; Weber & Glynn, 2006; Weick, 2012; Weick, Sutcliffe, & Obstfeld, 2005). It is often characterized as how people come to understand and adapt new knowledge within existing knowledge in the context of their daily lives (Coburn, 2001; Coburn & Woulfin, 2012). Sensemaking occurs when one uses prior knowledge and experience to understand new knowledge and experience. Sensemaking is considered an individual and collective process of negotiation that ties the worldviews, understandings, and beliefs of individuals to their actions (Weick, 1995).

Most of the research on teacher sensemaking is focused on the interpretation and implementation of educational policy (Coburn, 2001, 2005; Coburn & Woulfin, 2012; Schmidt & Datnow, 2005). However, a few scholars are beginning to explore teacher sensemaking within the context of professional development (Blignaut, 2008; Colestock & Sherin, 2009; Rosebery & Puttick, 1998). The current study explores how middle school teachers engaged in the process of sensemaking to negotiate and construct meaning of their job-embedded learning experiences.

MAIN FOCUS OF THE CHAPTER

Purpose of the Study

The purpose of this study was to examine how middle school teachers made sense of and gave meaning to their learning experiences that occurred during the school day as they engaged in the work of being a teacher. The overarching research question for this study was: How do teachers construct understandings of their job-embedded learning experiences? This research question was intentionally broad to allow the researcher the flexibility needed to explore how teachers make sense of and give meaning to their formal and informal learning experiences during the school day. In addition, the inclusive nature of the overarching research question allowed the researcher to consider how the nature of professional development—such as its format, duration, and content, or the school culture and context—influenced how teachers constructed understandings of their job-embedded learning experiences.

Theoretical Framework

A sensemaking framework was used to unpack teacher knowledge construction. According to Weick (1995), sensemaking is the ongoing, social process individuals use to make sense of or construct understandings of their world. Sensemaking is a way of organizing and assigning meaning to experiences or ideas (Weick et al., 2005). Sensemaking theory assumes interpretation and action are influenced by the negotiation of social cues and the co-construction of knowledge within the context and the culture of the environment (Choo, 2006). Specific to professional development, Coburn (2001, 2005) noted that sensemaking is not only influenced by workplace norms and patterns but also by the existing worldviews and experiences of those engaging in the sensemaking process. Teachers' beliefs and prior experiences influence how they understand, interpret, and adapt new knowledge, just as the conditions of their learning environments affect meaning making. Ultimately, the consideration of teacher worldviews and sensemaking processes will be essential to understanding how teachers construct understandings of their job-embedded learning experiences.

Study Design

A qualitative research approach was used to examine how teachers constructed understandings of their job-embedded learning experiences as qualitative research is interpretative and seeks to understand the meaning people give to their experiences (Creswell, 2007; Merriam, 2009). More specifically, an ethnographic, multi-case study design was used. Case studies offer researchers the opportunity to study the processes, perspectives, and experiences of a person, group, or phenomenon in its original context and culture. A multi-case design was implemented because it allowed the researcher to examine multiple cases within a single context. The addition of ethnography to the case study design highlighted the influence of context and culture on the understanding and interpretation of knowledge construction and experiences (Merriam, 2009).

Data were collected via interviews, shadowing, and teacher learning logs. First, each teacher participated in an initial, in-depth interview. The initial interview occurred face-to-face and used a semi-structured interview guide to gather data about each teacher's unique worldview, specifically focusing on her beliefs about professional development and her experiences with job-embedded learning. Next, the researcher

shadowed each teacher for one school day or eight-hour period as she engaged in job-embedded learning experiences. The researcher documented in a field journal how each teacher interacted with and co-constructed meaning during the school day by focusing on the talk and actions of each participant as she engaged in the work of being a teacher. In addition, the researcher chronicled insights and questions during and after shadowing each teacher to aid in data analysis.

Teacher learning logs were used to document each teacher's job-embedded learning experiences. More specifically, after any formal or informal job-embedded learning experience, each teacher wrote about her experience and uploaded supporting documents in a learning log that was submitted to the researcher weekly. Each teacher was given potential prompts to help facilitate her reflection and writing; however, it was ultimately the decision of each teacher to decide what and how often to write about her job-embedded learning experiences. Follow-up email exchanges were used to further explore or clarify the content of the teacher job-embedded learning logs. The purpose of the follow-up email exchange was to maintain constant, open communication between participant and researcher. Constant communication during the data collection period was essential to understanding teacher sensemaking of job-embedded learning experiences.

Purposeful sampling was used to select the research site for this study. In selecting the research site, the researcher located a middle school in Georgia that embraced the leadership and organizational characteristics of effective middle schools. Specifically, the school met the criteria set forth by the National Middle School Association (2010) related to ongoing professional development and organizational structures that foster purposeful learning. Participants were initially recruited during a post-planning faculty meeting. Although participants were recruited through a desire to take part, the sample of four participants represented the demographics of teachers at the research site remarkably well.

Within-case and cross-case analysis was used to examine the collected data. This approach to analysis allowed the researcher to analyze each teacher categorically as a single case before collectively considering the commonalities across teachers or cases (Creswell, 2007). However, both the within-case and cross-case analysis used the constant comparative method to generate inductively an understanding of how teachers constructed understandings of their job-embedded learning experiences. Evolving from grounded theory, the constant comparative method required the researcher to search for the similarities and differences of data to generate categories and themes (Bernard & Ryan, 2010). Ultimately, five themes were generated to present and discuss the results of the data analysis.

Context of the Study

This study took place in Willow County Public School District (pseudonym [WCPSD]), a small suburban school district, located northeast of a large metropolitan city in Georgia. The Georgia Department of Education reported that WCPSD served 7,256 students during the 2012–2013 school year, while the WCPSD website estimated enrollment for the 2014–2015 school year to reach 6,982 students. WCPSD is composed of 14 schools—eight elementary schools, three middle schools, one ninth-grade academy, one high school, and one alternative education school. Overall in the school district, 63% of students qualified for free or reduced-price meals, 14% qualified for special education services, and 14% were classified as English language learners in 2014. The per-pupil expenditure for 2014 was $8,307.95.

Originating as a high school and then a junior high school, North Willow Middle School (pseudonym) has established itself as the highest performing middle school in WCPSD as well as one of the highest performing middle schools in the Regional Educational Service Agency district as evidenced by its many

accolades and achievements. North Willow Middle School has also outperformed most middle schools in the state of Georgia according to recent standardized testing.

With regard to demographics, the student population at North Willow Middle School has remained consistent as much of the outlying community is composed of housing subdivisions rather than rental properties and apartment complexes. In 2014–2015, the year of this study, approximately 550 students in Grades 6–8 attended North Willow Middle School. The student demographic at North Willow Middle School was 88% white, 7% Hispanic, 1% Asian, 1% black, and 3% multi-racial. Approximately 55% of the 550 students at North Willow Middle School received free or reduced-price meals, while 16% of the student body received special education services and 10% received gifted services.

Findings

Within-Case Analysis

Given that the intent of the research was to examine how teachers construct understandings of their job-embedded learning experiences, each participant represented one case of a multi-case study design. For each case, the unit of analysis focused on how that particular teacher made sense of or gave meaning to what she learned during the school day. The boundary of each case was established as the learning that participants experienced during the school day while they each engaged in the work of being a teacher.

From the onset of data collection, the researcher began to concurrently analyze data collected from each participant's initial interview, learning logs, shadowing session field notes, and any relevant documents and other artifacts. Each participant was analyzed inclusively using the constant comparative method to identify emergent codes and categories within each case and unit of analysis. The emergent codes and categories later provided the foundation for cross-case analysis and the establishment of themes.

Case 1: Amanda

Amanda has taught at North Willow Middle School for 4 years. Currently, she teaches regular, advanced, and gifted seventh-grade language arts and reading. Amanda is a member of the school leadership team, the school's book study group, and the Response to Intervention committee. She is also the school's language arts and reading department chair and the seventh-grade team leader. Amanda is certified in middle grades language arts, reading, and social studies as well as early childhood education. In addition to her teaching credentials, Amanda holds three advanced degrees and is certified in gifted education. She is a member of the International Reading Association.

With 18 years of teaching experience, Amanda has taught at several schools prior to her tenure at North Willow Middle School. She taught seventh- and eighth-grade reading in inner-city Kansas City, Missouri, for 2 years; seventh-grade reading in an affluent suburb of Omaha, Nebraska, for 10 years; fifth grade at a Title I elementary school in WCPSD for 3 years; and sixth-grade language arts and reading at a different middle school in Willow County for 3 years. She is currently in her fourth year at North Willow Middle School. Amanda is a content and grade-level leader in her school. She expresses her opinions and beliefs with conviction and professionalism while acknowledging the thoughts of others.

During her initial interview, Amanda defined job-embedded learning as "on-the-job training to make myself a better teacher, but done on the job, not outside of school." However, Amanda noted that she does a lot of independent learning outside of school and brings those ideas into the classroom. She pon-

dered if job-embedded learning must occur within the walls of the school or if any learning experienced by a teacher, regardless of location and time, should encompass job-embedded learning. Despite her uncertainty about the meaning, expectations, and limits of job-embedded learning, Amanda was able to provide several examples of how she learns during the school day, such as the book study, collaborative meetings, and hallway check-ins.

Amanda used the job-embedded learning logs to reflect on several formal school meetings, such as content, grade-level, and leadership team meetings. Collectively, she found necessity and value in each meeting; however, meaningfulness was influenced by the delivery, relevancy, and applicability of presented content. For instance, in a learning log entry about content meetings, Amanda noted:

It's always useful to find out if you are on the same page as your cohorts. It gives us both a sense of direction and solidifies our expectations. The collaboration and understanding of what we expect kids to walk in knowing and what we expect them to learn over the year was powerful. It reaffirmed our common goals and missions. It helps us to hold each other accountable and gives us a true sense of all being in this together.

Amanda found content meetings meaningful because the nature of each meeting was collaborative, relevant to her classroom, and afforded her the chance to apply her content and instructional knowledge to new tasks. Furthermore, the opportunity to discuss successes and failures, set expectations, and plan for student learning with her colleagues, both formally every week and informally daily, encouraged Amanda to continuously refine her teaching knowledge and skills.

Case 2: Sarah

Sarah has taught for 24 years; however, this is her first year teaching at North Willow Middle School. She was transferred to North Willow at the end of the last school year from another middle school in WCPSD. Sarah teaches sixth-grade science and social studies and is certified in middle grades science and social studies, high school science, and early childhood education. Sarah holds three advanced degrees and is a member of the Professional Association for Georgia Educators.

Prior to teaching at North Willow Middle School, Sarah taught sixth and seventh grades for 11 years at a middle school in a neighboring county to WCPSD, 5 years as a fourth- and fifth-grade teacher at an elementary school in WCPSD, 5 years as a sixth-grade science and social studies teacher at a different middle school in WCPSD, and 3 years as an eighth-grade science teacher at the third middle school in WCPSD. Sarah is vocal with her opinions and beliefs with fellow teachers; however, she is very reserved when in the company of administrators. She relentlessly advocates for her students and goes above and beyond what is required in the classroom to ensure the success and well-being of her students. Sarah's classroom is inviting to students and clearly shows her dedication to designing lessons that are interactive, project based, and student centered.

During her initial interview, Sarah defined job-embedded learning as "something that occurs on the job to help you with your job during the hours that you are at work." She believed job-embedded learning was confined to learning experiences that occurred during the school day and offered information and ideas that were relevant to her as a teacher. As Sarah's interview progressed, she refined her definition of job-embedded learning to include "learning from the people who you are around." Her revision underscored the importance of collegial relationships when teachers seek to improve and refine their teaching knowledge and skills.

Sarah's learning logs proved insightful as she reflected on a variety of job-embedded learning experiences, including content meetings, administrator and academic coach observations and feedback, and digital learning modules provided by the Georgia Department of Education. First, Sarah stated numerous times how often she relies on her colleagues during content and grade-level meetings as this is her first year at North Willow Middle School. She wrote in her learning logs:

Content planning is huge! I'm not familiar with the social studies that I'm doing, but from what little time we've already had to plan, I've learned so much from the people who know about it. They have given me a lot of resources, past lesson plans, and ideas for projects. For science, they have shown me every experiment, how to set it up, and given me a list of what I'll need. It all has been so helpful!

Sarah admitted that she may not use everything her new colleagues have shared. She stressed, however, that "team work is the only way to survive. Never forget [that] those new teachers or new to the building teachers are not used to what is going on." Sarah's transparency about the importance of collegiality was a common theme throughout her learning log entries. Specifically, Sarah used the dedicated work time to refine her existing knowledge and skills by negotiating the new information and ideas presented by her peers. At the conclusion of the meeting, Sarah was able to reflect on how she co-constructed new knowledge to create a better understanding of the social studies content. She was also able to develop a strategy for implementing lessons and activities to meet the expectations of the standards, the needs of her students, and the fit between her teaching identity and philosophy.

Case 3: Leslie

With 14 years of experience at the research site, Leslie is a veteran social studies teacher at North Willow Middle School. She currently serves on the school council, sponsors the Junior Beta Club, and is coordinator of Katie's Closet, a program that collects and donates used clothing to students in need. In past years, Leslie has been a member of the school leadership team and the department chair for the social studies department. Leslie holds three advanced degrees and is certified to teach middle school social studies and language arts. She also holds endorsements in gifted education and teacher support specialist.

Before teaching at North Willow Middle School, Leslie was a fifth-grade teacher for 1 year in an impoverished area of South Carolina. She then taught sixth-grade social studies, language arts, and math for 14 years at a metro-area middle school in Georgia. Leslie is an innovative teacher and popular among her peers as someone who never does the same thing twice. She dedicates herself to learning about her students and to staying current with trending instructional strategies and reading to expand her content knowledge. Leslie plans to retire at the end of the school year.

In her initial interview, Leslie defined job-embedded learning as "just what you learn from your students, what you learn yourself by reading things or taking some classes, as well as what you learn from your other colleagues and anything in your environment." Leslie acknowledged that she was not familiar with job-embedded learning prior to the study; however, her definition reflects the general nature of job-embedded learning as specific to one's working environment and contingent on the relationships of colleagues. Leslie provided several examples of job-embedded learning to support her definition. For instance, she has participated in the following formal learning experiences at North Willow Middle School: book studies; collegial observations and feedback; peer mentoring; content, grade-level, and

leadership team meetings; content workshops; and conferences. Leslie also mentioned several informal learning experiences, such as impromptu hallway conversations and content check-ins.

One of Leslie's most interesting learning log entries chronicled her time mentoring a student teacher. During an initial meeting with her student teacher's advisor, Leslie compared her teaching experience to the requirements and expectations of her student teacher:

One thing the professor mentioned is that student teacher candidates are to use academic language in their lessons. As I'm sitting there listening, I'm thinking about my own lessons and I don't think I totally use academic language or reinforce it with my students. I guess I just automatically assume my students know what I am talking about when I say compare and contrast or analyze.

She continued:

I didn't realize I would be focusing so much on my own teaching. I plan to be more conscientious of using and explaining these terms to the students better. I want them to have a better and total understanding of what is being asked of them.

Despite Leslie's intent to retire at the end of the school year, she found meaning and value in mentoring a student teacher candidate. Not only did she enjoy helping to prepare the next generation of teachers, she used the mentorship as a way to reflect on and refine her teaching practice for the benefit of her current students.

Leslie used the job-embedded learning logs to reflect on several informal learning opportunities. On one occasion, Leslie recollected how disappointed she was that her students did not perform well on a social studies test. She compared her results with that of another colleague and discussed a plan for remediation and ways to prevent similar results in the future. In a separate instance, Leslie described how visiting other teachers' classrooms during planning could spark new ideas and applications. She stated:

I walked into Shanna's room and asked what she was doing. She said that she was thinking of making a foldable or using a choice board. I loved both of the ideas and so now I'm working to do these in my classroom.

In a follow-up conversation, Leslie remarked, "Just walking down the hall and seeing how people do things, you learn, you know . . . oh, I could tweak this or do that." Thus, Leslie's impromptu hallway chats and classroom visits helped her stay flexible and enthusiastic about her subject. In fact, another participant in the study commented on how much she admires Leslie because she never uses the same assignment twice, even in the later stages of her career.

Case 4: Emily

Emily is in her first year teaching regular education language arts and reading at North Willow Middle School. Previously, she taught 1 year as a special education preschool teacher in a neighboring county, 4 years as a high school special education teacher also in a neighboring county, and 13 years as a middle school special education teacher in WCPSD. Emily holds three advanced degrees and is certified to teach

special education, middle school language arts, and early childhood education. She also holds endorsements in reading, English for Speakers of Other Languages, and gifted education.

Emily serves as the Fellowship of Christian Athletes sponsor at North Willow Middle School; however, she has served in numerous roles during her career, such as student council advisor, school webmaster, assistive technology coordinator, and newspaper liaison. With almost 19 years of experience, Emily brings expertise and confidence to her classroom. For instance, Emily's new content and grade-level teammates at North Willow Middle School have solicited her for advice on how to integrate technology into the classroom and how to provide academic support for students with special needs.

Emily defined job-embedded learning as "learning while on the job through professional development and collaboration." Her definition emphasized teacher learning as embedded, ongoing, and relevant to one's profession. Emily viewed learning as collaborative and contingent on the relationships and environment of the workplace. She listed content, grade-level, and faculty meetings as well as digital learning modules and videos as examples of job-embedded learning. Over the course of the research period, Emily participated in many of the aforementioned opportunities; however, she tended to gravitate toward online, independent learning rather than face-to-face, collaborative learning.

Emily dedicated several learning logs to documenting digital learning experiences. Her first entry focused on using Edmodo to collaborate with other teachers and classrooms. Emily recalled:

I have used Edmodo to collaborate with other teachers. I have met teachers from Argentina, South Africa, New York, North Carolina, and Georgia, and my classes have Skyped and collaborated with other students over the years. Also, I love Edmodo because I was able to find several things other teachers were doing to teach a novel and was able to set up an interactive blog between my class and hers in North Carolina.

Emily stated how she enjoys the ease of use and flexibility Edmodo brings to her classroom. She was not only able to collaborate with other teachers at her own convenience, but she was also able to apply what she has learned with her students. Emily finds meaning and value in learning experiences that meet her needs and desires in the time and manner she chooses.

Cross-Case Analysis

Cross-case analysis commenced after each case, or participant, was examined individually using within-case analysis. During cross-case analysis, the researcher collectively considered the emergent codes and categories from each case to identify patterns within the overall data. The constant comparative method was used to establish common themes from the patterns and develop generalizations about the data. The findings from the cross-case analysis will be presented in the context of the related literature review and in relation to the emergent categories and themes.

Five themes were generated from the data. Each theme represented the processes or influences that guided teachers in their construction and negotiation of new knowledge and skills. Although these processes or influences often occurred concurrently, each theme is presented as a disaggregated subsection for depth and clarity. Each subsection discusses findings related to the research question from a sensemaking perspective. The subsections include the following: identity, reflection, collaboration, motivation, and application. Table 1 summarizes the research question, themes, and description of themes derived from data analysis.

Table 1. Research question and themes

How do Middle School Teachers Construct Understandings of their Job-Embedded Learning Experiences?	
Themes	**Description**
Identity	Teachers made sense of and gave meaning to new learning experiences using their unique worldviews, beliefs, and understandings. Teacher identity encouraged self-awareness and shaped the actions and interpretations of learning experiences.
Motivation	Teachers made sense of and gave meaning to new learning experiences when motivated intrinsically and extrinsically. Teacher motivation considered relevancy and applicability of new learning experiences to explain why teachers engage in job-embedded learning.
Reflection	Teachers made sense of and gave meaning to new learning experiences by reflecting on prior beliefs, understandings, and experiences. Teacher reflection fostered the negotiation and melding of new and old learning experiences.
Collaboration	Teachers made sense of and gave meaning to new learning experiences when they collaborated with colleagues. Teacher collaboration provided support for new learning experiences and challenged teachers to examine how their interactions influence their teaching practices.
Application	Teachers made sense of and gave meaning to new learning experiences that were applicable to their jobs. The transferability of the learning experience encouraged teachers to establish a purpose for learning something new and to identify a course of action for acquiring and applying the new knowledge and skills in practice.

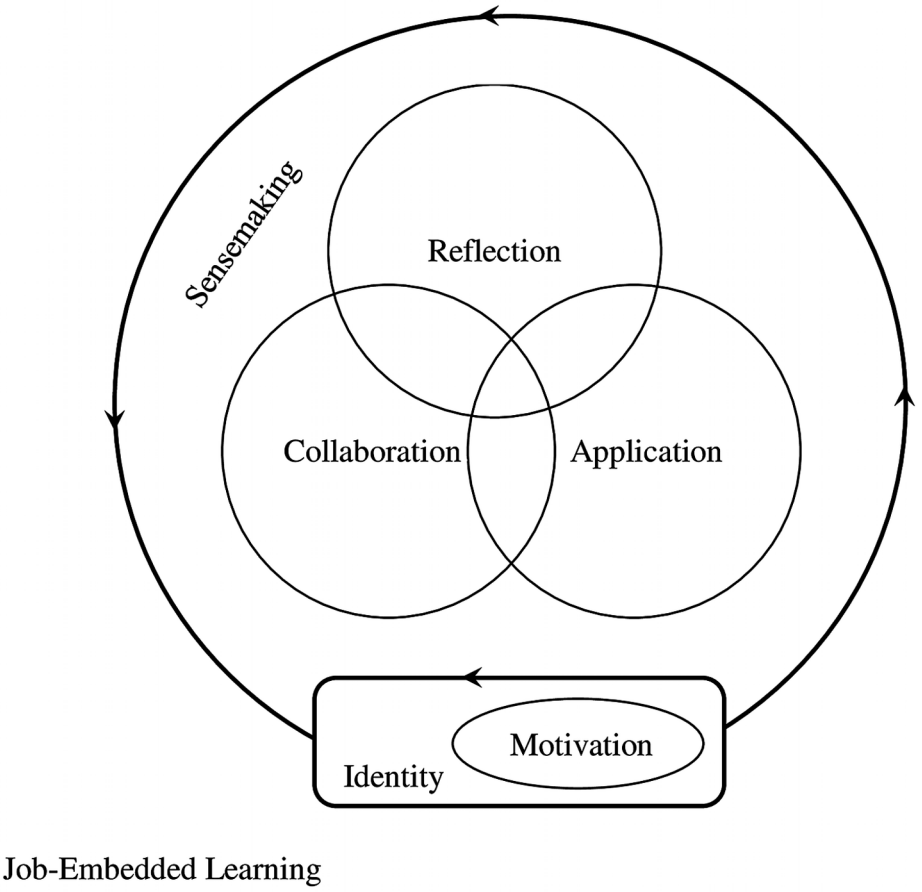
While the findings of this research will be presented as five disaggregated subsections for the purpose of discussion, the relationship among the findings is worthy of emphasis. Figure 1 illustrates the connections among the findings within the frame of job-embedded learning. *Identity* provides the foundation for sensemaking because teachers use their unique and respective worldviews, beliefs, and experiences to begin the sensemaking process. Within identity, the *motivations* for engaging in job-embedded learning influence the sensemaking process of teachers. The identities and motivations of teachers are consistently refined as represented by the arrow. Beyond identity and motivation, teachers engage in *reflection*, *collaboration*, and *application* to continuously negotiate and co-construct new knowledge and skills. The Venn diagram represents how reflection, collaboration, and application contribute to the sensemaking process independently, in tandem, or as a collective group. Overall, the five findings of identity, motivation, reflection, collaboration, and application occur concurrently as teachers construct understandings of their job-embedded learning experiences.

Identity

Each teacher made sense of and gave meaning to her job-embedded learning experiences using her unique worldview, beliefs, and understandings to negotiate and construct new knowledge and skills. For instance, Amanda's beliefs about student learning and achievement have largely been shaped by her initial teaching experiences. Amanda stated:

I did my student teaching with CUTE, Cooperative Urban Teacher Education program, in Kansas City, Missouri. Under the guidance of a professor, we learned about the culture of our students. We did police ride alongs. We also had to volunteer to teach ESOL [English for Speakers of Other Languages] for three nights a week for the duration of our student teaching. We had to live in the community, work in the community, and volunteer in the community and it was to help prepare us for the rigors of inner-city teaching. That experience changed me as a person and has made me the teacher I am today. I developed a do-whatever-it-takes kind of attitude to make sure that my students are successful no matter the circumstances they may bring to the classroom.

Figure 1. Sensemaking within job-embedded learning



Amanda's identity as a teacher was guided by her initial teacher preparation program and continued to influence how she learned during the school day. She believed teacher learning was essential to improving the quality of teachers; however, the responsibility for engaging in learning activities and applying learned knowledge was up to the individual teacher. In other words, teachers who are "self-motivated, highly organized, outside-the-box thinkers and teacher leaders tend to be student-driven and always looking for new opportunities to improve, rather than teachers who are self-driven, tired, and burned out from their job."

Likewise, Leslie agreed that her worldview and beliefs about teaching and learning have been influenced by her early teaching years. Specifically, she went from teaching in a low-income, rural elementary school in South Carolina to teaching in one of the biggest middle schools in a large metropolitan area of Georgia. Given her experiences, she recalled, "In all of my teaching experiences, I learned a lot about myself, my strengths and weaknesses, because each situation was different. The faculty, the students, and the building were all different and influenced how and what I taught." According to Leslie, learning on the job was a continuous process as she periodically needed to assess and improve her knowledge and skills to be a better teacher. The constant retrospection contributed to Leslie's overall identity as a teacher as she continues to practice a cycle of self-reflection and revision, even in her final year of teaching.

Motivation

There were several factors that influenced the motivation, intrinsically and extrinsically, of teachers to engage in job-embedded learning. In particular, self-improvement, passion for teaching, annual evaluation, and the need to strengthen knowledge and skills influenced the motivation teachers had for learning during the school day. First, self-improvement and passion for teaching were two of the biggest indicators of teacher learning. For example, Amanda stated, "I do a lot of reading to help me improve my teaching. I just ordered a bunch of stuff today on writing practices. I'm always trying to keep it fresh." Similarly, Emily recalled, "I love using technology in the classroom, so I'm always looking for new websites to pull resources from or finding apps and interactive links for my students to use." Both teachers often initiated their own on-the-job learning, informally, because they were interested in the improvement and refinement of their teaching, albeit because of an instructional need or personal interest.

In comparison, lack of motivation can hinder teacher learning during the school day. Sarah recalled her prior learning experience with Literacy Collaborative as one in which she had no motivation to participate but did so out of obligation. She recalled:

It [Literacy Collaborative] was not my preference. The presenter was okay and it was good information, but it was not what I wanted to do. I went through it and I did the stuff and it was useful in class.

In a follow-up conversation, Sarah elaborated, "Seeing and doing it myself is how I learn so I need chances to try things in my classroom with actual kids." Leslie shared the sentiment that "if I have to learn something with technology and it was expected that I implement it, I would need someone to work with me one-on-one in my classroom; otherwise, it probably won't happen." Thus, through Sarah's and Leslie's descriptions of motivation, they believed they were limited in their sensemaking because they were not interested in the content and had concerns about its delivery. Both teachers believed they would have more motivation to participate in job-embedded learning experiences if the presenter considered their learning preferences and skill levels when planning and delivering the content.

Reflection

Reflection, during and after a learning experience, proved to be very beneficial to teachers acquiring new knowledge or skills. By reflecting on prior beliefs, understandings, and experiences, teachers were able to negotiate and meld old and new experiences. For example, while mentoring a student teacher from a local college, Leslie remarked:

He hasn't begun to teach yet. He's just been observing me teach, but because of this I'm more conscious of how I'm teaching and the activities I provide for the students. I want my teaching to be a positive and meaningful experience for him. Having him here has really made me reflect on my own teaching and what I do well and what I need to do better.

In a follow-up conversation, Leslie commented:

I will never forget one student teacher who came in and did stations on Egypt. I'd never done stations before, but I really liked the idea and saw it work with my kids, so I kept the idea to adapt for future students.

Leslie found meaning and value in working with future teachers because it inspired her to take risks and stay current with instructional strategies. Moreover, Leslie's work with student teachers encouraged her to reflect on her own teaching practices to learn more about herself and her teaching abilities. Reflection was key to Leslie's sensemaking processes because it allowed her to meld new knowledge and skills with her prior understandings and experiences.

In comparison, Amanda dedicated one of her learning log entries to the Socratic Method. Amanda reflected:

When I taught in Omaha, the whole school was trained to use Mortimer Adler's Socratic Method. We were giving Socrates and Aristotle to read to eighth graders who were reading on a fourth- or fifth-grade level and they were able to make meaning of it through Socratic seminars. And when I saw it in action, it was so powerful . . . and I let it go through my many moves, but I've kept coming back to it and now one of the high school classes uses the method and I didn't know it until I started to do it with my kids here. I thought I was doing something in isolation, but now I see that I'm not alone at all.

Amanda recalled and applied past knowledge to benefit her current students. Amanda admitted that she did not always use the Socratic Method with her students; however, she decided to revisit and use her prior knowledge and experiences to implement the Socratic Method once again in her classroom because she felt that it suited the needs of her gifted students. Amanda made sense of her current instructional desires and needs by reflecting on strategies that worked in the past. In other words, Amanda's understanding of the Socratic Method and her classroom context allowed her to recall and modify past knowledge and experiences for application with a new group of students.

Collaboration

How teachers constructed understandings of their job-embedded learning, positively or negatively, was largely determined by their opportunities for teacher collaboration. Teacher collaboration provided support for new learning experiences and challenged teachers to examine how their interactions had or will influence their teaching practices. For example, Sarah and Emily discussed the importance and benefit of collaboration when planning with their content area teams. Sarah blatantly stated:

I could not survive without other teachers to work with and to plan with. When I taught elementary school, I felt much more isolated. At least at the middle school, I feel like I am part of a team and can get help with planning when I need it, especially this year since I'm teaching a new grade level and subject. I'm appreciative of all the stuff my teammates have given me. I might use some of their ideas, but I don't feel pressure from them to do things exactly like they do. It's just nice to have their support.

Sarah's response highlighted how collaboration helps to combat the feeling of isolation and promotes teachers taking risks and trying new instructional strategies. Overall, Sarah believed that she was capable of learning her new content area and meeting the needs of her students because she was encouraged to collaborate with her colleagues on an ongoing basis through required content and grade-level meetings.

Collaboration also occurred in a more informal manner. When asked how she learns about new activities and ideas, Leslie remarked, "Just walking down the hall and seeing how people do things, you learn, you know . . . oh, I could tweak this or do that." Recently, Leslie noted that she incorporated

foldables, choice boards, and close reading into her social studies lessons as a result of informally visiting other teachers' classrooms. Conversations with Leslie also revealed that impromptu hallway chats about student engagement and understanding of a new activity or lesson as the day progresses were beneficial in planning for future classes. Leslie commented, "I sometimes tweak what I do from one period to the next based on how the lesson went or from what I've discussed with other teachers." Leslie made sense of and gave meaning to what she heard and observed from colleagues as she negotiated how to implement their ideas and instructional strategies into her own classroom.

Application

How teachers made sense of and gave meaning to their learning was dependent on the potential application of the job-embedded learning experience. The transferability of the job-embedded experience encouraged teachers to establish a purpose for learning something new and to identify a course of action for acquiring and applying the new knowledge and skills in practice. In addition, job-embedded learning experiences that were relevant, coherent, and ongoing were found to ignite greater transfer and application of new knowledge and skills. For example, Sarah best summarized the connection between applicability and how teachers make sense of and give meaning to their job-embedded learning experiences when she stated:

We meet often with our content areas to plan. I don't mind participating in these meetings because it gives me new ideas and resources. It also serves as a sounding board for my ideas and can help me meet the needs of my students when I'm having a problem. I don't like meetings where we sit and listen; however, I understand that sometimes the purpose of the meeting is to deliver information rather than learn something.

In this instance, Sarah not only conveyed the importance of collaboration, but she also illustrated the many benefits of content planning. She found the most value and applicability in content planning experiences because those meetings were intended to offer ideas, encouragement, and support rather than information. Sarah believed her sensemaking was enhanced following content meetings because the focus was on finding and strategizing how to implement teaching resources.

SOLUTIONS AND RECOMMENDATIONS

Research has found that effective professional development programs include a focus on content, an emphasis on active learning, attention to coherence, consideration of duration, and the encouragement of collective participation (Borko, 2004; Elmore, 2002; Wayne et al., 2008; Yoon et al., 2007; Zepeda, 2011b, 2012b). A continued commitment to developing effective professional development programs is imperative because it has been shown to improve both teacher and student learning (Darling-Hammond & Richardson, 2009; Desimone, 2009; Garet et al., 2001) and increase the transfer of new knowledge and skills into practice (Coggshall et al., 2012; Pate & Thompson, 2003; Sparks & Hirsh, 1997; Zepeda, 2000, 2006).

Job-embedded learning offers a viable avenue for educators to transform their beliefs, knowledge, and practice within the context of their schools while adhering to the key features of effective professional

development. Job-embedded learning occurs when teachers are actively engaged in and reflect on their daily work via formal or informal activities (Wood & McQuarrie, 1999). Moreover, job-embedded learning is grounded in the daily practice of teachers, occurs on a regular basis, aligns with school standards and goals, occurs collaboratively, and encourages active participation (Croft et al., 2010; Desimone, 2011; Redding & Kamm, 1999; Wood & Killion, 1998; Wynne, 2010; Zepeda, 2011a, 2011b, 2012b).

Because the purpose of this study was to examine how middle school teachers construct understandings, or make sense of and give meaning to, their job-embedded learning experiences, it is necessary to summarize the major findings or themes and then analyze those findings in light of the related current and seminal literature. Thus, the significant findings will be further discussed in the next five subsections with a focus on how teacher learning and sensemaking paralleled with the characteristics of effective professional development and job-embedded learning identified in the literature.

Identity

The teachers at North Willow Middle School used their respective and unique worldviews, beliefs, and understandings to negotiate and construct new knowledge and skills. First, the data suggested that initial teacher preparation significantly influenced teachers' teaching identities—for example, their teaching and learning philosophies—but also guided how they made sense of and gave meaning to their subsequent job-embedded learning experiences. In addition, the first few years of teaching influenced the ongoing perceptions teachers developed about students, the roles and functions of school, and their expectations and beliefs about professional development.

In the related literature, identity—or one's worldview, beliefs, and prior experiences—has been recognized as the foundation for sensemaking (Coburn, 2001; Kezar & Eckel, 2000; Mitchell, 2014; Weick, 1995). More specifically, Weick (1995) noted that sensemaking begins with self-awareness. Teachers must understand their values, beliefs, experiences, and abilities to make sense of and give meaning to new learning opportunities during the school day. Teachers need an understanding of their identities to negotiate and construct new knowledge and skills into practice (Mitchell, 2014).

In their study on teachers' emotions in the process of making sense of Comprehensive School Reform, Schmidt and Datnow (2005) found that teachers' prior knowledge and understandings affected the sensemaking and interpretations teachers had of policy. In fact, teachers were found to misunderstand or reject policy interpretations that did not align with their identities. In a similar study designed to investigate how teachers viewed content, learning, teaching, and assessment in three diverse South African educational contexts, Blignaut (2008) discovered that teachers adapt curriculum policy based on their prior beliefs and knowledge about teaching and learning. In this instance, teacher identity once again proved to be a key component of how teachers make sense of and give meaning.

In relation to the current study, teachers used their existing identities to process, sort, edit, and adapt new information until it aligned with their worldviews, beliefs, and prior experiences. For instance, Amanda's participation in the CUTE program and her whatever-it-takes attitude provided the foundation for her teaching identity. Amanda's teaching identity encouraged her to approach job-embedded learning with an open mind, seek out new resources, and take instructional risks. Leslie's ability to identify and address her strengths and weaknesses helped her filter and apply new information as she progressed in her career. Essentially, the teachers' identities influenced how they approached and processed job-embedded learning experiences—specifically, which learning experiences they participated in, what they found meaningful in the experiences, and what they took back to try in the classroom.

The notion of teaching identity is particularly important for administrators as they hire new teachers and design professional development for their faculty. First, teacher identity is often not considered during design or delivery of job-embedded learning experiences. However, doing so could elevate the interest, acceptance, and implementation of new knowledge and skills into practice, especially when the topic or concept might not initially resonate with a teacher. Furthermore, maintaining attention to teacher identity may better personalize the learning experience as well as increase the likelihood that the learning experience will be considered valuable and meaningful to the teacher. Future research should focus on understanding teacher identities within the context of professional learning and growth.

Policymakers may also find teacher identity important as they draft new legislation and exert political expectations for teacher professional development. At present, teachers are considered as learning units rather than as individuals. Policymakers should consider the benefits of endorsing professional development that aligns with the unique worldviews, beliefs, and understandings of teachers. Moreover, policy should be revised to reflect the learning needs of the individual teacher while continuing to consider the features of effective professional development highlighted in the literature—content focus, active learning, coherence, duration, and collective participation (e.g., Darling-Hammond et al., 2009; Desimone, 2011; Garet et al., 2001; Guskey & Yoon, 2009; Wayne et al., 2008; Wei et al., 2010). Overall, teachers need legislation and political expectations that aspire to enhance and build on their existing teaching identities rather than policy that focuses on creating a common, unified vision of professional development.

Motivation

One of the major findings of this research study focused on how teachers' motivation influenced their sensemaking of job-embedded learning experiences. Teachers' motivation to learn new knowledge and skills coincided with their desire to improve. In addition, teachers revealed motivations to construct understandings of their learning experiences as they sought to respond to others' perceptions of a need to improve their teaching practices, avoid social stigma, or follow an obligation or requirement. In fact, a job-embedded learning experience may adhere to the key features of effective professional development, but a teacher's interest in the content, regardless of its relevance and application, often drives her expectations and sensemaking experience. Teachers' unique identities and motivations significantly influenced the job-embedded learning experiences in which teachers engaged, how teachers made sense of and gave meaning to those learning experiences, and the overall effectiveness of the learning experience.

No related research on sensemaking and teacher motivation was found; however, numerous researchers have discussed motivation in adult learning within the context of job-embedded learning. Darling-Hammond and McLaughlin (2011), King and Newmann (2000), Wood and McQuarrie (1999), and Zepeda (2012b) agreed that job-embedded learning is most effective when it adheres to adult learning principles. These scholars noted that adults are unique, self-directed learners who are motivated to learn when the content and focus of a learning experience is related to tasks or problems that occur in their daily lives. This is a significant finding for administrators because it underscores the importance of designing and implementing job-embedded learning experiences that are coherent and relevant to the needs and interests of teachers. Furthermore, learning experiences should mutually consider the identities and motivations of teachers to help ensure that teacher sensemaking and learning is most effective, especially because the data revealed that teachers tended to make sense of and give meaning to experiences aligned with their perspectives and expectations.

Reflection

Findings indicate that reflection was integral to the process of how teachers constructed understandings of their job-embedded learning experiences. Most noteworthy, the process of reflection assisted teachers in negotiating and melding old and new learning experiences. Reflection was also used to help solve other teachers' problems and was considered a major component of collaborative meetings. Thus, teachers engaged in the process of reflection to make sense of and give meaning to their job-embedded learning experiences, such as negotiating how to implement a new teaching strategy, recalling how one taught a topic or concept in the past and brainstorming ways to improve it, or thinking of ways to solve a problem. The process of reflection not only challenged the teachers to consider and share their current and past teaching practices but also to make plans for revising and improving what and how they teach individually and with others.

Mitchell (2014) highlighted the importance of retrospection, or reflection, to the sensemaking process when she concluded, "Individuals reflect on their experiences to reconsider their thoughts on and action towards [experiences]. This process allows individuals to evaluate their views and (re)align their actions to be consistent with their beliefs" (p. 4). Reflection bridges one's identity and current learning experience to allow teachers to negotiate and construct understandings of new knowledge and skills and transfer those understandings into practice.

Similarly, in their case study of how one teacher, Liz, made sense of her professional development, Rosebery and Puttick (1998) discovered that as the teacher became more comfortable reflecting and asking herself clarifying questions about what she was learning, it became easier for her to transfer her new knowledge and skills into practice. Reflection was critical to helping the teacher negotiate and meld old and new understandings. Colestock and Sherin (2009) identified strategies that teachers use as they negotiate and meld old and new understandings, including comparison, generalization, perspective taking, reflective thinking, and problem solving.

Teacher reflection aligned with the key features of job-embedded learning. First and foremost, research has shown that job-embedded learning—regardless of whether it is formal, informal, or incidental—enhances teacher reflection (Coggshall et al., 2012; Croft et al., 2010; Lenski & Caskey, 2009; Wood & McQuarrie, 1999; Zepeda, 2012b) and subsequently improves the ability of teachers to transfer and apply new knowledge and skills into their practices (Coggshall et al., 2012; Sparks & Hirsh, 1997; Zepeda, 2000, 2006). In relation to the current study, teachers' use of reflection as a means of sensemaking is apparent as they recalled prior knowledge and experiences to adapt and apply new knowledge and skills. Specifically, Leslie and Amanda recalled strategies and information learned from classroom visits and workshops to plan and implement modified versions of what they learned.

Administrators need to account for reflection as a component of sensemaking when they design and implement job-embedded learning activities. Specifically, ongoing and meaningful opportunities for reflection should be built into the school day rather than reserved only for formal learning activities. For instance, designating time for oral or written reflection as a normal part of collaborative meetings, lesson plans, and evaluative conferences is a simple way to initiate and challenge teachers to think about their past, current, and future teaching practices. In addition, reflection can provide ideas and support for teachers wanting or needing a new instructional strategy.

Collaboration

The data indicated that teachers at North Willow Middle School were in a constant state of learning, both informally and formally. Informally, teachers engaged in conversations and interactions with colleagues as they checked in and discussed lessons and student progress throughout the school day or developed new ideas and resources after an impromptu visit to a colleague's classroom. Findings also revealed that teachers informally collaborated with peers from around the country and world via online learning communities for the purposes of improvement and support. Formally, teachers collaborated during planned content and team meetings, book studies, and academic coaching sessions. Regardless of whether the collaboration was informal or formal, teachers agreed that collaboration not only influenced how they made sense of what they learned during the school day, but it also improved their overall understanding. Collaboration helped teachers refine their teaching practices, provided them with the support necessary for implementation, and offered them an outlet for discussing successes and failures.

In the related literature, collaboration has been found to be a significant factor in determining how teachers make sense of and give meaning to learning experiences that occur during the school day. Collaboration not only exposed teachers to multiple perspectives, but interactions with others encouraged teachers to challenge their identities and reflect on their teaching practices as they implement new knowledge and skills (Mitchell, 2014; Quinn, 2009).

In her in-depth case study on reading policy, Coburn (2001) found that to whom teachers talked, the depth of their conversations, and how leadership structured those collaborations influenced how teachers made sense of reading policy. In a follow-up study, Coburn (2005) concluded that the sensemaking of principals, or the person who delivers the reading policy information, directly influenced how teachers made sense of the policy. Connecting with teacher identity, the principal's worldview, beliefs, and experiences determined the delivery of the policy, including what was emphasized or omitted.

Collaboration and active participation are both key features of effective professional development and job-embedded learning (Birman et al., 2000; Darling-Hammond et al., 2009; Desimone, 2011; Garet et al., 2001; Islas, 2010; Wei et al., 2010; Zepeda, 2015). Teachers should be provided ample time and consistent opportunities to collaborate with their colleagues during the school day. Islas (2010) noted that collaboration should focus "on understanding what and how students are learning and on how to address students' learning needs, including reviewing student work and achievement data and collaboratively planning, testing, and adjusting instructional strategies, formative assessments, and materials based on such data" (p. 12). Finally, teachers who participate in collaborative job-embedded learning experiences, such as collaborative planning, have reported improved classroom practices, a better understanding of their content and instructional knowledge, more opportunities for feedback and support, and increased teacher empowerment (Borko, 2004; Levine & Marcus, 2010; Mawhinney, 2010; Strahan & Hedt, 2009).

Similarly, teachers used collaboration, formally and informally, to make sense of and give meaning to their job-embedded learning experiences. In fact, teachers used alternative avenues for engaging in dialogue, such as digital learning communities, in addition to more traditional forms of collaboration, such as collaborative planning. No matter the avenue, teacher collaboration tended to focus on improving both teacher and student learning.

This study is important for administrators because the findings highlight the unique and varied ways teachers use collaboration to make sense of and give meaning to job-embedded learning experiences. For instance, teachers collaborate informally—via online learning communities and impromptu hallway chats—and formally—via content and grade-level meetings. Formally, administrators should provide

structured time during the school day for teacher collaboration. Teachers need face-to-face interaction with colleagues familiar with their teaching context to receive the most specific feedback and support. Informally, administrators should encourage teachers to take advantage of online learning communities because such communities can provide a wealth of resources, ideas, and feedback in a timely and efficient manner. Nonetheless, administrators should remain cautious about relying solely on digital forms of professional development as teachers tend to make the most meaning out of learning experiences that challenge them to negotiate and co-construct new knowledge and skills.

Application

Findings indicated that the transferability of job-embedded learning experiences influenced teacher sensemaking and their ability to apply new knowledge and skills to practice. Teachers did not like learning experiences in which they were not given the opportunity to apply and practice new knowledge and skills. They needed ongoing support and feedback throughout the learning process and application phase. Teachers preferred learning experiences that were self-initiated or directly related to their current teaching situations or goals, such as content area planning and peer coaching. Teachers expressed that they had fewer opportunities for classroom transfer and application when learning experiences were required and/or only somewhat related to their professional goals, expectations, and aspirations. Nonetheless, most teachers attempted to remain optimistic and find something of value to take back to their classrooms. Finally, teachers asserted the importance of ongoing support and feedback as they implemented new ideas and strategies into their classrooms.

In their study on how reading coaches mediate reading policy and teachers' classroom practices, Coburn and Woulfin (2012) found that teachers were more likely to alter their classroom practices when coaches, rather than administrators, delivered policy messages. The researchers attributed this to the coaches' familiarity with the classroom context and ability to persuade reluctant teachers. Furthermore, coaches were able to provide more ongoing support and feedback to teachers. Ongoing support and feedback has been shown to enhance overall sensemaking and gives teachers the confidence to take action (Mitchell, 2014).

Cohen and Hill (2001), Mizell (2010), and Penuel et al. (2007) also determined that teachers were more successful in implementing new knowledge and skills when they were given opportunities to practice through job-embedded learning experiences connected to their daily work. Further, other scholars have found that job-embedded learning experiences should be ongoing, focused, embedded in context, and connected to what teachers want and need (Coggshall et al., 2012; Darling-Hammond et al., 2009; Sparks & Hirsh, 1997; Zepeda, 2000, 2006). Given the research on the transfer of new knowledge and skills into practice and the findings of this study, administrators should consider ways to increase opportunities for teachers to apply new knowledge and skills in practice. Teachers need time to learn and apply new knowledge and skills to enable them to more seamlessly transfer their learning into practice. Ongoing feedback and support over an extended period of time are required if teachers are to reap the long-term benefits of their job-embedded learning experiences. Teachers make sense of and give meaning to *experiences* rather than to isolated learning opportunities, and without *applying* newly acquired knowledge and skills in the context and culture of a classroom, the likelihood of teacher learning and classroom success diminishes.

FUTURE RESEARCH DIRECTIONS

There are numerous implications for future research given the findings of the current study. First, most research on effective professional development and job-embedded learning has not critically examined the processes teachers use to make sense of and give meaning to their learning experiences while being engaged in the daily work of a teacher. This study attempted to address this gap in the research and contribute to the body of literature on job-embedded learning. However, because the context and conditions of North Willow Middle School were representative of a high-performing middle school, future research should focus on replicating the study in a variety of contexts, including schools with different demographics and student achievement records. Implementing a similar study in a variety of contexts will help determine the influence of context and culture on how teachers make sense of and give meaning to their job-embedded learning experiences and offer general patterns of strategies for and influences on teacher sensemaking.

Future research might also consider extending the duration of the study or designing a multi-case study in which each school represents a case rather than each participant within a single school representing one case. Changing the parameters of the study to multiple schools would provide alternative perspectives on teacher sensemaking and account for different professional development and administrator practices within each school. Future research might consider the inclusion of additional shadowing hours as the perspectives gained from shadowing proved to be valuable for understanding the varied forms that job-embedded learning can take in a school environment and how the interactions and relationships among teachers may influence their sensemaking of new knowledge and skills.

Finally, future research should closely examine how teacher identities and motivation influence how teachers make sense of and give meaning to their job-embedded learning experiences. The current study recognized teacher identity and motivation as influential factors in the sensemaking process, but more study is needed to determine how consideration of teacher identities and motivations might affect the design and delivery of job-embedded learning so that teacher sensemaking is enhanced.

CONCLUSION

The purpose of this chapter was to examine a study on how teachers constructed understandings of their job-embedded learning experiences. Specifically, the primary goal was to explore how middle school teachers made sense of and gave meaning to their learning experiences that occurred during the school day as they engaged in the work of being a teacher. Findings revealed five influences that affected teacher sensemaking: identity, motivation, reflection, collaboration, and application.

While each influence affected teacher sensemaking independently, each influence also often intertwined with and complemented another. Nonetheless, a teacher's identity initiated sensemaking as each teacher's worldview, beliefs, and understandings encouraged self-awareness and shaped the actions and interpretations of each learning experience. Teacher motivation proved to be a significant finding as previous research had not identified it as a factor in sensemaking. Teacher reflection focused on bridging old and new learning experiences using teacher identity and motivation as a starting point. Collaboration was found to provide support for new learning experiences and challenged teachers to examine how their conversations and interactions influence their teaching practices and those of their colleagues. Finally,

application encouraged teachers to establish a purpose for learning and to identify a course of action for acquiring and applying new knowledge and skills in practice.

These findings, while limited, revealed how teachers constructed understandings of their job-embedded learning experiences. In this study, job-embedded learning was defined as any informal or formal learning opportunity teachers engaged in during the school day. However, future research might consider a broader view of job-embedded learning as described by Zepeda (2015) as it was difficult for research participants to limit their sensemaking to only experiences that occurred during the work day. Considering this broader definition of job-embedded learning could help address any gaps in the current study and offer additional suggestions to administrators and policymakers beyond those given. Despite the potential for future research and suggestions, the intentions of this study were achieved and contribute to the body of literature on middle school professional development, job-embedded learning, and sensemaking. In particular, this study supports the characteristics of effective middle schools as outlined by *This We Believe: Keys to Educating Young Adolescents* (National Middle School Association, 2010) and *Turning Points 2000: Educating Adolescents in the 21st Century* (Jackson & Davis, 2000), as well as the key features and conditions of job-embedded learning (Zepeda, 2012b, 2015). Further, the findings of this research pave the way for additional study of sensemaking as middle schools continue to engage teachers in job-embedded learning through teaming and collaborative discourse.

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KEY TERMS AND DEFINITIONS

Case Study: A case study is defined as a holistic investigation and analysis of a person, group, or phenomenon within a real-life bounded system. Case studies offer researchers the opportunity to study the processes, perspectives, and experiences of a person, group, or phenomenon in the original context and culture. Case studies allow researchers to study a particular *how* or *why* question in great detail within the parameters of the person, group, or phenomenon's unique context.

Formal Learning: Formal learning opportunities include activities such as conferences, certification courses, or graduate coursework. In the context of job-embedded learning, formal learning might refer to book studies, lesson studies, or learning circles.

Informal Learning: Informal learning refers to loosely structured, continuous learning that is often the result of collaboration and interaction. Informal learning can occur anytime or anywhere. Specific to job-embedded learning, informal learning may take place during peer coaching, mentoring, and collaborative meetings.

Job-Embedded Learning: Also called as on-the-job learning, job-embedded learning refers to the learning that is grounded in the daily work of teachers. It is characterized as learning by doing and encourages teachers to actively engage in and reflect on their practices.

Middle School: A single school site that houses Grades 6–8 with a dedicated, full-time principal.

Professional Development: Professional development refers to any formal or informal learning experience or process that refines and enhances the professional knowledge, skills, and practices of teachers to improve student achievement and growth.

Sensemaking: An ongoing, social process individuals use to make sense of their world. Sensemaking assumes that interpretation and action are influenced by the negotiation of social cues and the co-construction of knowledge.

Chapter 27
What Can I Do?
Using Critical Literacy and Multimodal Text Types to Enhance Students Meaning Making and Talk

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ABSTRACT

This chapter offers preservice candidates and inservice teachers a portrait into a classroom context where one teacher: 1. Identified the experiences and backgrounds of 20 culturally and linguistically diverse students; 2. Used critical literacy as a theory to purposefully select literature grounded in the lives and experiences of her culturally and linguistically diverse third graders; and 3. Used critical literacy and multimodal text types to enhance students meaning making and talk. Implications for practice and research are provided.

INTRODUCTION

Read alouds serve as a central figure to classrooms across K-12 settings. They have come to be known has central tasks among literacy classrooms to support children in becoming strategic readers and writers. In my own Elementary Literacy Instruction course, the author uses Sharon Taberski's *On Solid Ground: Strategies for Teaching Reading K-3* (2000) to provide an overview of teaching reading to elementary students. For my preservice candidates, Taberski's text offers a window into how to support readers strategically during whole group discussions. On pages 81 of *On Solid Ground* (2000), Taberski defines a read aloud by saying:

During a read aloud, the teacher reads a book to the children that is beyond what they can read on their own. Since the children aren't reading the text themselves, she only shows children the actual text when there are illustrations to share (2000, p.81).

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However, read alouds become more than just a place to demonstrate comprehension strategies and offer children opportunities to respond orally to texts, they become tools for which teachers can help children see themselves reflected in texts, communities, their school, and society.

A recent campaign by a grassroots organization has placed an interest on the diversity of books written by diverse authors and representing diverse people. The We Need Diverse Books campaign has sparked an interest in children, teachers, parents, authors, and others to look at the ways people of color and diverse issues are being represented in literature written for kids. According to the Cooperative Children's Book Center (2015), which examines pictures books, novels, and non-fiction annually, their report revealed that the number of books written by and about people of color has increased but the numbers are still bleak. In 2015, the CCBC received 3,400 books:

- 106 were by African American authors.
- 269 were about African Americans.
- 19 were by American Indians authors.
- 42 were about American Indians.
- 176 were by Asian Pacifics/Asian Pacific Americans authors.
- 113 were about Asian Pacifics/Asian Pacific Americans.
- 58 were by Latino authors.
- 82 were about Latinos.

Although the quantity of multicultural children's texts that sit within elementary schools is important, it is not enough to just place or use a book in a classroom if students do not see themselves accurately reflected and/or portrayed. The CCBC notes on its website that the books they document vary widely with regard to accuracy and authenticity. This is critical since the children that sit within schools vary in their experiences and backgrounds. Therefore, it is vital that they have diverse books that are diverse in regards to race, gender, religious affiliations, and topics. Nevertheless, in thinking of the children consuming the stories and messages in literature, we must gear our focus as teacher educators towards supporting and scaffolding preservice candidates and practicing teachers in intentional instruction around selecting literature and engaging in a critical inquiry. For this reason, this chapter offers preservice candidates and inservice teachers a portrait into a classroom context where one teacher:

1. Identified the experiences and backgrounds of her culturally and linguistically diverse students;
2. Used critical literacy as a theory to purposefully select literature grounded in the lives and experiences of her culturally and linguistically diverse third graders; and
3. Used critical literacy and multimodal text types to enhance students meaning making and talk.

For this chapter, multicultural literature is defined as literature that takes up themes related to people of color, gender, class, religious, and language differences are highlight. Children's literature that highlights diversity and social justice issues relevant to diverse learners is defined as critical multicultural literature. This literature offers students an avenue to discuss power differentials, sociopolitical relationships, and taken for granted assumptions (Allen, 2014).

LITERATURE REVIEW

Classrooms are filled with culturally and linguistically children; however, are met with a homogenous teaching force that consists of white, middle class female educators. Despite a teacher's background, teachers have to become aware of the issues that impact the lives of students. Classrooms have to be filled with teachers who understand children's ways of knowing the world and capable of capturing pluralistic thinking (Yenika-Agbaw & Napoli, 2011). Several studies have documented how immersions in multicultural literature and critical multicultural experiences can give young children the opportunity to articulate and challenge hegemonic structures and make meaning of texts (Allen, 2014, Robinson, 2013). In an ethnographic study of third graders reading multicultural literature and engage in multimodal composing after read-alouds, Robinson (2013) found that discussions around figures such as Dr. Ben Carson led students to critically responds and empathize with others in the process of constructing and deconstructing narratives. Therefore, literature comes to help children value the diversity of our society and the individuals within our society when teachers intentionally use literature that offers students a window into what other people are like (Bishop, 2007).

According to Meller, Richardson, and Hatch (2009), "Every read-aloud should include high-quality children's literature, but not every read-aloud has to feature a critical literacy text. In fact, texts are not critical in and of themselves; it is the conversations that take place around the texts that qualify as critical" (p. 77). These texts often lead children to develop ideas about different cultures (Roberts, Dean, & Holland, 2005). For Lewison, Flint, and Van Sluys (2002), when exposing novice and newcomer teachers to critical literacy, the authors believed that using social issue books could support newcomers as they approached discussing controversial issues in their classroom. Although teachers were challenged by the experience in coming to understand how children respond to critical texts, one teacher noticed the overall engagement as her students interacted and examined literature with social issues around homelessness, class, and poverty. Corroborating the findings of Lewison, Flint, and Van Sluys (2002) work with using books around social issues in the classroom, Hefferman (2004) discussed how he initially had fears of using emotionally charged texts; however, in facing his fears he noticed his third graders had more to say when writing about critical texts during writer's workshop. Additionally, Heffernan's new knowledge enabled him to see the "underside" of his students writing and begin to use writer's workshop as a place where students can "rewrite the world." Therefore, as teachers learn to use critical literacy in their classrooms to help students become critically conscious of social issues and their influence on texts, they too develop an awareness of the transformative nature of this perspective on their once narrow understanding of students and learning. This somehow bridges the social and cultural distance that often characterizes our nation's schools.

The work to prepare teachers to engage in critical multicultural experiences such as critical literacy has to begin prior to stepping into classrooms. This work can and should begin in teacher education programs where preservice teachers have the opportunity to reflect in what Kinloch and San Pedro (2014) denote as dehumanizing pedagogy and explore the ideologies that they bring to classrooms (Williams, May, Williams; 2012) and their awareness of cultural diversity (IWAI, 2012). Several studies have documented preservice teacher's engagement with multicultural children's literature and use of critical literacy (Hadjioannou & Hutchinson, 2014; Evans, 2014; Norris, Lucas, Prudhoe, 2012). When preservice teachers were able to engage in, the process of engaging with semiotic objects other than language based texts, to discuss multicultural literature and support critical conversations, preservice candidates noticed that they were able to understand stand books at a deeper level. According to Hadjioannou and

Hutchinson (2014), the process of engaging in literary thinking that was supported and encouraged around multicultural literature "… can help in stereotype-reduction and de-otherizing immigrants and other oppressed groups" (pg. 15).

In summary, research indicates that teacher education programs need to provide adequate support in the process of learning to enact critical literacy engagements with multicultural literature.

THEORETICAL FRAMEWORK

Critical literacy invites readers to question and examine the power relations that exist between the reader, context, and author (McLaughlin & DeVoogd, 2004). There are dimensions or key tenets that exist to its approach. Several scholars have based their definition on Freebody and Luke's four resources or types of knowledge model. Luke & Freebody (1997) suggest that reading involves four roles: code breaker, text participant, text user, and text analyst. As codebreakers, readers ask, "How do I crack this?" As a text participant, readers consider, "What does this mean?" As text users, readers pose the question, "What do I do with this, here and now?" In this way, readers come to understand how texts are organized. And as text analysts, readers critically analyze text, "What does this do to me?" However, in looking at critical literacy literature, Lewison, Flint, and Van Sluys (2002) examined and synthesized three decades of literature related to critical literacy definitions to uncover four interrelated dimensions:

1. Disrupting the commonplace which involves questioning the everyday ways of "seeing",
2. Interrogating multiple viewpoints or examining competing narratives,
3. Focusing on sociopolitical issues or challenging larger power relationships that exist between systems, and
4. Taking action to promote social justice by moving from a spectator to a more action oriented role.

Together, these scholars provide a framework from which researchers and teachers can evaluate critical literacy practices in classrooms. In this chapter, critical literacy is used as a framework for literature selection, creating multimodal text engagements, and prompts that will encourage talk. The next section outlines the engagement that the author embarked on as a teacher-researcher. The intentionality of my critical inquiry has implications for preservice and inservice teachers.

BUILDING A COMMUNITY FOR CRITICAL LITERACY

During the 2012-2013 school year, my classroom was organized in a way where students could interact and talk with one another. Desks were clustered in groups of four to five. Students' work was often displayed on the walls throughout the classroom and on the wall outside the classroom door. I often tried to create a warm environment by displaying student's drawings, notes, and photographs. Towards the back of the classroom, students often gathered on a carpeted area intermittently throughout the day in an area known as our community area. Here resided an easel, a carpeted area that allowed students and I to sit facing one another, and the classroom library. The literature included within the library referred to diverse people and perspectives. My students and I would often gather in the carpeted area throughout the year to discuss new topics and figures we might want to display in the library. For example, one-year

students became enthralled in knowing more about the Holocaust. In tub located in our library, I displayed non-fiction text and stories, picture books, and chapter books appropriate for elementary age children. W also viewed a number of virtual tours and watched documentaries related to this tragic event in history.

I spent much of the time during whole group and small group instruction facilitating ways of talking and ways of understanding others. Our work was often the topic of conversations, in addition, to our readings and inquiries in other subjects such as math, social studies, and science. The process of how to use the language of response in discussions was often facilitated to literature discussions carried over to discussions, wonderings, and critical conversations.

Research Study

In the spring of 2013, I designed a unit of study around immigration as the teacher researcher of 20 third graders attending an elementary school within the southeastern portion of the United States. The students in this study lived within a community where 48% of the population of this small community is Latino/a. The majority of students within my classroom during the 2012-2013 school year were of Latino/a (Mexican heritage). The topic of immigration came to the forefront as several new stringent immigration enforcement measures were taking shape in the southeastern portion of the United States (e.g., Georgia, Alabama, and South Carolina). The punitive remarks made nationally around immigration were beginning to provide discursive results for children in locales that were not unaccustomed, especially our very own town. Several were students in our school and my classroom were members of mixed status families, a term given to families where the child is considered a U.S. citizen but one or more parent is undocumented. In Georgia, for example, state officials passed Georgia law (HB87) also known as the Illegal Immigration Reform and Enforcement Act of 2011. The nature of this study was designed in response to the awareness of students' cultural knowledge and family experiences. The climate of the enactment of immigration policies during this time, led me to examine how immigration policies and topics related to immigrant life could facilitate thoughtful critical dialogue among young children who were experiencing discursive changes to their family structure using critical literacy, critical multicultural literature, and multimodal texts.

A FRAMEWORK FOR SELECTING LITERATURE

I selected literature that offered a window into the experiences of immigrant life. In think of the minimal topics I knew students were grappling with like: separation, discrimination, fear. I purposefully selected a number of texts that captured and reflected the situations with characters. Moreover, in knowing, that many of my students were from mixed-status families and Mexican, I purposefully chose texts that reflected the same image. According to Bishop (2007), students who fail to see them reflected in literature begin to believe they have very little importance in both society and school. Therefore, the text that I define as critical multicultural literature, were intentionally selected with prior knowledge of student's backgrounds and familial experiences as children of immigrants. The text titles included *Let's Go See Papa* (Schimel, 2011), *Harvesting Hope* (Krull, 2003), *Waiting for Papa* (Lainez, 2004), *America is her Name* (Rodriguez, 1998), and *My Diary from Here to There* (Perez, 2009). According to Rosenblatt (1978), as children read literature, they bring with them specific cultural, social, and political factors that influence their interactions with the text. The election was constructed with student's backgrounds,

knowledge around topics related to immigration, and age level. My criteria for selecting titles included the following:

1. Literary works that focused on Latino/a and/or Mexican American characters. By selecting stories involving Latino/a characters, my students could relate to the personal life experiences of characters.
2. A recurring theme of immigration. Reading a text with a direct link to immigration focuses the conversation on issues related to immigration. According to Bomer and Bomer (2001), when teachers select texts that they believe will evoke critical conversations, they make it easier for students to critique such texts rooted in critical issues.
3. Texts identified as picture books. Due to the grade level and age of participants, it is warranted to use literary works that help participants grasp the meaning of texts with ease. Therefore, picture books were used so that readers could construct meaning from both the texts and illustrations.
4. Literature selections mostly authored by Latino/a authors. In selecting texts authored by cultural insiders, it is believed that the stories and experiences of characters may accurately portray the life experiences of many Latino/a families. The exception to this was *Harvesting Hope* by Kathleen Krull. The author chose Krull's work due to the poetic nature of its language and vividness in biographic information that depicts the courageous life story of Cesar Chavez. Moreover, the touch on socio-cultural issues allowed readers to engage in discussions around topics dealing with:
5. Literature selections are published within the last ten years. In an effort to ensure that the experiences of characters related to the current issues occurring with immigration policies, recent picture book publications were selected. Again, an exception occurred in the selection of the text, *America is her Name* (Rodriguez, 1998), which was published in 1998. Despite not following the criteria set forth in selecting timely literature for this study, the clarity of the events which recount the struggles and complexity of living and becoming educated in a monolingual urban environment for an immigrant young girl allowed me include this text within this study.

Although critical multicultural literature was used as the primary focal point to initiate discussions around immigration, videos, images, and speakers were added as additional material depending on its relation to the texts read and immigration topic of discussion.

DESCRIPTION OF CRITICAL ENGAGEMENTS

Read-aloud discussions played a central role in my classroom. During read-alouds, students gathered on the carpet in a semicircle in the community area to listen to selected texts. The read-aloud began with a book introduction from me and then was followed by the reading of the text. I periodically stopped throughout the read-aloud in order to: pose questions; provide for response and discussions to posed questions; allow students to provide personal responses; and engage in "turn and talk" discussions, where students turn to a neighbor to discuss a posed question.

For this study, I read a number of critical multicultural texts focused specifically on issues of immigration. These stories offered students an avenue to discuss power differentials, sociopolitical relationships, and taken-for-granted assumptions about immigrants. A new title was selected at the beginning of each week, with one story lasting a two-week span of time. The text, a picture book, appropriate in length for

a third-grade reader, was read in its entirety during the reader's workshop meeting over the course of one to two days on average. Following the read-aloud time, the books were made available in the classroom library and near the classroom computers so that students could return to them for further reading and to support their online discussions.

In addition to meeting participants face to face during whole-group read-alouds, I facilitated an online discussion on a blog for students in the classroom on Kidblog.org. Kidblog.org is a trusted website designed specifically for K-12 teachers to implement and facilitate blogging in their classrooms. I provided each student with a username. Students created an undisclosed password to enhance the security of their information. Prior to implementing the blog for the study, students were given numerous opportunities to examine weblogs, blog on paper, and participate in discussions about online netiquette.

Following the read-aloud discussion, students were asked to write responses to the literature in their reader response notebooks and on the blog site. The reader's response notebooks were a common component of our daily reader's workshop and curriculum. Students' responses in notebooks were not constructed by prompts; rather, they were based on their personal reactions to the text and summary of reading. The blog site often had questions that students brought up in the discussion as starting points for their writing. Discussion prompts were constructed around issues that resonated with students and questions asked by students during the read-aloud discussions. As a result of my observations, I posed questions that needed additional elaborations from the face-to-face read-aloud meetings. Discussion prompts on the blog were constructed in a manner to encourage students to make a variety of connections (e.g., text to text, text to self, and text to world) (Rosenblatt, 2005). Students also posed questions for further elaboration from discussions. I did not come into this inquiry with predetermined prompts but listening carefully and closely to what children were saying during discussions. Moreover, I wanted salient discussion topics to push their thinking and help me understand as the teacher researcher their ways of knowing to enhance the discussion and ensure that each student had the opportunity to participate, I asked student participants to respond to the initial prompt and to respond to two other peers during the week. In an effort to give students ownership of the blog and develop autonomy in their participation, no requirement was placed on how many times they would need to blog.

In this study, I collected data from multiple data sources. A variety of data sources enabled me to gather detailed and in-depth descriptions of my participants and their meaning making of texts. Data sources included: student writing samples (e.g., reader response journals, response to sketch to stretch invitation, and response to illustration), students' blog posts, audio recordings and transcripts of read-aloud discussions and individual interviews, and field notes of classroom observations (e.g., student interactions and student reactions to texts).

After collecting and organizing all data, I used Atlas.ti, a qualitative data analysis and research software, to begin opens coding (field notes, read-aloud transcriptions, blogging transcriptions, and interview data). Open coding (Saldana, 2012) allowed me to use an inductive process of developing codes that captured participants' understanding of texts and discussions. I selected quotes relevant to my inquiry; however, I found it was important to code small cod able moments by carefully scrutinizing action occurring in the data. I used ATLAS.ti coding software to analyze the language used by participants themselves as a means of capturing what is truly significant to children. I wrote memos in my researcher's journal and in Atlast.ti during the coding process to help define apparent relationships and themes developing from codes. I used the developing relationships to build categories. I also used axial coding (Saldana, 2012) to redefine relationships amongst developed categories and to determine their variation among focal participants.

Facilitating Students Talk Around Immigration

Since I had an understanding that some students were grappling with immigration, I relied on the use of critical literacy, critical multicultural literature, and multimodal text types to engage in meaningful talk and discussions. This section outlines how I initiated discussions with young children and facilitated talk to support them in thinking critically and deeply.

As students engaged with one another a number of salient findings emerged. In the role as the teacher researcher, I paid close attention to the meaning making and shifts in understanding from their engagements and participation with one another and transactions with texts amongst different modalities. The shifts in student's active engagement and participation with peers when they read about social activism and engaged in activism in the process of "reading the world" is the focus of this section. I intend to highlight moments that allowed students to learn from and engage in activism and lead me to gain practical insights for working with my culturally and linguistically diverse students.

Social actors are real describes students' reactions to social actors within the critical multicultural texts used in this study. Taking up agency through writing denotes the way students recognized writing as a tool that children of immigrants use to cope with the immigration process. Within this section, I discuss how students began to use writing on a blog as method to enact agency in different ways. Through reading and interacting within the text sets students were able to recognize the pervasive power structures in place and discuss the privileges that often placed immigrants and their children in discursive situations. A purpose of this inquiry was to engage students in a dialogue or provide a space for them to critique structures, which affect their personal lives. Thus, through reading a variety of critical multicultural texts and listening to the candid stories of social actors, students were able to develop more complex understandings and begin to reflect upon structures that place them in difficult situations. The next two sections highlight students' discussions about social agency.

THE POSSIBILITIES OF TALKING ABOUT AGENCY

Social Actors are Real People

As children read and listened to the stories of social actors they reflected upon the practices of these social actors to enact change. Some students appeared to hold naive perceptions of how to enact change by indicating telling one's teacher or telling authorities can change inequities; however, listening and discussing the work of these social agents enabled children to reflect upon how they may possibly enact change within their own communities. One theme that emerged through students' responses to social activism is that social actors employed a variety of nonviolent methods to enact change. The episodes below highlight students' responses to the social actors within and across texts and within multimodal text sets. For example, in a reading of *Harvesting Hope* (Krull, 2003) children responded to the social actor Cesar Chavez and his work for migrant workers in fields. Below I highlight the whole group read aloud discussion questions that created opportunities to talk about their ways of knowing:

Teacher: [Reads text "... ripe grapes do not last long."] So how was taking a strike going to make change? Why would the farmers even care?
Mark: Because if they don't pick the crops they are going to lose money.

T: If the grapes aren't picked, what happens to the grapes...
Mark: They'll rot.
T: So that gets them to think, maybe I should change my ways. [Reads text] "... to ask for the governments help." First he did a march, now he is striking. What words could we use to describe Cesar?
Marcos: Dramatic but I don't know what it means.
T: When have you heard the word dramatic? Dramatic comes from the word drama.
Unknown student: [interjects] I learned it from you. TV.
T: Well it comes from the word drama. Have you had a brother and sister act out or overreact. He is being a little overdramatic. Why would he (Cesar Chavez) have to be?
Mark: So the farmers would pay attention.
T: So when you want things to change you have to draw attention to yourself. So when your brothers and sisters want something they make sure they roll around and cry a little to get what they want so they are dramatic. So if he (Cesar Chavez) wants change he has to be dramatic or full of drama. What other words could we use describe him?
Mark: My brother rolled around… Drama queen [inaudible].
T: Why would we use the word brave?
Bradley: Diligent! (calls out)
Bradley and Joseph: Because he never gave up.
T: [Reads text] "Si se puede." Have you ever heard those words "Si Se Puede?" When have you heard them? Maria, tell me where you've heard those words.
Maria: From my mom.
T: Why?
Maria: So when I say I can't do something my mom said yes I can do it.
T: Who else?
Patricia: From my grandmother. When I was small and I said I couldn't ride a bike. She said yes you can do it.
Bradley: My mom.
Mark. My mom
Jesus: So on television when Mexicans are trying to fight for something. Everybody starts screaming Si, se puede.
T: This kinds of remind me of when we were trying to save our school many of the parents started to say 'Si, se puede.' Many of the parents and teachers came together in a church and we were having a meeting on how were we going to save our school and some of the parents said, "Si, se puede, si se puede". So we can see that saying "Si, se puede" is a way you are showing social action. Ok mmm. Jesus do you know what they were fighting for?
Jesus: Fair jobs in Mexico. The police were throwing bombs at them. (Read-aloud, 4-16-13)

As I read more of Cesar's actions, students began to see his actions and the responses of the owners. Marcos identified Cesar's actions as "dramatic" however he cannot quite put into words why. I began to scaffold Marcos's thinking by comparing dramatic, a word he used, to that of a sibling acting out. Mark immediately picked up on the connection and shared with the group that Cesar was doing this to get the owners attention. Thus, actions of the social figures may be novel for some students; however, the discussion in a group setting allowed students to co-construct their understanding of such actions. Later on in our discussion, we discussed how words in conjunction with actions such as demands, marches,

and strikes might be a method to gain the attention of others. As the teacher researcher, I asked students about the phrase "Si se puede" used by Cesar and the context of the use of the phrase, some students shared that they heard the phrase used by their parents, grandparents, but for some students, they heard the words used in action. One student, Jesus, detailed a time when he witnessed the phrase *Si Se Puede* being used by Mexican employees on a news telecast demanding better pay. Students noticed how language was used to exercise power. At the end of our discussion, students briefly discussed what they learned from Cesar Chavez.

T: Which one of the social actions do you believe helped make a change?
Marcos: Because the grapes started rotting and it didn't make some food [I think he is saying here that the boycott which led to many farmers losing money actually persuaded the farmers to change their working conditions]
T: [Reads text] "… and he would never be powerless again."
[I read the author's note at end of text]
T: So what is one thing that you think we could learn from Chavez?
Mark: To not use violence.
Marcos: To be diligent.
Patricia: Never give up.
Jose: Don't work for anyone that doesn't give you enough money.
T: Did anyone treat you unfairly when you thought it was wrong?
Joy: Raises hand.
Joseph: Don't run away from school.
T: Don't ever run away from your education because someone makes you feel different?
Bradley: Always be treated fairly
T: So do you think many of the migrant workers felt powerless because they were immigrants? What did he teach them? Think about it and you are welcome to share later. (Read-aloud, 4-16-13)

Through students' read-aloud discussions, students were able to reflect upon Cesar's actions and the actions of the many activists we read about; however, it was on the blog that students shared openly what resonated with them. Below the teacher researcher provided a few posts to give context to students understanding and reflection.

Andrea: I think Cesar could of done something when he was little as a child like stand up for himself when he was in school. I would stand up for what's right. (Blog, 4-26-13)
Ciara: He was a diligent man and he was a great helper. And he didn't like his job. (Blog, 4-24-13)
Teacher: Ciara, You are so right. He was a diligent man. What can we learn from his actions? Write back soon. (Blog, 4-25-13)
Ciara: He can help kids for learning how to stand up. (Blog, 4-26-13)
Marcos: I think he was a brave man and that all that hard work paid off. (Blog, 5-20-13)

Several students indicated that they learned to stand up for their beliefs from the actions of Cesar. Additionally, students shared thoughts from the work of Emma Tenayuka, a social activist, who fought for the rights of pecan shellers. After reading Tenayuka's story, *That's Not Fair* (Tafolla, 2008), and

viewing a documentary of her work, children shared their emotional reactions; moreover, they shared a deeper level of compassion for activists who have fought for equal rights.

Arielle: This is my reason how I will change the world is by helping people and treating them with kindness. (Blog, 4-29-13)

Patricia: If I was Emma I would not stop fighting till everything is fair and people treated more fairly and everybody gets along. (Blog, 5-15-13)

Andrea: When I saw this video I felt sad for Emma because she fought and fought for the rights of pecan workers. She never gave up. (Blog, 5-16-13)

The critical multicultural texts afforded students opportunities to discuss social activism and learn the stories of leaders fighting for the equal rights of immigrants and their families. Additionally, students in this study were also exposed to real individuals whose life experiences questioned equitable and just practices; similar to the experiences and themes noted with the texts. Mrs. Toress, a former migrant worker who brought forth a lawsuit against her employers, and Jesus father's, who described to the class his experiences of deportation and the impact his family. Both individuals became central to helping students understand the social issue of immigration and immigrant experiences as they visited our class. By incorporating nontextual modalities within the inquiry, students were able to see the realness of activism by hearing from others in their own community and school. According to Lopez – Robertson (2010), discussions that are contextually based within the curriculum, allows for students to see that their lives are not situated within a vacuum. Below, the author highlights the story of Ms. Toress.

Ms. Toress, a former migrant worker, challenged her employer's dismissal of her after she was recognized as a member of the United Farm Workers Association. During her visit to my classroom, Ms. Toress detailed the difficulties of working in the fields with other adults and young children who were often exposed to unsafe chemical sprays and unfair working conditions as farm workers. As she shared her story in her native tongue of Spanish through an accompanied friend who translated on her behalf, Ms. Toress retold the struggles of being a migrant worker. Her story made students aware of the hardship and scarcity of support for migrant laborers until the arrival of Cesar Chavez. Below the author provides an episode from Ms. Toress' visit.

Ms. Toress: They use to pay us very little for what we did. We would work 10 hours or 12 hours with the short hoe. Bending over all day. By the end of the day when we got to the other side of the field we couldn't bend it hurt so bad. They would pay us very little. Whenever the planes would come by to drop all the pesticides they would tell us to just move to the side and then we would keep going [working]. Those were bad. It would really hurt me that there were some older people in the field that would get sick. When the author heard about Cesar Chavez and that he was fighting for the rights, and one of the things he was fighting for was for them to take out that short hoe out of the fields, the author felt a great relief and joy. That's when the author joined the union, Cesar Chavez's union. And at that time, I knew one day we would have justice. To fight for a lot of people that suffer out on the fields. When the movement started, I would shout every day, "Viva Francisco Chavez, Viva La Union". Never did I once imagine I would be the first woman in court fighting for those rights. I had a lot of sorrow and pain because I knew they paid us very little. We would take five gallon buckets out to the field and cut the top off the tomato can and all the workers would drink from the same cup.

Students: Yewww.
Teacher: So is that what caused the court case?
Ms. Toress: The court case that I was fighting for...See I withstood all of that...but they laid me off and my family off and the company was a multimillion dollar company. They couldn't give me a reason why they fired my family and me. They let us go and they didn't give us a reason. I demanded a reason and they couldn't give one. In the end it turned out to be discrimination. So that's why we went to court. The company knew that I was a member of Cesar Chavez's union. And the people that helped me called the health inspector to go out on the fields to see how the people were given water and to see all my stories were true. It was really hard for me to win the court case because it was a multimillion dollar company and they were from a German background. I was a Hispanic woman from Mexico. The circumstances led me to defend myself and hundreds of people. When Cesar Chavez and his people heard of the case they came and helped me and they were in the court with me. Three and half days in court with people on the jury. The judge decided I should get my job back and back pay since they let me go plus ten percent. Since they were a multimillion dollar company, they didn't want to give up. After the case was decided, they put up a sign on the company equipment and said that the company was bankrupt. I knew that they wouldn't go along with the judge's rule. I appealed to the Texas Supreme Court. And I went to the Supreme Court and waited 6 months. To this day, I am the first Hispanic woman who took her case to the Supreme Court for her civil rights.
T: Do you mind if they ask you a few questions?
Phillip: I helped my dad in Mexico on the farm. [Says in Spanish]
Jesus: I helped my dad plant onions.
Ms. Toress: I've never done it but I heard that it is really hard.
Ciara: How old were you when you began working?
Ms. Toress: 9 years old
Araceli: Do you wish each day you work you could get as much money as you want?
Ms. Toress: Yes. (Ms. Toress' visit, 5-2-13)

Students shared their understanding and thoughts of Ms. Toress' story through the blog. For many of the students, hearing Ms. Toress' story brought forth the reality of the life of many immigrant families and migrant workers. As noted by Ciara after Ms. Toress' visit, she could not believe Ms. Toress' actually met a social actor such as Cesar Chavez who has been portrayed in text. Thus, Cesar Chavez's work was no longer a fantasy but a reality as students listened to a figure that had worked with Cesar.

Maria: I think that it was good for her to shout what she said because she believed in Cesar Chavez. (Blog, 5-6-13)
Ciara: I cannot believe that she really met Cesar Chavez. I was very surprised. (Blog, 5-13-13)
Mark: SHE WAS BRAVE. (Blog, 5-15-13)
Francisco: I know she vas brave but can't you tell any more information? (Blog, 5-21-13)
Francisco: She did diligence and that means never give up. (Blog, 5-21-13)

The next section details how students understand the role of writing in the lives of children of immigrants and how it is used to enact change.

Taking Up Agency through Writing

Children's discussions centered largely on their personal experiences and intertextual connections. In their discussions, they made evident the "dual frame of reference" (Suarez-Orozco, 1989) that they as children of immigrants hold on legalization and moving across borders in the immigration process. Moreover, it appeared that from hearing stories of characters dealing with similar issues, students' talk began to center on ways with dealing with such loss. Writing became an approach to deal with such loss and a means to help families who were separated. In this section, the author details how children considered the topic of writing as a form of agency.

As students read text such as *Let's Go See Papa* (Schimel, 2011) where a young girl writes letters to her father who is living in the U.S. and also documents her feelings of leaving her grandmother behind, or *My Diary from Here to There* (Perez, 2009) where Armada keeps a diary of her travels towards the border to wait upon her father while he obtains a green card, or America in *America is Her Name* (Rodriguez, 1998) who writes in secrecy about living in a new country, and finally Beto in *Waiting For Papa* (Lainez, 2004) who vocalizes his sincere love for his father who he had to leave behind in El Salvador in a letter; children to realize and understand the importance of writing to characters in text. Thus, writing appeared to help those who were both separated from family members and strives to help families deal with the process of immigration. Children of immigrants appear to understand the unique qualities in the "act of writing". They clearly understand its importance as seen in this discussion of *America is Her Name* (Rodriguez, 1998).

T: How's writing in each of the text?
Patricia: It helps.
Andrea: It helps you remember stuff, memories, …
Marcos: It helps you remember your home, feelings, and what they were doing before.
Mark: Get their emotions through.
Marcos: Cheer them up
T: Did you notice that? Think about that also.
T: [Reads text] "… long before they've rotted on the vine"
Jose: Why are they talking about beer in a children's book?
T: You tell me?
Phillip: You waste money.
T: I think that the reason they included this is because remember many of our stories are based on true stories from the authors' lives of being an immigrant and growing up in America. So this is what happens that some people drink …
Mark: To deal with their emotions.
T: Yes to deal with their emotions maybe. And they are showing us this is not good. (Read-aloud, 5-16-13)

Patricia, Andrea, Marcos, Mark, Jose, and the teacher researcher discussed the importance of writing in the texts as we began to see a recurring theme appear. Patricia notices the therapeutic nature of writing by saying "It helps". For Andrea and Marcos, writing allowed individuals to remember their home and memories. Remembering one's home is very important to students as some have very few experiences and memories of travels to their parents' home country. For Mark, writing offered children an opportunity to deal with troubling emotions. Marcos ended the discussion by saying that it cheers

them up. Thus, children appeared to have positive views of writing that allowed them to document their personal struggles and emotions.

As students discussed the benefits of writing for children of immigrants, they noticed how letters and not just diary writing helped characters within texts keep a connection with family members. In a discussion around the letter Beto writes to his father in *Waiting for Papa* (Lainez, 2004), Arielle, Patricia, Andrea, and the author discussed what they think about Beto's letter. Arielle notices that Beto misses his father. She is able to make a connection to such loss since she actively uses the computer to FaceTime her older brother who is in El Salvador. Patricia recognizes that regardless of Beto's father absence he still has a presence in his life. Andrea ended the discussion by making a profound statement that shows that she understands that a person who is distant is still a part of your life.

T: [Reads text "… he spoke with mom for a long time."] What do you think of Beto's letter?
Arielle: He misses him.
Patricia: Telling his dad he is like his hero.
Andrea: His dad is not with him but he is still with him. (Read-aloud, 5-13-13)

Children show their level of maturity and continued "dual frame of reference" (Suarez – Orozco, 1989) as they discussed letter writing and waiting patiently for their parent or parents. As children of nonimmigrants may experience separation due to normal life events, children of immigrants are often left in a state of "liminality" (Suarez – Orozco et al., 2011) where they are unsure of their parents' legal status and how their parents are unable to be afforded the same citizenship rights as them.

T: Yes, how is it the same or different from my diary from here to there?
Araceli: Because the dad sends letters in the other book.
T: Laura?
Laura: Both of the girls had to wait patiently.
T: So yes, they are doing a lot of waiting. In real life when someone goes to another country do you have to do a lot of waiting?
Students: Yeah.
Jesus: In here they wait for a call [he is speaking of this book] [he was preparing to share his own story then stops abruptly]
T: Yes, here they were waiting for a call and in the other book they were waiting for a letter? What were you getting ready to say about yourself?
Jesus: I had to wait for three years.
T: Anyone else had to wait? [Reads text] "… When I ask at last." So I want you to turn and talk here, do you think she should go and live with her father in the U.S or stay in her own country?
Arielle: When I was little, like 7 years old, I missed my brother, …
T: Who's in El Salvador?
Arielle: Yes, and he had to get on the computer to FaceTime me.
T: So that's one way you can stay connected to your family if they stay far away?
Arielle: Yes. (Read-aloud, 5-3-13)

Children used letter writing as a means to stay connected and as a means of action to help their parents. In our discussion of *My Diary From Here to There* (Perez, 2009), Maria briefly discussed

how she waits for her father; however, she does not use letter writing as Jesus does do stay connected to her father. Throughout our discussion it appeared that Maria does not have a close relationship with her father because of his deportation and their lack of communication. In an interview with Maria she says, "I'm more used to my mom than to my dad, and my sister's used to my dad instead of my mom." This is due to the fact that Maria's mother and baby sister spend half of the year in Mexico with their father. Therefore, Maria feels her sister has a greater connection with her father than she has with him. In our personal conversation, Maria would regularly tell me she missed her mother after her departure to Mexico. Initially, the author believed Maria longed for her father's return, but as we began to speak at times about her family's situation, the author began to think that she longed for her father more because her family would no longer have to be separated and her mother would not have to spend half a year away from her. In our text discussions, Maria spoke of the lack of communication and correspondence between her father and herself. She indicated that she did not receive letters similarly to Jesus and she does not make the effort to write. In Jesus's moment of taking action, he detailed how he took a stance in order to transform his world. Thus, Maria is able to connect to her own experiences how writing can be a transformative act. The discussion below illustrates Maria's awareness on how letter writing can be an act of agency used by children whose family is coping with separation.

The blog afforded more introverted speakers to share their thoughts in an alternative format. Thus in the next few episodes it is apparent that children are able to take action and move beyond the spectator to a more actor role within the discussion. Francisco and Joy were two such students in the class who were surprisingly more vocal in their responses on the blog than they were on in the classroom environment. In a discussion of *That's Not Fair* (Tafolla, 2008), students discussed injustices they believed were unfair and ways they could possibly change those things.

Francisco: It's true that things are sometimes not fair but sometimes they are but that's how life is. (Blog, 4-29-13)

Teacher: Francisco, Lol. You are so right that that is how life is but I do think that we can change some things that are unfair. Even as a teacher I see things that are unfair for kids and when I do I speak up or try to help make changes. Do you agree or disagree? (Blog, 4-29-13)

Jose: WHY DID YOU PUT LOL MISS.ALLEN? (Blog, 5-1-13)

Joy: If people work they should get a lot of money like 35 per hour. (Blog, 4-29-13)

Teacher: Joy, why do you suggest 35 per hour? (Blog, 4-29-13)

Francisco clearly shares that he believes that some things are just unfair and we have to live with it as it is. Joy also shows her ability to question others in the blog discussion of *Waiting for Papa* (Lainez, 2004).

Joy: I agree with you. Do you like this book cause I do but it is sad because the little boy wants to see his dad but he can't see him. Why can't it be sad? (Blog, 5-20-13)

FUTURE RESEARCH DIRECTIONS

The inquiry outlined in this chapter developed from a specific need to examine how the use of critical multicultural literature with third grade Latino/a students may help young children make sense of immigration. Although the inquiry provided two curricular spaces for students to engage in dialogue and

complex discussions, future studies need to examine how other modalities can be used with Latino/a students. For example, digital storytelling can be another means by which children of immigrants can share their experiences. In thinking of the current trajectory of students in this study, a future study may examine longitudinally how focal participants' literacy achievement and success in school are impacted by immigration policies. Since the focus of this chapter lends itself to examining how literature selections and critical dialogue facilitated by preservice and inservice educators working within a critical lens informed this work, future research can delve into the micro-and macro-shifts of agency and activism employed by young children after engaging in this work in classrooms.

CONCLUSION

The discussion in this chapter will benefit preservice and inservice teachers in several ways. First, they are able to see how a topic that students were silently grappling with was taken up by one teacher and included as part of the classroom discussions. Secondly, preservice and inservice teachers are able to see what occurs when literature is both critical and multicultural in nature. Lastly, the findings highlighted from this inquiry revealed students' reactions to social actors (i.e., individuals taking on leadership roles in reaction to an injustice) and participants taking up agency through writing in different formats when multimodal texts are provided. Through reading critical multicultural texts, students noticed the ways social actors employed a variety of methods to enact change. In their understanding of these actions, children discussed the manner in which they have noticed social action being taken on by individuals. For example, students discussed how the phrase, "Si, se puede!" has been used in the Latino/a community. This led students to recognize the power in language as they attended to how marginalized voices often use language to exercise power. Moreover, in students' discussions during read-alouds and on the blog, they were able to engage in the second dimension of critical literacy by considering multiple viewpoints (Lewison et al., 2002) as Ms. Toress shared her story. The critical dialogue between students afforded them the opportunity to consider alternative ways of dealing with an injustice such as unfair working conditions and deportation. In the process of reading and listening to the stories in text, visitors, and peer students began to discuss how writing could be a means for children to be more action oriented. Moreover, they used the blog to take action as they moved from more of a spectator role in reading about social actors to a more actor role (Lewison et al., 2002).

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KEY TERMS AND DEFINITIONS

Critical Multicultural Literature: Children's literature that highlights diversity and social justice issues relevant to diverse learners. This literature offers students an avenue to discuss power differentials, sociopolitical relationships, and taken for granted assumptions. This study primarily used critical children's multicultural literature related to immigration and/or immigrants' experiences.

Latino/a Immigrant Children: Latino/a children born in Latin American countries but raised in the U.S. and/or children born in the U.S. to one or more Latino/a immigrant parents.

Literacy Practices: The activities associated with reading and writing as one makes meaning. The manner in which language and texts are used in order for readers to make sense of their lives.

Mixed–Status Families: Families with at least one parent born in another country and not a U.S. citizen. However, the children are U.S. citizens by virtue of being born in this country, thus, affording the child and not the parent with the rights associated with being a citizen (Brabeck & Xu, 2010; Landale, Thomas, Van Hook, 2011).

Chapter 28
Innovative Instructional Strategies for an Online Community of Learners: Reconstructing Teachers' Knowledge

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ABSTRACT

This qualitative, design-based research identifies innovative instructional practices for teacher professional development that support an online community of learners in reconstructing their technological pedagogical content knowledge (TPACK) for teaching mathematics. This analysis describes instructional practices that guide inservice teacher participants in inquiring and reflecting to confront their knowledge-of-practice conceptions for integrating multiple technologies as learning tools. The research program describes an online learning trajectory and instructional strategies supporting the tools and processes in steering the content development in a social metacognitive constructivist instructional framework towards moving from "informal ideas, through successive refinements of representation, articulation, and reflection towards increasingly complex concepts over time" (Confrey & Maloney, 2012). The results provide recommendations for online professional development learning environments that engage the participants as a community of learners.

INTRODUCTION

In this digital age, today's teachers need opportunities to relearn, rethink, and redefine teaching and learning in mathematics as they know and learned it. Their experiences ultimately must reconstruct their knowledge-of-practice for teaching through "systematic inquiries about teaching, learners and learning, subject matter and curriculum, and schools and schooling" (Cochran-Smith & Lytle, 2001, p. 274). They need practical experiences for inquiring and reflecting in ways that confront their knowledge-of-practice

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conceptions for integrating technologies in teaching mathematics (Loughran, 2002; Shön, 1983). This conception "emphasizes that teachers have a transformed and expanded view of what 'practice' means" (Cochran-Smith et al., 2001, p. 276), reflecting the transformed knowledge at the heart of Technological Pedagogical Content Knowledge (described as TPACK).

Online avenues potentially offer access to professional development for teachers while they are actively teaching (Moon, Passmore, Reiser, & Michaels, 2013). In online educational avenues, teacher educators are challenged to design learning progressions that effectively transform teachers' knowledge for integrating technologies in the teaching of mathematics. In essence, they must identify learning trajectories that incorporate the online instructional strategies towards reconstructing teachers' knowledge of teaching with technologies (Niess & Gillow-Wiles, 2013; Sztajn, Confrey, Wilson, & Edgington, 2012). Ultimately, these learning trajectories need to identify an "ordered networks of experiences…to move from informal ideas, through successive refinements of representation, articulation, and reflection, towards increasingly complex concepts" (Confrey & Maloney, 2010, p. 968).

Lave and Wenger (1991) and Wenger (1998) describe the importance of social participation and active involvement in learning, suggesting that learning in a community is an essential ingredient, in essence promoting learning communities for online instruction. A virtual community of learners acknowledges the importance of learners in active roles, building their understanding and making sense of new information despite the lack of face-to-face instruction. Garrison and Cleveland-Innes (2005) advocate for a community of learners around an integration of cognitive, social, and teaching presences towards higher order learning while engaging learners in critical reflection and discourse (i.e., critical inquiry): "reflective and collaborative properties of asynchronous, text-based online learning are well adapted to deep approaches to learning (i.e., cognitive presence)" (p. 145). Conrad (2008) calls for "careful consideration of design and facilitation of learning environments" for the "creation of appropriate spaces for community development" within which the community can grow and become sustainable (p. 17). Akyol and Garrison (2008, 2011) focus on the process and integration of the social, cognitive and teaching presences in online courses as supporting more collaborative and social constructivist approaches. Sztajn, Confrey, Wilson, and Edgington (2012) connect the ideas as basic teaching guides for instructional decisions, suggesting the addition of a metacognitive aspect to the instructional decisions framed in a learning trajectory for online courses. However, the sparseness of virtual worlds presents challenges for teacher educators in developing and maintaining the envisioned community of learners as an essential attribute of a social metacognitive constructivist foundation (Holmes & Sime, 2012) in online educational environments.

This chapter presents a learning trajectory supported by innovative instructional practices for online professional development course design. In doing so, the work describes how teacher educators might transition their thinking from within a traditional face-to-face environment to an online distance education context for transforming teachers' knowledge for teaching with technologies in the digital age.

BACKGROUND

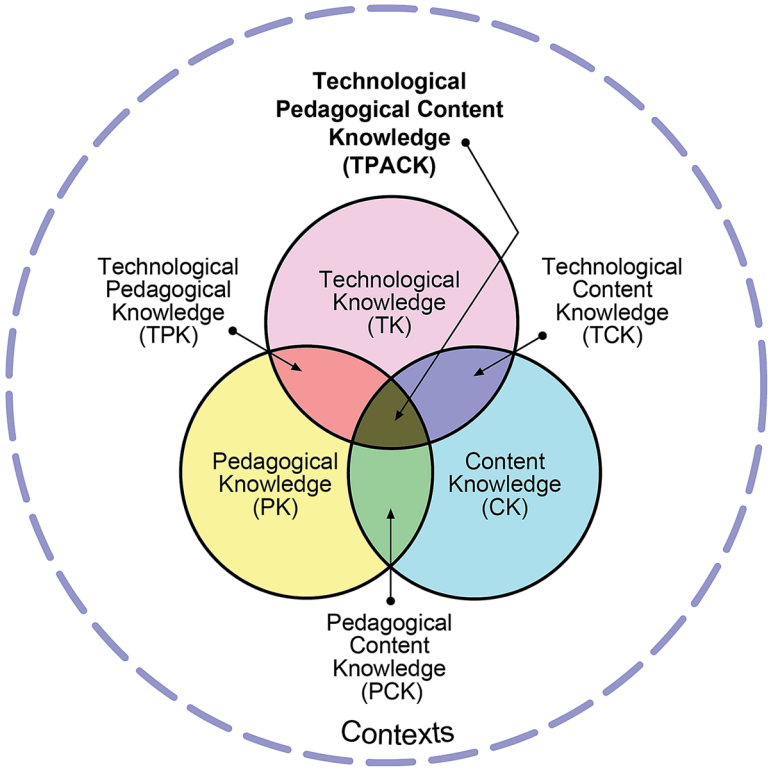
Technological Pedagogical Content Knowledge (TPACK) highlights the highly complex and challenging knowledge that teachers rely on for teaching mathematics with appropriate digital technologies – basically through an assimilation and accommodation of their technological, pedagogical, and content knowledge as shown in Figure 1 (Mishra & Koehler, 2006; Niess, 2005). TPACK is a dynamic framework that describes

teachers' knowledge as they design curriculum and instruction to prepare their students for thinking and learning mathematics with digital technologies. TPACK is more than the set of the multiple domains of knowledge of content (CK), pedagogy (PK), and technology (TK) and their intersections (pedagogical content knowledge (PCK), technological content knowledge (TCK), and technological pedagogical knowledge (TPK) (Mishra & Koehler, 2006). However, the center intersection (also called TPACK) is the desirable teacher knowledge that teachers rely on when designing instruction with digital technologies in various content areas such as mathematics. This center TPACK is considered as "a transformation of subject matter knowledge so that it can be effectively and flexibly used in the communication exchange between teachers and learners" (Angeli & Valanides, 2009, p. 155). TPACK embodies teachers' strategic thinking and knowing when, where, and how to use and interweave these multiple domains for planning, organizing, critiquing, and abstracting instruction around specific mathematical ideas, student needs, and classroom situations while concurrently considering the affordances and constraints of multiples digital technologies (Shavelson, Ruiz-Primo, Li, & Ayala, 2003).

Niess (2005) further clarified the nature of TPACK when revising Grossman's four central components of pedagogical content knowledge (PCK) (1989, 1990) to include technology. TPACK emphasizes the importance of the teacher's:

1. Overarching conception of teaching mathematics with technologies;
2. Knowledge of students' understandings, thinking, and learning in mathematics with technologies;

Figure 1. Technological pedagogical content knowledge
(reproduced by permission of the publisher, © 2012 by tpack.org)



3. Knowledge of instructional strategies and representations for teaching mathematics with technologies; and
4. Knowledge of curriculum and curricular materials that integrate technologies.

Simply demonstrating a calculator graph as the calculator rolls two dice a thousand times to show that the most common sum is 7 is not the understanding embodied in TPACK. Rather, teachers' TPACK is more closely revealed if they organize small collaborative groups to graphically explore functions in the form $f(x)=mx+b$ to identify how the values for m and b affect the function, where the students must defend their results in a presentation such as a video to explain their results and where the class engages in discourse about the results. Such teacher knowledge and understanding relies on their strategic thinking around the instructional strategies of grouping, problem solving, questioning, and student discourse where the learning environment is centered on student's active engagement with the mathematical ideas using the affordances of various technologies to enhance their learning.

Given this dynamic framework, teacher educators are challenged to re-design professional development programs that do more than simply guide teachers in learning about a particular technology. Teacher educators must re-design programs to develop this strategic thinking around teaching mathematics with the recognition that *how*, *what*, and *where* the teachers learn mathematics is as important in their TPACK education as *how*, *what* and *where* they learn about teaching and learning mathematics. As underscored through the Association of Mathematics Teacher Educators (AMTE) position statement, teachers need to develop knowledge for integrating appropriate technologies in teaching mathematics, knowledge that is actualized through:

- *A deep, flexible, and connected conceptual understanding of K-12 mathematics that acknowledges the impact of technology on what content should be taught;*
- *A research-based understanding of how students learn mathematics and the impact technology can have on learning;*
- *A strong pedagogical knowledge-based related to the effective use of technology to improve mathematics teaching and learning; and*
- *Appropriate experiences during their teacher preparation program in the use of a variety of technological tools to enhance their own learning of mathematics and the mathematical learning of others.* (AMTE, 2006, p. 1)

Transforming teachers' knowledge for teaching mathematics with technologies requires experiences that engage them in reframing their current knowledge, skills and understandings –to rethink, unlearn and relearn, change, revise, and adapt for teaching in the 21st century filled with new, more powerful digital technologies. Shreiter and Ammon (1989) propose that attention to these challenges requires that teachers be engaged in a process of assimilation and accommodation toward the reconstruction of their personal experiences and understandings in teaching and learning mathematics. They need practical experiences for inquiring and reflecting in ways that confront their knowledge-of-practice conceptions for integrating multiple technologies as learning tools (Loughran, 2002; Shön, 1983).

Online Teacher Professional Development

Many of today's teachers have neither learned their content with the multitude of available technological tools nor learned to integrate these technological tools as they developed their own pedagogical content knowledge. Thus, teacher educators are faced with determining how to provide appropriate avenues for guiding them in reconstructing their teacher knowledge toward that described by TPACK. With the evolving trend toward online learning environments, teacher educators are examining how they might take advantage of the affordances inherent in online learning (such as anytime-anywhere learning) for addressing this TPACK teacher knowledge.

As the demands of teaching change with the adoption of the consistent evolution of national standards and new testing requirements, this challenge has been to provide professional development programs that also meet the teachers' schedules and disperse geographical locations. Online professional development allows inservice teacher educators to enhance and extend teachers' TPACK in areas such as teaching mathematics with technologies while also focusing on the latest national expectations. Moreover, this recognition of online professional development educational opportunities parallels that of student-centered online education, a pedagogical direction in TPACK understanding.

In an attempt to describe the then current state of research as well as that of suggesting possible directions for the field, Dede, Ketekhut, Whitehouse, Breit, and McCloskey (2006) described a body of online professional development research that was anecdotal, lacking a sense of rigor necessary for developing best practices, ideas about program evaluation, or funding decision guidelines. For example, an early study focused on trying to understand the impact of situating professional development in an online context; in 2004, Charalambos and Michalinos examined their work in developing online professional development experiences. Using a three-part perspective (constructivism, situated and distributed cognition, and communities of practice), they presented the lessons they had learned. Their primary findings suggested that evaluation, communication, and collaboration were critical to successful online professional development experiences. Furthermore, they proposed that technology must be "used in ways that are consistent with constructivist learning, and [that] recognizing that online professional communities of practice can contribute to professional growth" are essential and merit further exploration (p.1). While these findings were later reinforced by other researchers (Beach, 2012; Cady & Rearden, 2009; Moon, Passmore, Reiser, & Michaels, 2013), they were primarily based on the researchers' reflections on a description of their professional development program. By 2009 Dede et al. formally forwarded recommendations for a research agenda to provider further guidance for online teacher professional development scholarship toward an evidence-based conceptual framework that provided robust explanatory power for theory and model building.

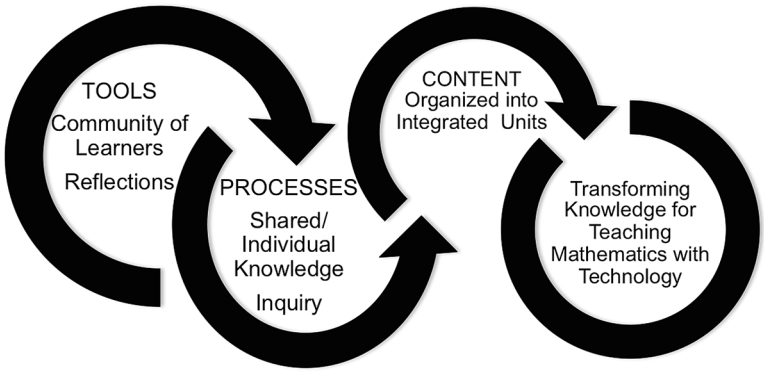
As the field matured and research moved from describing personal experiences to a more structured, rigorous research design, critical questions around the idea of best practices emerged. As in other areas of research, investigations into online professional development began as reporting on the experiences of early adopters, where the first hints of important elements were revealed. Building on these emerging ideas, current thinking around online professional development describes how student interaction and purposeful instructor facilitation of collaboration impact inservice teacher thinking. Rienties, Brouwer, and Lygo-Baker (2013) investigated the effectiveness of online professional development in research as they described the effects of online professional development on teachers' beliefs and intentions towards teaching and learning with technology. They found that, with time to develop a working professional learning community (through a 12-week training), the teachers in the study were more confident

in their ability to integrate technology and were changing their practice to bring technology into their classrooms. This idea of support from the teacher cohort was found to be a meaningful piece of what the participants felt was a "good" professional development. In another study, Maher, Sanber, Cameron, Keys, and Vallance (2013) found that gaining confidence in integrating technology into teaching and learning resulted from engaging collaborative, community of learner based instructional strategies in online teacher professional. Results from our own research agenda aligned with this developing body of knowledge about effective practices in designing online professional development. Instructor facilitated collaboration, reflective activities where participants describe their thinking, and effective technology use, where technology is a pedagogical tool used to think with, were all essential elements of what we found to be best practices (Niess & Gillow-Wiles, 2014, 2013).

Online TPACK Learning Trajectory

Online avenues potentially offer access to professional development to support teachers in reframing their current knowledge. As researchers-instructors, our almost decade-long designed-based research program on mathematics teachers' thinking about teaching with technology through online professional development began with the identification of a researcher-designed, empirically-supported framework for an online learning trajectory that uses a social metacognitive constructivist perspective (Niess & Gillow-Wiles, 2014). Figure 2 depicts the key features of the learning trajectory designed for reconstructing and thus transforming mathematics teachers' knowledge for teaching with technology identified through this research effort. The first consideration in this trajectory is the establishment of the essential tools for the learning experiences. Our research identified two important tools for online learning - a community of learners and reflections. These tools are infused with important processes for engaging learners. Two important processes included involving learners in both shared and individual knowledge building efforts while they also were engaged in inquiry activities throughout the content units. The third aspect concerns the content that is organized through integrated units arranged specifically "to move from informal ideas, through successive refinements of representation, articulation, and reflection, towards increasingly complex concepts" (Confrey & Maloney, 2010, p. 968).

Figure 2. A researcher-designed, empirically-supported online professional development learning progression



With this basic learning progression for the professional development course design, our challenge shifted to the identification of innovative instructional strategies that effectively and successfully supported the tools and processes in steering the content development through a social metacognitive constructivist instructional experience. The goal for the learning progression has consistently been to have the teachers reconstruct their thinking and transform their knowledge more towards that described by TPACK. Thus, since 2008, the focus of our research program has been to identify best practices in instructional strategies for guiding an online TPACK learning trajectory towards the goal of reconstructing teachers' knowledge for teaching mathematics with technology.

THE DESIGN-BASED RESEARCH EFFORT

Instructional strategies merge the tools, processes, and content development within a social metacognitive constructivist instructional structure. Our specific research challenge has been to identify and describe innovative instructional strategies that support the establishment of an online professional development learning trajectory for the more than 15 three-credit graduate level courses in a three-year online Masters of Science (MS) degree program in mathematics education for enhancing the teachers' abilities to incorporate technologies as learning and teaching tools in their classrooms. Throughout this course design period, we relied on the design-based methodology (Barab & Squire, 2004; Brown, 1992; Cobb, diSessa, Lehrer, & Schauble, 2003; Collins, 1999) to formulate and improve the instructional strategies under the support of two, three-year Oregon Mathematics Science Partnership (MSP) grants. We used this methodology for its strength in connecting "interventions to outcomes through mechanisms" for leading "to better alignment between theory, treatments, and measurement … in complex realistic settings like the classroom" (Hoadley, 2004, p. 204). The qualitative nature of the study afforded a rich description of the instructional strategies and of multiple participant experiences depicting the online cognitive, social and teaching presences that developed.

The social metacognitive constructivist structure involved the participants as a community of learners, where they collaborated about their explorations, research, and reflections on their own thinking and their students' thinking and learning in mathematics with appropriate technologies. The most informative results evolved from the iterative implementations of three technology-based courses in the MS program combined with an additional course that blended teaching practice and reflections where the participants taught with technologies, testing their theories through these experiences as they inquired into their knowledge-of-practice for integrating technologies as mathematics learning tools. Table 1 describes these four courses in the MS program that provided the most informative results.

During the technology courses, we challenged the participants to examine various technologies for multiple educational purposes in teaching mathematics where they were focused on inquiry, collaboration, and communication. These technology courses emphasized multiple, diverse technologies with different content and pedagogical strategies. The fourth course blended online interactions and discussions in an online community of learners' interactions with classroom-based practical experiences when teaching with technologies. In the online discussions, they collaborated in the identification and development of technology-enhanced instructional strategies for promoting inquiry and higher order thinking in a discourse-oriented learning experience. This online collaboration was blended with their practical experiences in their classrooms focused on inquiry, analysis of their practice, and reflection on their practice. Through this practice-based experience, the participants enacted their knowledge, gathering data about

Table 1. Primary MS courses in multiple iterative research cycles for informing the instructional strategies for the learning trajectory

Course	Title	Description	Course focus	Research Terms
SED 520	Integrating Technology and Literacy in Learning Math and Science	Engage students as critical thinkers and creative producers of their knowledge in mathematics/science taking advantage of multimedia affordances	Multimedia focus: Web 2.0 apps; temperature probes; Jing video software; presentation software; web inquiry; Google docs	Winter 2011 Winter 2012 Winter 2013
SED 521	Teaching Mathematics and Science with Digital and Video Technologies	Examine and incorporate digital image and video technologies to support learners in becoming critical thinkers and creative producers of their knowledge and understanding in mathematics/science.	Watch, analyze and create using digital images; create digital image spreadsheet library; mashups; watch, analyze and create videos using digital images and Jing video software; digital storytelling	Spring 2012 Summer 2012 Spring 2013
SED 522	Dynamic Spreadsheets as Learning Tools in Science and Mathematics	Explore algebraic reasoning through learning with spreadsheets in science and mathematics	Dynamic and dependable spreadsheet design; algebraic reasoning with spreadsheets; spreadsheets and problem solving	Spring 2010 Spring 2011 Spring 2012
SED 593 and SED 594	Advanced Teaching Strategies in Science /Mathematics	Practical experience with instructional strategies and models for teaching mathematics and science with technologies;	Community of learner's collaboration on reform-based strategies; design, implement and assess teaching 5-day unit with technologies; gather artifacts of instruction in an electronic Scoop Notebook	Winter 2012 Fall 2012 Winter 2013

the enactment, and then analyzed and reflected on their teaching with technology experiences. They gathered data, documenting their instruction using technologies in teaching mathematics over a series of lessons with analysis of two videos of their lessons, analysis of student work, and multiple reflections on their practice. This course project was adapted from the Scoop Research Project by Borko, Stecher, and Kuffner (2007). As they worked on this project in their own classrooms, they used the online community to share the developments of their designs and plans, reviewed each other's work to clarify and share the inquiry, analysis and in depth reflections on the teaching practice. Throughout this process, the teachers compiled electronic portfolios (called Scoop Notebooks) containing multiple classroom artifacts and related materials.

The basic learning progression in Figure 2 framed our research focus to identify the best instructional practices in the online professional development for reconstructing teachers' TPACK. Three concentrations guided the design and refinement analyses for this research:

1. Tools (Community of Learners, Reflection):
   a. What instructional strategies establish a functioning community of learners in the online learning environment?
   b. What strategies support the participants in engaging in reflective experiences in the online environment?
2. Processes (Shared/Individual Knowledge, Inquiry):

   a. What instructional strategies support participants' engagement in shared and individual knowledge development in ways that lead to high levels of learning in the online environment?
   b. What instructional strategies engage participants in inquiry activities in the online environment leading toward high levels of learning (e.g., cognitive gains) such that they envision the integration of technology and mathematics in their curricula?
3. Content (Scaffolding of Units):
   a. What instructional directions engage the teachers in high levels of learning in the online environment in preparation for teaching mathematics with technologies?
   b. How are cognitive, social, and teaching presences managed in support of a deep approach to learning to teach mathematics with technologies in the online environment?

In essence, through these questions, we focused on "designing and exploring the whole range of designed innovations" where we examined multiple possibilities for instructional strategies for the graduate asynchronous online courses and thus resulting in "contextualized theory" of the researcher-designed and empirically supported learning trajectory (The Design-Based Research Collective, 2002, p. 5, 8). At the completion of each research term for each course, using the iterative nature of the study, we were able to reframe each course presentation in Blackboard to better meet the challenges revealed through the analysis from the use of various instructional strategies. Thus, through multiple iterations, the implementation of specific instructional strategies was improved to meet the goals in the learning trajectory.

Data Sources

Over the multiple years of this research in the courses described in Table 1, more than 60 graduate students participated in this ethics-approved research project as required in compliance with our institutional policies, federal and state laws and regulations. As course designers, instructors, and researchers, we satisfied our need for thoroughness by collecting everything from the course online presentation and all that the participants produced with their approval: course syllabi and their enactments in Blackboard (our online course management system); all participant products and interactions (including discussion board interactions, unit/weekly products, unit/weekly reflective essays and reflective learning community essays); and multiple interviews upon course and program completion. More specifically, throughout the research with each course, the participants created a collection of learning products, including content focused and reflective essays, PowerPoint reflections, Jing videos of their thinking, and Blackboard interactions and discussion forum postings. These data sources provided us with an extensive description of how the study participants engaged with their learning as well as how their thinking about teaching with technology changed as they worked through the units. This action provided a broad view of the learning experiences as well as a reasonable triangulation of the data, increasing the validity of the analysis. The data sources also included a thorough description of the instructional strategies used in establishing the community of learners and the strategies used to maintain those communities.

Data Analysis

The data analysis for each course in each of the terms of the research effort began with an analysis of the specific course online presentation and how the instructional strategies were incorporated in the

presentation. For this analysis, we relied on recommendations from Garrison and Cleveland-Innes (2005) to complete a detailed analysis of each course design, considering questions such as:

- Were expectations clearly defined and presented in manageable chunks?
- How were activities structured (collaborative and individual)?
- How was the community managed?
- How were the assignments assessed? Were the assessments congruent with the intended goals?
- What processes were in place to foster a deep approach to learning?

Next, we engaged in the more detailed analysis of all the class and student participant artifacts with respect to the cognitive presence, social presence, and teaching presence using Garrison, Anderson, and Archer (1999) community of inquiry coding template to describe the results and impact of the instructional strategies on the students' achievement in meeting the course outcomes (Rourke, Anderson, Garrison, & Archer, 1999). For each analysis we gathered electronic student case course portfolios (Meyers, Chappell, Elder, Geist, & Schwidder, 2003) to track the participants' interactions and progressions throughout the course. We organized these electronic portfolios by type/source, one for each participant, to create a description of the participants' progression and outcomes from their learning experiences.

These important data sources included the metacognitive reflections on the community of learners' interactions in the different assignments and their analysis of the impact of the community on their learning. Analysis of these reflections provided the participants' views of their knowledge gains along with their engagements while examining the influence of the community's shared knowledge and its impact on their emerging individual knowledge as they engaged in the instructional activities. Interviews at the conclusion of the students' programs provided summative reflections on the affordances and constraints of the instructional strategies and the community development. The interviews supplied their reflective thinking about learning with specific identification of the tasks and resources influential in their thinking as well as their reflections on the impact of the community of learners on their knowledge growth.

With these descriptions of the participants' progressions and outcomes from their learning experiences in a specific course both researchers first independently examined in depth each individual electronic portfolio to identify preliminary patterns and themes. Following this independent coding, we collaboratively began the more intense analysis initiated by a comparison of the preliminary patterns and themes until reaching a consensus on the emergent themes. This more detailed process involved two recoding cycles.

The first coding cycle employed an attribute coding process (Saldana, 2009), through which we collaboratively re-examined the data from all sources for participant information and contexts for analysis and interpretation. This coding type provided a 'grand tour' of the data as well as a comprehensive overview of what was collected. This first coding cycle produced a large number of representative phrases to describe the thinking of the participants or represent their actions at specific points. In our studies, each of these phrases made up a single modified thematic unit. For our purposes, a modified thematic unit was considered the unit of analysis and was defined as an individual thought unit that conveyed a single item of information. These units were most often in the form of complete sentences or self-contained passages and were considered a combination of a thematic unit and a syntactical unit, thus allowing us to capture the unit in its natural form while retaining the reliable identification attributes. However, in some cases, the thematic unit was a single thought unit, but conveyed multiple, related information items. These thematic units were identified as having this characteristic and were coded as described in the second round of coding.

These phrases initially were coded into a number of categories: for example, what the participants were referring to; who they were talking to; who they were talking about; the content (e.g., emotive, informational). As this process continued, we were able to collapse a number of codes (i.e. the various emotion categories became a single 'emotion/affective' category). In this coding cycle, we grouped the codes into the three concentration categories:

1. Tools,
2. Processes, and
3. Content.

A fourth category was added as we developed our understanding of how the participants experienced the course. This category included phrases that indicated participants engaged in more than one category. For example, if the participants described how their interactions with another participant helped them understand how to use the temperature probe in a certain way, we coded that phrase as engagement with both the tools and the communication.

The second coding cycle employed a pattern coding process, where the coding process provided a way of pulling together a variety of material into more meaningful units of analysis, revealing a "smaller number of sets, themes, or constructs" (Saldana, 2009, p. 152). Since one focus of this study was the impact of the course experiences in terms of how the instructional strategy choices affected the participant's TPACK, the emergent themes developed through the initial coding process were analyzed with respect to the three concentration categories. During the second coding cycle, the four TPACK components (Niess, 2005) provided the framework for pulling together the wide variety of data collected. This pattern coding process examined the narratives created by the participants as they described how they thought about how their TPACK was developing in response to their experiences. During this coding process, we looked for phrases that described relevant aspects of the experiences. For example, a comment like, "Provided a frame of reference for how it could be used, much more engaging" was coded in the first pass as talking about process. In the second coding cycle, this phrase was associated with the fourth TPACK component: *Knowledge of instructional strategies and representations for teaching and learning subject matter topics with technologies*. A comment like, "Teaching content with tech, not presenting understanding through tech is what I wanted and got from the MS program" was coded as tools in the first coding cycle and associated with the first TPACK component in the second cycle: *Overarching conceptions about the purposes for incorporating technology in teaching subject matter topics*. In this way, the four TPACK components helped to develop an understanding of the impact the instructional strategy framework had on the participants' developing TPACK.

ITERATIVE DESIGN-BASED RESEARCH RESULTS

The research challenge was to identify instructional strategies that effectively and successfully supported the tools and processes in steering the content development in a social metacognitive constructivist professional development educational experience designed to transform teachers' TPACK for teaching mathematics with technologies. After three iterative implementations of each of the technology courses and the practice-based blended course as shown in Table 1, we identified innovative instructional strategies for the tools, processes, and content along with essential ingredients throughout the implementa-

tions. Representative comments from the K-12 teachers in these courses demonstrate the influence of the strategies on their learning.

Tools

Two important tools for the online learning trajectory involved a functioning community of learners and the involvement of reflection as an instructional strategy.

Community of Learners

A community of learners is not an automatic result of organizing online participants in groups for working on tasks. Specific strategies are needed to advance the community. Instructional strategies must connect the learners in cooperative and supportive activities throughout the course beginning with the first online activity.

An introductory task is intended to facilitate the community of learners' engagement towards a common goal (Garrison, 2006; Garrison & Akyol, 2012; Shea & Bidjerano, 2010). For example, the teachers as students in the course might be challenged to introduce themselves to each other through small (2 or 3) collaborative groups where they exchange digital images in ways that communicate who they are as teachers. Each participant posts an image to the small group discussion board and challenges the others to decipher the message in the image. The others in the group become the "respected other" (Bandura, 1982) charged with identifying what the image communicates about the participant as a teacher. The small group then presents a collective description of the participants along with the images to the whole class discussion board, challenging them to connect the descriptions with the images. Throughout this engagement, all the learners interact with each other around the image communications. A typical participant's reflection on these introductions indicated that the task "helped us find common ground with one another, and helped us get to know one another so that we would be comfortable working together through the course."

Once the community is initiated, purposeful, regular, and varied inquiry activities and tasks are vital for maintaining the community of learners' emphasis. As the participants become more familiar with each other (and comfortable with the process of moving between small and large group engagements), the focus of the activities transitions from the familiar (themselves) to the new and unfamiliar (the course content). The participants found value in the variety of the grouping structures, saying "Interaction through small group and the whole class provided me with two different groups as sounding boards. The small group felt more intimate and we worked together to share new ideas or extensions for each other's videos. The larger group was not so involved, but still offered sound advice and help when needed." Assigning groups based on similar backgrounds was found to be less important than simply varying the compositions of the groups. The key was that every student needed to interact with every other member of the community in meaningful ways throughout the course. One participant noted, "You mixed people up so that you would work with different people… it forces you to interact with different people."

The tasks for the small groups over the course needed to be varied with each major unit topic. In one unit, the groups might have been asked to cooperate in the identification of a single group response (consensus of the different ideas in the group) for a specific task. In another unit they might have been organized as a collaborative group where each member developed an individual response based on the

interactions and work in the group. For another unit the groups might operate as study groups, where individual members were responsible for specific tasks in the process of developing a group response. In some groups, members were given roles, such as discussants, respondents, or consolidators, for completing the analysis and synthesis in response to key questions for the unit. The group consolidators were asked to post a compilation of the analysis and synthesis to the discussion board for interaction with the whole community, thus sharing the accumulation of ideas. This organization effectively placed the participants at the center of the learning rather than incorporating instructor confirmation of the learning.

Online learning, with its text-based, asynchronous discussion forums as the primary communication for the small groups as well as the whole class discussion boards, limited the free-flowing exchange of thoughts and ideas. The extended time between posting and receiving a response typically led to feelings of isolation where the participants were not able to identify if another member of the community was currently available for discussion. Instant messaging technologies, such as Skype and Google Chat, provided an alternative to alleviate the feeling of loneliness voiced by the participants, as the sense of being "alone at midnight with no one available for asking questions." Adding instant messaging as a community tool allowed the participants to search at any particular time, ask questions and share files with others in real time.

Another strategy for supporting the community of learners' small group work was collaborative writing using Google Docs. This technology facilitated small groups, where each member used a different pen color to enter ideas into an evolving document. Instructors were not involved unless the document was shared with them. Interestingly, with the addition of this technology, the learners began reporting the use of this technology for engaging their own students in their classrooms. In essence, the addition of collaborative technologies provided multiple advantages when focusing on teachers' TPACK. Their personal experiences with the technology supported them in rethinking and redefining their instructional strategies for teaching with technologies.

Reflection

Reflection is the "active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends'' (Dewey, 1933, p. 9). Adult learners, in particular, enter the learning experiences with prior knowledge and understandings that impact how they make sense of new ideas in their educational situations. According to von Glasersfeld (1991), they need to "step out of the stream of directed experience, to re-present a chunk of it, and to look at it as though it were direct experience, while remaining aware of the fact that it is not" (p. 47). This additional metacognitive perspective has gained acceptance in the research literature (Akyol & Garrison, 2011; Chiu & Kuo, 2010).

As part of the design-based research for effective online instructional strategies, we consistently integrated reflective activities in three primary ways: content reflective essays, community engagement reflective essays, and peer reviews. As we analyzed their responses, we noted the importance of reflection as an important strategy in their developing knowledge. They needed to unpack their ideas and rebuild them given the new information. Thus, throughout each course, we asked them to reflect weekly. They reflected on the content through weekly essays based on the unit questions. We provided detailed instructions such as these for their reflective essays to assure that rather than simply answering questions individually, the participants worked at drawing together and reflecting on the ideas for the unit and on the content:

Think of structuring your essay beginning with an introduction where you provide an overview of the concepts and ideas, followed by sections where you present your claims/ideas/understandings; include a closing to your essay. The essay sections should include support for your claims/ideas/understandings from the readings you have explored throughout the unit. The closing section should be a summary of your arguments and conclusively tie the ideas together in a synthesis of the information.

In addition to these weekly essays on the content, the participants individually reflected on the community engagement, their role in the engagement, the impact of the various instructional activities and the discourse that occurred. Some typical questions for this essay assignment included:

- How did this collaborative experience support the development of a description of you as an educator?
- How did this collaborative experience help the development of your reflective essay?
- How did your interactions (either small group, whole class, Skype, etc.) support your thinking and planning?
- What were the advantages and challenges you experienced in meeting the outcomes for this week?

Again, rather than responding to the questions individually, the challenge was to integrate the response into an essay where they reflected on the entire set of questions.

A third reflective practice engaged the participants in peer review after they worked on a particular assignment for multiple weeks where they needed input from a different perspective. We organized them for maximum exposure to multiple points of view: Participant A reviewed participant B, participant B reviewed participant C and participant C reviewed participant A. Not only did this review help them improve their own work, it caused them to rethink their own efforts on the expectations. As one student noted:

In reviewing the work of another … I was forced to more critically analyze the paper than I would when just reading the work … an outside reviewer could point out sections that needed clarification and pose questions that caused me to reflect on whether I made my intent understood … when you are working on explaining your ideas, it is hard to step outside of your own knowledge constructs to see how someone who does not have your same background knowledge understands your points.

Processes

With the challenge of framing an online professional development in a social metacognitive constructivist-learning environment, two primary processes emerged:

1. Shared/individual knowledge development and
2. Inquiry.

Shared/Individual Knowledge Development

Through designed tasks and activities, we engaged the participants in social metacognitive ways, where the "group members monitor[ed] and control [led] one another's knowledge, emotions and actions" in

ways that increased "the visibility of one another's metacognition" and improved "individual cognition, resulting in reciprocal scaffolding and greater motivation (Chiu & Kuo, 2010, p. 322). Thus, individual knowledge and group knowledge merged to build a shared community knowledge resulting in higher order learning.

Relying on the community of learners and learner reflection as learning tools required the participants to fluidly move between group and individual knowledge building to create understanding that more clearly reflected their world view with respect to the course (Dunlap & Lowenthal, 2014; Rienties, Tempelaar, & Lygo-Baker, 2013; Swan, 2001). This collaborative understanding needed to be integrated with their existing knowledge base as well as be accessible as a platform for building new knowledge in the social metacognitive engagement, where as a group, they shared their understanding and thinking (shared metacognitive knowledge) and, based on this understanding, renegotiated their understanding (shared regulation) (Hacker, 1998). From one participant's perspective, "The ah-ha I had while working with this group was really understanding how important it is to have others to talk to and work through questions and problems."

The dynamic interaction between developing shared knowledge and individual knowledge was sustained through the participants working as a learning community where they learned to value metacognitive reflection (Garrison, 2006). We purposefully structured the small group collaborative/cooperative activities and large group assignments to reinforce the community relationships. Virtual workbenches provided the small groups with opportunities to develop ideas and concepts leveraged through the social metacognitive engagements. These ideas and concepts were then brought to the larger community for a more thorough review and integration into the commonly held body of shared knowledge (Magnusson, Palincsar, & Templin, 2004).

Multiple reflective activities established both individual knowledge and shared knowledge (Hodes, Pritz, Kelley, & Foster, 2011; Yukawa, 2006). The participants examined their learning in a community through inquiry and higher order thinking tasks, learning about and with new technologies and sharing their knowledge in ways that enhanced their individual knowledge (Hershkowitz, Hodas, Dreyfus, & Schwartz, 2007; Puntambekar, 2006; Shea & Bidjerano, 2010).

Three primary modes of communication recognized this dynamic interaction of knowledge building. The participants built shared knowledge from their individual knowledge through discourse in the discussion forums. This activity enhanced their individual knowledge, voiced through weekly individual reflective essays using word processing technologies (the first mode). Yet, they often used screen capture videos (using Jing video software) as a second mode to communicate their developing ideas as well as their final reflections. In several instances, the participants assembled 'drafts' of their emerging projects, posted the drafts on the discussion board for the third mode, and invited all members of the class to help them with the developing ideas. As one student said: "This process of constantly building a body of shared knowledge has invigorated and increased both my engagement in our community of learners and my enjoyment of it."

Inquiry

A second critical process for online professional development was the adoption of inquiry as a primary instructional strategy. We incorporated the tools together through an inquiry-based pedagogical approach framed by the 5E's (Engage, Explore, Explain, Elaborate, Evaluate) instructional model (Bybee, Taylor, Gardner, VanScotter, Powell, Westbrook, & Landes, 2006). This model supplied an inquiry-focused tra-

jectory reinforcing the implementation of the tools through the processes in the learning trajectory. We found that by designing inquiry-based activities in each unit using the 5E's instructional model engaged the participants with important experiences for negotiating the content.

The tools and inquiry learning processes supported them throughout the inquiry process. They constructed their understandings, where they took ownership of their learning, starting with questions and exploration leading to investigating worthwhile questions, issues, problems or ideas. They asked questions, gathered and analyzed information, generated solutions, made decisions, and justified their conclusions. The resulting actions interwove multiple technologies, instructional approaches, and content topics through multiple units in ways that reframed their thinking about teaching with technologies.

Throughout this process, they consistently engaged in thinking and reflecting about the dynamic interactions among content, pedagogy and technology that emerged from the tasks in their online learning experiences (Roberts, 2002; Wheatley, 1992). As they noted in the technology course focused on teaching with digital images, "Teaching students in the 21st century requires teachers to utilize instructional strategies that address all areas of the 5E's learning cycle while employing digital technologies. Allowing students to develop their own digital video stories is one way to achieve this goal."

Content

The content is an important aspect of the design of the online professional development coursework. Typically, general course goals frame thinking about the content. Course goals define the desired learning outcomes for the professional development but they do not define the pathway for necessarily reaching those outcomes. They do not describe the social, cognitive and teaching presences important in scaffolding the online experiences. Specific instructional considerations help in designing the online environment such that the content is organized into integrated units strategically arranged "to move from informal ideas, through successive refinements of representation, articulation, and reflection, towards increasingly complex concepts" (Confrey & Maloney, 2010, p. 968). This study revealed two important ideas for meeting this challenge – deliberate and purposeful scaffolding of the integrated units and incorporating key questions for each unit.

The scaffolding of the content begins with introductory ideas and moves toward higher order thinking experiences for increasing the cognitive load toward more sophisticated understandings. After the course content is divided into manageable unit chunks, more specific attention to the cognitive presence of the course is managed through the identification of key questions framing the course outcomes for each unit. These key questions become organizers for the content reflective essays tasks for each unit.

The second consideration in the scaffolding is directly related to the teacher education aspect of the professional development. Learning to teach the content with new and emerging technologies presents teachers with learning about more than just the technologies. They are engaged in relearning and rethinking about pedagogies for teaching with the technologies. Thus, the content scaffolding needs to integrate both learning about the technology as well as learning various pedagogical strategies for teaching with the technology.

For one course (SED 520), we designed a two-week unit where the participants were focused on higher order thinking and inquiry learning using a technology new to them – a temperature probe. During the first week of the unit they learned about the probeware through multiple experiments where they gathered and analyzed temperature data. The ultimate goal was to guide their work with the probe for

thinking about their learning as well as students' learning with new technologies in ways that engaged them in higher order thinking and inquiry learning. The key questions for this unit were:

1. What are higher order thinking and inquiry learning?
2. How are the International Society for Technology in Education (ISTE) Teacher Technology Standards (2008) connected with higher order thinking and inquiry learning?
3. How can probeware (such as the temperature probe) be incorporated as a learning tool in mathematics in ways that support inquiry learning and higher order thinking?
4. What knowledge do teachers need to prepare students for meeting the standards and challenges of inquiry learning and higher order thinking in mathematics?

Over the two-week period for this unit, in addition to the individual and group work with the technology, the participants developed two PowerPoint presentations (presenting them using Jing video software). In one video they described their individual knowledge development for teaching with the probeware. In the second video, they described students' thinking when engaged in open-ended inquiry with new technologies such as the temperature probes through various inquiry-framed experiments. The participants' small group interactions and discussions supported the identification of specific pedagogical considerations for guiding student learning in the open-ended inquiry and in linking these ideas with the strategies that had helped them in their own learning about the probe. Eventually, as a result of this learning experience, some of the teachers followed the experience by testing their theories on teaching with probes in the blended practical experience course.

Essential Ingredients

The multiple expectations and tasks for assuring participant engagement with the tools, processes and content presented questions as to whether the participants would actively engage in the learning experiences. Thus, an important question for our research was to identify essential ingredients for assuring active participant engagement. From the many participant reflections, we identified the importance of assessment where the participants unanimously concurred with the literature "What is assessed is what is valued" (Swan, Shen, & Hiltz, 2006, p.45). We found that to launch an effective online community of learners, the instructional strategies needed to include some form of assessment, in particular assessment of the community activities. Simply participating the community activities was not found to meet this ingredient for effective participant engagement (Gillow-Wiles, 2012). The question for our research then was to identify specific strategies for the assessment. What guidelines were essential for the assessment of the various community activities?

The iterative research design was critical in framing the assessment structures to effectively guide the participants' learning. We needed to describe the assessment guidelines such that the participants clearly connected the learning goals and assessment tasks to help them understand the important features for their learning as well as making connections between the previous content and the current activities. Thus throughout the research, we iteratively designed, tested, and revised scoring guidelines for all the tasks in each course with explicit expectations for participation and interactions. The scoring guidelines became an essential ingredient for detailing the assessment criteria for not only the academic aspects, but also the criteria for the participants' interactions and engagement in the assignments.

Table 2 provides a sample of the guidelines that were identified for the reflective essays and tasks for the first week in the digital image course. Recall that the participants were engaged in introducing themselves to each other, an activity that was more specifically aimed at participant interaction and engagement than academic extensions. The left column in Table 1 provides the criteria for the tasks, which are followed by point scores associated with the extended descriptions linked to specific number of points. Note that one key criterion in this scoring guide is the learning community activity with detailed descriptions of the participant's actions for the various point scores. The total points for the assignment is 50 and the points for the learning community activity is 30% of the total, describing the importance of this expectation.

Beginning each course with this assessment norm was both positive and productive. One participant indicated, "Clearly presented expectations and loss of points motivated individuals in participating." She added that in another professional development program in which she had participated, there was "No required participation, so my engagement was pretty minimal," while having, "… weekly interactions that you were required to do and respond and communicate, required participation" and helped her "feel connected." This feeling of connectedness was at the heart of creating the relationships necessary for the development of the online community of learners, as described by one participant: "The quality of the community was entirely dependent on how involved each person was in whatever online collaborative it was."

Swan, Shen, and Hiltz (2006) found assessment of collaborative activities to be essential for the success of instructional strategies. Their research illustrated the relationship between assessment and community building, indicating "it is terribly important to clearly communicate assessment procedures to students through course documents available at the beginning of a course and accessible throughout it, and through ongoing and timely feedback using the criteria outline in these documents" (p. 56). Combining assessed collaborative activities with clearly defined assessment criteria, we re-designed the online courses to meaningfully support learners' interactions through collaborative activities where a detailed assessment scoring guideline was part of each assignment. This element of structured collaboration not only increased participant interaction but also furthered the development of the online community. In the view of the participants, "the cooperative group felt like each person had a goal and responsibility and to make it come together, everyone had to do their part." Through these activities, they felt that their "collaboration, was to create something that you wouldn't be able to create on your own."

Perhaps the most important recognition about this learning trajectory was that the tools, processes and scaffolding of the content were dynamically intertwined. Rather than focusing on them independently in the course design, their interaction pushed the content development. With the first class, the community of learners was established and reflection happened — both within the context of the content development. The tasks were inquiry-based and emphasized shared knowledge. The instructional strategies were employed:

1. To help develop understanding and knowledge.
2. To initiate and facilitate the development of an online community of learners.
3. To introduce the value of reflection on both the content and the community actions.

Through a consistently applied set of instructional tasks and strategies with assessed engagement where the participants had opportunities for discussion, reflection, and a variety of interactions, the learners were able to develop comfort and trust. The increased comfort and trust level allowed them to

Table 2. Scoring guidelines for key expectations during the first week of the digital image course

	7-6	5-4	3-1	0
Topic Reflective Essay	Extended and enhanced reflective essay.	Solid reflective essay	Varying quality in the reflective essay	Not acceptable
Introducing yourself through images	Incorporation of both the image and description along with a well-supported and solid discussion of "A picture is worth a thousand words"; includes at least two additional images in the appendix	Incorporation of both the image and description along with a solid discussion of "A picture is worth a thousand words"; includes at least one additional images in the appendix	Limited use of and attention incorporation of both the image and description along with a description of "A picture is worth a thousand words"; appendix is not provided	Not acceptable
Academic Contribution and Communication	Responds to all sections in the assignment as described meeting all expectations in a superb manner; responses communicate clearly and concisely with correct English conventions in grammar and spelling. Uses correct APA.	Responds to all sections meeting the expectations with some need for extended clarity. Response communicates somewhat clearly and concisely with some errors in English conventions. Some issues with APA.	1 or more sections and expectations need deeper thought and clarity. Responses do not communicate clearly, concisely, or with correct English conventions	Not acceptable
Analysis & synthesis	Responses demonstrate deep synthesis and analysis of assigned readings in relation to all topics. References to the readings are clear and demonstrate the student has extended beyond the references provided.	Responses do include synthesis and analysis including meaningful comments with limited support (from only the readings provided).	Responses do not demonstrate understanding of basic concepts in the assigned readings. Analysis and synthesis are limited and references only to limited readings.	Not acceptable
Reflection	Responses reflect a deep understanding of how all of the materials affect and are affected by the context of one's own teaching AND students' learning. Makes connections with substantive and meaningful references to activities and tasks during this week.	Responses include the context of one's own teaching AND student's learning. Makes connections with substantive and meaningful references to activities and tasks during this week.	Responses omit the context of one's own teaching OR students' learning OR connections with substantive and meaningful references to activities and tasks this week.	Not acceptable
	15-12	**11-8**	**7-1**	
Learning Community Activity	Consistently participated in the Learning Community during the week; consistently provided ideas, feedback and questions in the "discussions" to help others in understanding ideas as well as to build own knowledge. Engaged others in talking about specific ideas. Evidence of deepening the learning for all through the discussions. Responses to learning community activities are thorough and solidly communicate the impact of the community. Clear connections to classmates and the interactions.	Participated in the Learning Community activities throughout the week; provided ideas, feedback and questions in the "discussions" focused primarily on preparing personal responses. Limited discussion of specific ideas but some evidence of a deepening of understanding both for author and for classmates. Responses to learning community activities are thorough and communicate the impact of the community. Acceptable connections to classmates and the interactions.	Limited participation in the Learning Community activities throughout the week; provided few ideas, feedback and questions in extending the "discussions." Not active in the group discussion. No discussion of specific ideas. Responses to learning community activities are weak and could use attention in discussing the impact of the community. Questionable connections to classmates and the interactions.	Not acceptable

form relationships where more than a desire for grades motivated interaction and engagement. As one of the learners reflected:

At first I didn't want to do it because I was too busy doing other stuff, then I did it because I had to. Then I started seeing the value in it to the point where I was getting on to see what people had to say. I would even sneak it during my work day, what are people saying, what are people talking about right now? As I got to know people better, I became more comfortable and less formal. I think that it started carrying itself and some of that was that social feel. In a strange way, it had some of that social network feel to it a little bit.

Developing this sense of a community resulting from the dynamic interaction among the tools, processes, and content development revealed another essential ingredient in the online learning trajectory. The shift in motivation for engagement reflected the transition from the learners feeling like they were alone in their efforts in the program to feeling like they were part of a community of learners. Another student indicated, "it was a score, something I had to do initially; then it kind of developed into, I know these people, what is an idea they might have, what are they thinking about?" The relationships formed through continued interactions supported the participants in freely discussing their ideas and understandings of the concepts. During their discussions, sometimes initiated by the instructors but most times by the learners, they felt they learned the most. In essence both the consistent incorporation of scoring rubrics for each assignment and the focus on the development of the community of learners were revealed as essential ingredients in the online learning trajectory.

SOLUTIONS AND RECOMMENDATIONS

The research results identified instructional strategies for engaging the tools (community of learners, reflection) and the learning processes (shared/individual knowledge development, inquiry) for steering the course content and outcomes (TPACK development). The online instructional learning trajectory infused social metacognitive constructivist pedagogical practices for engaging the participants in ongoing collaborations, interactions, and reflections for thinking about teaching with technology. Three important themes emerged along with the description of the pedagogical practices.

Theme One

The learning trajectory is multi-faceted. The learning trajectory for online teacher professional development is more than just learning the content. It must include how to become an online student and how to become an online community member. Three phases clearly emerged in the trajectory designed toward the TPACK outcomes. The first phase in the learning trajectory immersed the participants in valuable experiences for learning to work with and take advantage of the special features of the tools for learning. As the participants gained skills with the tools, the trajectory transitioned to a focus on the specific outcomes for the course (TPACK in this study). For this transition, the tools needed to be interjected with the learning processes (inquiry and shared/individual knowledge development). In this transition phase, the tools were integrated with specific tasks that engaged the participants in these learning processes as

they began the exploration of specific technologies for teaching mathematics. Through these multiple tasks, the participants were engaged in a progression that helped their knowledge become more robust with respect to teaching mathematics with technologies and thinking about student thinking and learning with these technologies. The tools supported the learning processes that in turn engaged the participants in thinking about teaching with the technologies. The final phase brought closure to the ideas and concepts that emerged over the course. This stage was marked by a metacognitive emphasis focusing their thinking about their thinking when learning with technology and supporting them in thinking about students' thinking and understandings when using technologies as learning tools. By this phase, the tools and learning processes had formed a solid platform from which the participants were able to engage in large and small group discussions as they reflected and expressed the concepts and ideas demonstrating a transformed knowledge for teaching with new and emerging technologies.

Theme Two

The second theme highlighted the technology as a critical component of the learning trajectory, a component that required introduction to guide participants in becoming online students and effective community members. Additionally, the technology needed to be integrated as a package. For example, the Jing videos used the PowerPoint presentations where the participant provided the audio communication about their identities. Also, participants created Jing videos to describe and demonstrate their learning with the temperature probe. Again, this creation incorporated PowerPoint slides and sometimes probeware graphical software along with Jing video for communicating their learning with and thinking about learning mathematics with technology. Thus, the participants used multiple technologies both as tools for sharing knowledge as well as for constructing knowledge.

Theme Three

The third theme focused on the types of activities and experiences important in building teachers' knowledge. The influential tasks for the participants were when they personally explored new technologies, where they thought and reflected about their developing personal understanding about the technologies and about student thinking and learning, and where they designed lessons and activities for student exploration with the technologies. Through hands-on, directed activities, they explored problems that required mathematical/scientific thinking as highlighted in the 5 E's (Bybee et al., 2006). Their personal experiences were accompanied by the challenge to describe student thinking and understandings in similar experiences and then design lessons for students. Through these experiences, their views on learning with technologies shifted toward the application of the technologies as higher order thinking tools. Based on their experiences, the participants identified the importance of placing control of the technologies in students' hands, developing student facility with technology while engaging them in inquiry-oriented, higher order thinking, and assuring that students controlled the flow of developing ideas. This theme highlights the importance of the participants' personal experiences in learning with the technologies and gaining an understanding of students' thinking with the technologies. The experiences the participants had in the role of "teacher as student" were instrumental in helping them transition to their role of "teacher as teacher" in crafting their thinking and understanding the creation of learning experiences for their students where technology was an essential thinking and learning tool.

FUTURE RESEARCH DIRECTIONS

Teacher professional development is a complex undertaking with the persistent emergence and evolution of recommendations for improving teaching and learning. The challenges require that teacher educators design programs where teachers have opportunities to think outside their traditional views of how content is learned and communicated. As a result, more and more professional development programs are structured around teachers' work lives (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009). Online education professional development programs provide access for teachers in reconstructing their views on learning their content with technology (Guilar & Loring, 2008). The challenge is in designing effective asynchronous experiences to engage teachers as students in meaningful, rigorous discussions and interactions to support their learning.

This extensive design-based research effort used an iterative process over multiple years for designing and refining a learning trajectory for online teacher professional development directed toward guiding mathematics teachers in reconstructing their knowledge for teaching with technologies – their TPACK. The study was done with an entirely online MS program that suggests the identified strategies may require a more extended program than one course. The program was designed in a social metacognitive constructivist structure that identified the importance of reflection in teacher learning. This study was focused on teaching mathematics with technologies. Therefore, the instructional strategies identified for the online program resulted in specific tools and learning processes to engage the teacher participants in ongoing collaborations, interactions, and reflections for thinking about teaching with technology.

The instructional strategies (assessed engagement, collaborative activities, peer-review as an assignment component, intentional group design, and the incorporation of new and emerging technologies to support free-flowing discussions) were all effective individually in helping to stimulate interaction leading to a higher level of learning toward the enhancement of the participants' TPACK, a deep and meaningful approach to learning through the MS program expectations. Alone, none of these strategies or structures individually had the same impact as implementing them together as a complete program where the strategies were utilized from beginning to end of the program. The findings of this research reinforced the importance of instructor actions in creating online educational experiences where participants had opportunities for individual knowledge building with respect to integrating technology in teaching mathematics.

Future studies for online professional development in the context of guiding teachers in reconstructing their knowledge for teaching with technology need to extend beyond the features of this online graduate degree program. Different content areas for engaging teachers in refining and redesigning their thinking about teaching with technologies may result in different tools and processes for steering the content. Additional studies need to consider different program durations. Assessment of the teachers' actions was identified as an important ingredient in our studies. What other strategies are useful in encouraging participant interaction other than grading? Many similar questions need future study in understanding and making progress with online professional development towards supporting teachers in relearning and rethinking about teaching in this digital society.

CONCLUSION

Our research directs the attention of teacher professional development toward the use of researcher-conjectured, empirically-supported learning trajectories when designing programs specifically for teachers' TPACK development. Our results highlight the importance of the selection of specific tools and learning processes as a platform for engaging the participants in the designed content. The identification of a specific framework (such as the social metacognitive-constructivist framework used in our research) guides the identification of the tools and learning processes for the learning platform. With this platform, the instructional tasks are interwoven with specific pedagogical strategies holistically to guide the interactions with new and emerging technologies. Our research-based learning trajectory focused on teachers' thinking about the role of technology in learning along with thinking directed toward students' thinking and understanding with the technologies. This online learning trajectory thus infused social-metacognitive constructivist pedagogical practices using the tools and learning processes to engage the teacher participants in ongoing collaborations, interactions, and reflections for thinking about teaching with technology.

Schoenfeld (2010) indicates that the identification of the tasks or actions comprises important pieces of an instructional puzzle. What must follow is an explanatory framework integrating the pieces toward in-service teachers' knowledge development and reconstruction for teaching with technology. This study is an initial step in the identification of an explanatory framework for instruction leading toward the development of TPACK. This empirically-supported learning trajectory provides the identification and development of an explanatory framework that integrates descriptive tasks into a purposefully designed instructional approach. The result then influences the reconstruction of teachers' knowledge for teaching with technology with specific attention to teachers' thinking about the role of technology in learning along with thinking directed toward students' thinking and understanding with the technologies. The key to the success of this learning trajectory is the scaffolding of the learning platform, first guiding the participants in learning with the course tools and then merging the tool experiences with experiences in the learning processes while also integrating these experiences with the course content toward TPACK development. Through purposeful planning in the successive phases in the learning trajectory, the participants are then engaged in "predictable sequences of constructs that capture how knowledge progresses from novice to more sophisticated levels of understanding" (Confrey & Maloney, 2010, p. 698).

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KEY TERMS AND DEFINITIONS

Community of Learners: The collection of participants in a course who work cooperatively and collaboratively in solving tasks that lead to consensus and collective understanding of ideas.

Knowledge-Of-Practice: Teacher's knowledge for teaching gained through "systematic inquiries about teaching, learners and learning, subject matter and curriculum, and schools and schooling" (Cochran-Smith & Lytle, 2001, p. 274).

Learning Trajectory: An ordered network of experiences that a student encounters through instruction (i.e. activities, tasks, tools, forms of interaction and methods of evaluation), in order to move from informal ideas, through successive refinements of representation, articulation, and reflection, towards increasingly complex concepts over time (Confrey & Maloney, 2010, p. 968).

Shared Knowledge: The knowledge that learners develop as they engage in collaborative units for solving tasks directed toward building understanding of particular ideas and processes.

Social Metacognitive Constructivist Learning: Learning that engages participants as a community, collaborating about their explorations, research, and reflections about their own experiences for connecting with their thinking about and learning with technologies (Chiu, 2008; Chiu & Kuo, 2010).

Technological Pedagogical Content Knowledge: The knowledge from the interaction and integration of technological, pedagogical, and content knowledge that teachers rely on for teaching their subject matter with technologies. This knowledge is typically referred to as TPACK.

Chapter 29
Patterns of Practice and Teacher Identity:
Insights from the QTEL Professional Development Program

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ABSTRACT

The increasing diversity of public school students presents challenges both to institutions of teacher education as well as professional development providers as mainstream educators must now be versed in skills and techniques that result in rigorous and effective learning for English learners (ELs). This chapter presents insights from a university-run professional development program for pre- and in-service teachers closely examining the ways one participant engaged in a variety of practice-based identities within her classroom as a result of her participation in the professional development program. These practice-based identities include the tool collector, content monomath, and polymath, with each bring particular strengths to the classroom for ELs. This work suggests a need to consider the ways in which professional development participants conceptualize themselves as they make sense of their own educational experience as well as to provide insight into the most meaningful elements of such an experience.

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INTRODUCTION

There are a multitude of challenges facing classroom teachers in contemporary times: from increasingly sophisticated technologies to dwindling public budgets to new and evolving standards for teaching and learning, educators find themselves expected to know a wide body of information from policy to pedagogy. Furthermore, beyond these professional and institutional structures, the students in these classrooms are increasingly diverse, bringing with them a variety of languages, social practices, and ways of knowing. While students are coming from increasingly diverse backgrounds, teachers remain relatively homogeneous. While diverse students may comprise forty percent of the students enrolled in public schools, Black and Latino teachers represent approximately fifteen percent of the teaching faculty (National Center for Educational Statistics, 2009). Moreover, in approximately forty percent of schools, there are no teachers of diverse background (United Negro College Fund, 2008). Nestled within these statistics is the underlying challenge of language diversity; while our classrooms are filling with students speaking a variety of languages, our teaching force continues to be overwhelmingly monolingual, yet charged with educating students who are learning, simultaneously, multiple languages.

The challenges facing teachers in their classrooms are mirrored in teacher education programs, which must actively engage in the preparation of candidates to teach in these increasingly diverse classrooms, despite an overwhelmingly white, monolingual teacher candidate population. Teacher educators grapple with the fact that, while many factors shape the academic achievement of their students, it is their teacher who will have the greatest impact on that child's learning.

In response to this charge, the Quality Teachers for English Learners (QTEL) program at the University of Missouri, St. Louis seeks to provide both pre-service as well as in-service educators with opportunities to engage in coursework designed to foster inclusionary classroom environments in which English learners are recognized and supported for the particular strengths they bring to the classroom as well as the scaffolding required for rigorous, durable learning in literacy as well as the content areas of science, math, and social studies. While the emphasis of the program is supporting the language practices of English Learners, QTEL approached this task widely across the curriculum, infusing culturally responsive pedagogy in not only language arts and the various disciplines in the field of social studies, but also within science and mathematics. Participants in the program included pre-service elementary education students at the university in addition to in-service elementary and middle school teachers recruited from school districts surrounding the university supporting large numbers of English Learners in their classrooms. Participants enrolled in a series of university-based courses specifically targeted toward understanding language, including language acquisition and sociolinguistics, assessment, and instruction development; these courses functioned as an integral part of the pre-service teachers' program of study and allowed in-service teachers the necessary credits to apply for a TESOL emphasis on their certification. Each of the six courses was designed to support the development of teacher background in pedagogical language knowledge (Galguera, 2011), particularly the ways in which a teacher, who may themselves be monolingual, can support students learning not only English but their home language or languages as well. In addition, program participants engage in several professional development opportunities throughout the school year as well as a five-day summer institute; these summer institutes allowed participants to explore application through hands-on workshops, exposure to presenters who shared their own successful implementation of strategies for engaging English Learners in high levels of academic engagement, and reflection on their own practices in anticipation for the coming school year through focused experiences in lesson design, seeking connections between the content of the courses

based at the university and classroom contexts. Throughout the summer institute, program faculty and staff coached participants, acting as critical friends in the refining their practice through the incorporation of their learning.

THEORETICAL FRAMEWORKS

To more fully understand the ways in which participants changed their classroom practices through engagement in the university coursework and QTEL professional development activities, the work is approached, theoretically, from two perspectives: one emphasizing the sociocultural nature of learning, with the other providing a particular lens into how pedagogy must manifest within the classroom to provide support and instruction for the acceleration of all students. In this section, we will delineate these two theoretical frameworks before addressing the context of the program itself.

Communities of Practice

The act of mentoring has a deep-rooted history in teacher education, from clinical experiences in one's undergraduate program to the act of student teaching. Lave and Wenger (1991), having studied the ways in which mentorship is enacted within a variety of workplaces, has posited the notion of a community of practice to emphasize the social nature of learning in any given context. It is a social system in which novices move from legitimated peripheral participation to full participation in the system itself. Within these communities, learning is a social project, mediated and constructed through interactions with others while engaged in the practices of the community. To this end, "understanding and experience are highly connected. Participation is always based on situated negotiation and renegotiation of meaning in the world" (Lave & Wenger, 1991, p. 51).

A sociocultural theory of learning, Lave and Wenger's work illuminates the ways in which newcomers or novices come to fully engage in the practices of a community through legitimate peripheral participation. It is a form of apprenticeship, as those individuals who are full participants in the community interact with and teach particular ways of being and doing marking that particular community. Wenger (1999) furthers this work through a model consisting of four interdependent components: community, practice, meaning, and identity, elements that, within a community of practice, are both shaped by and, in turn, shape one another. For the purpose of this work, we are particularly interested in the ways pre- and in-service teachers conceptualize identity as they engaged in the social learning of the QTEL program.

Culturally Responsive Pedagogy

If learning is a social endeavor, understanding culture is an essential, yet often overlooked, element to ensure rigorous and lasting learning (Banks, 2003). Culturally responsive teaching capitalizes upon "the cultural characteristics, experiences, and perspectives of ethnically diverse students as conduits to teaching them more effectively" (Gay, 2000, p.106). As such, it is essential for educators to understand the social, cultural, political, and linguistic experiences of the children they work with (Murrell, 2002; Nieto, 2000). Ladson-Billings (1994) defined this manner of teaching as a pedagogy of opposition within which teachers utilize "cultural referents to impart knowledge, skills, and attitudes" (p.32).

Building upon Ladson-Billing's (1995) notion of Culturally Responsive Pedagogy (CRP), Paris (2012) utilizes the term Culturally Sustaining Pedagogy, asserting it is a pedagogical stance that "requires that they [educators] support young people in sustaining the cultural and linguistic competence of their communities while simultaneously offering access to dominant cultural competence" (p. 95). The notion of a culturally sustaining pedagogy is particularly salient to this project as the QTEL project not only seeks to be only relevant but also to create sustainable learning spaces for diverse populations of children.

LITERATURE REVIEW

Public schools have come under increased scrutiny for the academic achievement of their students since the 2001 passage of No Child Left Behind (U.S. Department of Education). Particular attention is paid to the adequate yearly progress of students for whom, historically, academic achievement has been stagnant or markedly behind their peers. English learners are one such subgroup, creating a need for all teachers to develop expertise in teaching language to ensure appropriate scaffolding for ELs in the classroom.

While teacher preparation is in the initial stages of conceptualizing approaches to educating teacher candidates to serve a multiple of populations (Brisk, 2007; Lucas & Grinberg, 2008), there are scholars who have conceptualized the expertise that supports ELs in the classroom. Within this conceptualization, expertise is developed through the interplay of core knowledge, instructional practices, and key dispositions (de Jong & Harper, 2005), with dispositions being an essential crux, influencing both the knowledge core and instructional practices a teacher uses within their classroom. Ideal dispositions include high expectations of all learners, an understanding of their roles as a language teacher and cultural facilitator, as well as a commitment to equity.

Assuming these dispositions positions the knowledge base of EL teacher expertise to be utilized for student achievement. Within their model, de Jong and Harper (2005) delineate the components of core knowledge for EL teachers to be an understanding of how additional languages are acquired as well as how oral and literacy development in primary and secondary languages both differ and maintain similarity. Additionally, nested within this understanding, is how bilingualism plays out in the student's learning experiences, capitalizing on native language and culture to support student learning.

Aligning with Culturally Sustaining Pedagogy, there is a need for teachers to understand culture and language as a medium for learning. In this way, teachers must have a working knowledge of the structure of the English language as well as the ability to identify formal and informal language use, particularly within the context of EL's experiences as students learning in a language other than their home or native language. Culturally, teachers must consider the ways patterns of interactions may differ betwixt and between students' backgrounds and how these differences may impact children's opportunities to engage in learning activities within the classroom.

Lastly, linguistic and cultural diversity must be goals of instruction. Put another way, teachers must have the knowledge to conceptualize the language demands within instructional activity and develop language and content objectives to support ELs' academic language proficiency (Gibbons, 2003; Freeman & Freeman, 2007).

METHODOLOGY

This work is conceptualized as an explanatory case study seeking to understand the ways that participation in an educational program shapes teacher identity, creating dispositions that increase the potential for powerful instruction for EL students. Participants in this study included both in-service and pre-service teachers participating in a professional development program at a mid-sized public land-grant institution in the Midwest. Both students and practicing teachers from surrounding school districts were recruited through a variety of channels, including informational tables, email newsletters, and flyers. Participants were compensated for their time through paid tuition in undergraduate and graduate courses at the university as well as a summer institute and monthly professional development seminars. For the larger project, a wide array of data was collected, including surveys, artifacts produced by participants in the program, interviews with participants, interviews with students, and classroom observations.

CASE SELECTION AND DATA ANALYSIS

While this chapter addresses the participation of a single in-service teacher, she is representative of a larger data corpus seeking to understand the ways pre- and in-service teachers can be supported in engaging ELs in their classrooms. The larger corpus includes several surveys administered after each class as well as after each professional development experience, assignments completed as part of university coursework, classroom visits by program faculty and staff, field notes from classroom visits, university courses, and professional development sessions, video segments of classroom practice, and photographs of student artifacts.

All narrative data, including interviews and classroom visits, were transcribed and coded for types of practices evidenced in the data source. Put another way, data analysis sought to create a list of practice types and description dimensions that could be ascribed to these types. The research team sought to create reliability amongst these practice types through independent analysis of the data sources, looking across their analyses to construct a series of practice types. The practices illustrated in this chapter drew upon researcher field notes from classroom visits utilizing an observation protocol in addition to field notes and teacher and student interviews to construct a single illustrative study.

Ms. Hampton (all names in this chapter are pseudonyms) was chosen as an illustrative case for this chapter as her patterns of practice within her classroom aligned very tightly with the university coursework as well as the QTEL professional development. Her patterns of participation in the overall experience mirror those of the larger participant population. Ms. Hampton is a second grade teacher at a suburban elementary school just outside of the city limit of a major urban city in the Midwest, where she has taught at the elementary level for five years, three of which have been in the second grade. In recent years, her district has experienced a large increase in enrollment of ELs, which prompted Ms. Hampton to seek out professional development opportunities that would provide her with new tools and frameworks for teaching her diverse students. She engaged in both coursework as well as monthly professional development seminars through the QTEL program during the 2014 – 2015 school year.

FINDINGS

The Tool Collector, the Content Monomath, and the Polymath

Throughout her year of participation in the QTEL program, Ms. Hampton showed considerable growth in her abilities to teach ELs within her elementary classroom, working diligently to bring what she was learning in her coursework and in the professional development seminars into her classroom. Ms. Hampton found her work in the QTEL program to provide her with a "solid background and knowledge" of the core knowledge needed to teach ELs in the elementary classroom and her professional growth in this area was commended by her administration as they recognized she "grew fast" in her teaching abilities with her diverse group of students (Teacher Interview, April 22, 2015).

As previously mentioned, Mrs. Hampton's school district has experienced a rapid increase in the number of ELs enrolled in the school. In Ms. Hampton's classroom of nineteen children there were fifteen ELs, including a child with very limited English ability having only moved to the classroom in February. These demographics, while higher than the school average, hinted at the changing nature of the neighborhoods the school served. It was this kind of forecasting that led Ms. Hampton to seek out the QTEL program, hoping to find guidance as she attempted to address the needs of students in her classroom.

Ms. Hampton's trajectory as a successful teacher of ELs, when examined across time through multiple data sources reveals a series of identity claims she makes in relationship to the core instructional strategies required to successfully teach ELs. At various times throughout the data, including her own perceptions of her teaching, her students' perceptions of her teaching, and classroom observations, Ms. Hampton enacts practices this project conceptualizes as being a tool collector, a content monomath, and a polymath. Each of these terms and how they were expressed in the data will be delineated within this section.

The Tool Collector

Looking across participants in the QTEL project, one pattern of practice that manifest over and over again was the collecting of tools, amassing a repertoire of skills and strategies without a particular purpose in mind. It is much like one acquiring a band saw at a flea market, simply to have it, without a concrete notion of how it will be used in one's daily life. Ms. Hampton, much like a majority of the participants in the early experiences of the QTEL program, was a tool collector, enacting these skills and strategies in the classroom without making any particular connection to learning for ELs.

A prime example of tools that have been collected are content and language objectives. In early visits to her classroom, Ms. Hampton was always observed with these content standards in her room. In her earlier observations, she would reference these standards at the beginning of the instructional activity and would only mention them again at its closure. In and of themselves, objectives are powerful in the way they focus teacher attention on the types of learning teachers want their students to be engaged in during instructional time. Within the Sheltered Instruction Observation Protocol (SIOP; Echevarría, Vogt, & Short, 2012), objectives are framed as both content and language objectives. Content objectives are meant to emphasize what the teacher wants students to understand within the lesson while the language objective emphasizes how the teacher wants to scaffold talk around that content. These content and language objectives form the basis form the SIOP framework and both writing and enacting these

objectives within the classroom were core instructional strategies in university coursework and QTEL professional development.

When considering enactment of the SIOP framework in an elementary classroom, it is imperative that these content and language objectives aren't nearly written on a board; rather, they must provide the ethos for the instructional experience as it unfolds within the classroom space. That the language and content objectives were written and reference to at all is a substantial step forward; however, without living through objectives through the lesson itself, they are merely tools and not nearly as powerful as they could be. Students perceive this disconnect between the tool and learning as well. When asked about knowing the objective of a lesson, Gerardo, a student of Ms. Hampton's, he replied "Yeah, [I know it] because I have to read it." (Student Interview, February 6, 2015). In these early observations, the objectives were simply present in the room, a tool collected and on display.

An additional example of tool collecting is in the rephrasing of directions. A language teacher must be aware of the various ways children may misunderstand directions. Planning for these misunderstandings requires teachers to consider alternative ways to communicate expectations to students. Inherent in rephrasing directions is the idea that the direction themselves will be revised to provide clarity to the students for whom they may not make sense. When observing in the classroom, particularly in early observations, directions were seldom rephrased. Rather than being rephrased, they were repeated verbatim. An example of this occurs during a subtraction lesson in the classroom; as they students are preparing for small group work, they engage in a group chant meant to help them conceptualize the subtraction of three digit numbers as a mathematical construction: *we start with a whole, take away a part, and find the missing part* (Classroom Observation, January 29, 2015). When a student looks confused, this confusion is recognized but rather than investigating where the confusion lies for the student, Ms. Hampton begins the chant again, assuming the repetition and rhythm of the chant have cleared up the confusion. While songs, chants, and rhymes do engage and support ELs, they must be interrogated and made sense of to truly be beneficial to students (Paquette & Rieg, 2008), much like the ABC Song can scaffold young children learning their letters but only when the song is broken apart and analyzed.

It is important to note these descriptions of tool collecting and usage within the classroom are not being criticized, but noticed and named. Much like a new knitter, who is unfamiliar with yarn, needles, and the work that is capable through their careful orchestration, Ms. Hampton, in these classroom vignettes, is testing these tools out for the viability in the classroom space. She is coming to know how they benefit both her and her students and while they may not be fully integrated into the learning activities of her classroom, they are adding structure amenable to successful EL learning.

Content Monomaths

Another pattern of practice to emerge is that of a content monomath, or practices that emphasize academic content over the ways in which students access, learn, and understand the content. Within the larger corpus of QTEL data, teachers working at the secondary level engaged in these types of practices more often than those teaching at the elementary level. It is hypothesized this is due to secondary teachers being confined, more often than not, to a single content area, while elementary teachers span multiple content areas.

While the practices of a content monomath were found more in secondary instruction than elementary instruction, it was still present. In Ms. Hampton's room, these types of practices are inherent in the student grouping strategies in the same three-digit subtraction lesson referenced above. When moving

into small group work, students find themselves grouped together by teaching, combining students who "know how to do the problem correctly" with those who might have difficulty (Classroom Observation, January 29, 2015). The emphasis is placed upon students' abilities to accurately complete the math problems at hand rather than their abilities to explain the reasoning behind how the math is done to one another; such talk around content areas like math help foster both deep understanding of content while also providing opportunities for all students, including ELs to engage in meaningful academic talk (Zwiers & Crawford, 2011; Stein, Engle, Smith, & Hughes, 2008).

Again, just as with those who collect tools, this is but noticing and naming. Content is important, even more so for ELs who need multiple access points for content knowledge. It is essential to balance out the content -- how a math problem is done, how history happened, how the water cycle works -- and how that content is come to be understood by students within the classroom.

Polymaths

Within the larger dataset, participants in QTEL activities were working toward being polymaths, able to bring together the content knowledge so prized by the content monomath with the skills and strategies of the tool collector to foster rigorous learning for all students. It was rare that these types of practices were seen early in participant experiences in the program; rather, these practices often developed as tools were explored and content was examined and made accessible to students.

Returning to Ms. Hampton's classroom in the spring, one would continue to find both content and language objectives: *students will listen to a story and identify the lesson of the story*. This time, however, the objective is accented by visuals, a picture of an ear after *listen*, an open book after *story*, and a pointing finger after *identify* (Classroom Observation, April 22, 2015). The environment of the classroom has shifted with the addition of a new student with limited English abilities; Ms. Hampton has been rethinking her instruction to help her new student have access to learning experiences in the classroom. The added layer of visuals to her language and content objective is one such change.

During this particular April observation, Ms. Hampton is reading *The Hen and the Apple Tree* (Lobel, 1983), a fable, aloud. Throughout the reading of the fable, she points out selected vocabulary words that might be foreign to the students, introducing them in the context of the text and making real world connections to their definitions, a strategy taught at a QTEL professional development seminar. After the fable is finished, she asks the whole class questions about the book, the rooms erupting in a quiet rumble of language as students turn to their elbow partner and respond to the questions, some in Spanish, some in English. Ms. Hampton listens in, allowing conversations to come a natural close, and asks for students to share out, reminding them of the content and language objectives she wants them to be practicing.

To the observer, there is an undercurrent of purpose in each and every one of the instructional moves Ms. Hampton makes in the classroom. The objectives are written on the board and are referenced several times through the lesson, driving student learning forward. Additionally, there is fluidity as students work with one another to respond to each other about their interpretations of the story, moving from Spanish to English to Spanish again in their chatter. Ultimately, students have been invited to partake in the learning event and feel comfortable accepting the invitation.

DISCUSSION

Within the QTEL project, our research team is interested in the ways participants are constructing these identities over the span of their participation within the program. Looking across the corpus of data, we have been able to identify the practices that align with particular kinds of identities: the tool collector, the content monomath, and the polymath. In this chapter, care has been taken to avoid any sense of judgment on any of these constellations of practices; as was demonstrated through the case of Ms. Hampton, EL educators can enact multiple identities throughout the course of a single lesson and each identity has some positive elements within it for English language learners. The relationships between these different sets of practices is much more complicated than these categories convey. There is fluidity between them as educators exert ownership over their own learning and the ways that this learning can, in turn, shape the learning of their students.

For teachers to successfully teach ELs in their classroom, polymath practices, drawing upon both content knowledge as well as knowledge about how to successfully teach English learners, are the ideal. For those in teacher education and professional development, we need to be continuously thinking about the ways in which we ask both pre- and in-service teachers to enact identities in the classroom and how these practices influence student learning. Additionally, we need to be conscious of the ways such instruction impacts monolingual English-speaking students within the classroom; Stuart, another student in Ms. Hampton's classroom, lamented that, while his Spanish-speaking classmates were offered opportunities to learn English but his opportunities to learn Spanish were minimal: "All my friends speak Spanish. I'm in a group with all Spanish speaking [children] and they usually just talk to each other in Spanish and it kind of leaves me out because I don't know Spanish" (Student Interview, February 6, 2015). When asked what could be done in his classroom to help him learn more, he replied: "More Spanish."

Identifying and naming these practices is but the first step in this particular line of inquiry; future work will examine the QTEL program itself, seeking to understand those educational experiences within the program that were most beneficial to participants, where the shifts in identity occurred. Through the identification of these mechanisms and their relationship to shifts in identity and practice, more robust professional development opportunities can be created for foster positive, rigorous instruction for not only ELs, but all learners.

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Chapter 30
Mathematics Teachers' Perspectives on Professional Development Around Implementing High Cognitive Demand Tasks

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ABSTRACT

This chapter will provide readers with an overview of a professional development created and enacted to support teachers' implementation of high cognitive demand tasks (Smith & Stein, 2011). This multiple case study seeks to give voice to the three seventh grade mathematics teachers who participated in the professional development as they share their perspectives on what factors affected their implementation of high cognitive demand tasks. The goal of this chapter is to provide an overview of the structure of the professional development, share the aspects of the professional development the teachers identified as supportive when planning and implementing high cognitive demand tasks in their mathematics classrooms, and discuss ideas for future professional development aimed at providing teachers with instructional practices to incorporate into classrooms.

INTRODUCTION

There is "no decision teachers make that has a greater impact on students' opportunities to learn and on their perceptions about what mathematics is than the selection or creation of tasks with which the teacher engages students in studying mathematics" (Lappan & Briars, 1995, p. 139). With this is mind, it is crucial that teachers not only realize the importance of choosing tasks, but also have the knowledge of what tasks can engage students.

Martin (2007) outlined seven standards that represent the core dimensions of teaching and learning mathematics with one being the selection of worthwhile mathematical tasks and explained that teachers

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should pose tasks that help students develop mathematical understanding, help students make mathematical connections, require problem formulation and problem solving, and help students communicate about mathematics. Research shows that successful mathematics teachers give students mathematical tasks like the ones described by Martin. Teachers in high achieving schools engaged their students in conversations about mathematics and did not focus solely on basic facts and processes (Edmonds, 1979; Kitchen, Row, Lee, & Secada, 2009). Those teachers who focused on higher order thinking and less on routine skills allowed students to think critically about mathematics, develop better mathematical vocabulary, provide justification for their answers and learn how to collaboratively work with other students (Gutierrez, 2000; Staples & Truxaw, 2010).

One way teachers can impact students' opportunities to learn is by engaging students in high cognitive demand tasks (Smith & Stein, 2011). Cognitive demand refers to the amount of effort a student needs to expend to think about a problem. Smith and Stein outlined and characterized four different demands of tasks: memorization tasks, procedures without connections tasks, procedures with connections tasks, and doing mathematics. Memorization and procedures without connections are low cognitive demand tasks while procedures with connections and doing mathematics are high cognitive. Memorization tasks involve recalling facts or definitions and do not require computation. An example of a memorization task is stating the Pythagorean Theorem. Tasks labeled as procedures without connections involve using a procedure to solve a problem but do not connect it to any other mathematical ideas, such as solving equations for missing variables. Procedures with connections tasks involve using a procedure but connecting it to other mathematical ideas. One such problem is solving a quadratic function, interpreting what the solution means, and relating these values to the graph of the function and the overall given situation. A task labeled doing mathematics does not give an explicit way to solve the problem and may include multiple solution methods, such as figuring out a pattern and coming up with generalized formula. (See Figure 1 for descriptions of the four levels of demand). Many of the descriptors of tasks with a high level of demand align with characteristics of tasks that promote conceptual understanding of mathematics (Doyle, 1983).

Teachers should be able to select tasks appropriately and implement tasks at a high level to support students' mathematical thinking (Henningsen & Stein, 1997). Researchers found that teachers who participated in professional development around high cognitive demand tasks increased both the number of high cognitive demand tasks used and their ability to maintain the level of demand throughout the lesson (Boston & Smith, 2009). Stein, Grover, and Henningsen (1996) found teachers involved in professional development targeted at implementing high cognitive demand tasks had success selecting and setting up high cognitive demand tasks that encouraged students to use multiple solutions and representations, participate in group work, justify answers, and engage in complex mathematical thinking and reasoning.

While implementing high cognitive demand tasks can provide students with opportunities to engage in complex thinking about mathematics, Doyle (1988) found most tasks in classrooms involve memorization, and students only need to remember what procedure to use to solve the problem correctly. Doyle's caution coupled with prior studies that suggest teachers may not have the knowledge, time, or necessary resources to find and implement high cognitive demand tasks (e.g., Boston & Smith, 2009; Smith, Bill, & Hughes, 2008; Stein, Engle, Smith, & Hughes, 2008), yields the goal of this research project: to support teachers in finding, planning, and implementing high cognitive demand tasks in their classroom. This chapter describes the professional development experience for three seventh grade mathematics teachers as they sought to implement high cognitive demand tasks in their classrooms, their perspec-

Figure 1. The task analysis guide
(Boston & Smith, 2009, p. 122)

Low-Level Cognitive Demands	High-Level Cognitive Demands
Memorization Tasks • Involve either producing previously learned facts, rules, formulae, or definitions *or* committing facts, rules, formulae, or definitions to memory. • Cannot be solved using procedures because a procedure does not exist or because the time frame in which the task is being completed is too short to use a procedure. • Are not ambiguous—such tasks involve exact reproduction of previously seen material and what is to be reproduced is clearly and directly stated. • Have no connection to the concepts or meaning that underlay the facts, rules, formulae, or definitions being learned or reproduced. *Procedures Without Connections Tasks* • Are algorithmic. Use of the procedure is either specifically called for or its use is evident based on prior instruction, experience, or placement of the task. • Require limited cognitive demand for successful completion. There is little ambiguity about what needs to be done and how to do it. • Have no connection to the concepts or meaning that underlie the procedure being used. • Are focused on producing correct answers rather than developing mathematical understanding. • Require no explanations or explanations that focus solely on describing the procedure that was used.	*Procedures With Connections Tasks* • Focus students' attention on the use of procedures for the purpose of developing deeper levels of understanding of mathematical concepts and ideas. • Suggest pathways to follow (explicitly or implicitly) that are broad general procedures that have close connections to underlying conceptual ideas as opposed to narrow algorithms that are opaque with respect to underlying concepts. • Usually are represented in multiple ways (e.g., visual diagrams, manipulatives, symbols, problem situations). Making connections among multiple representations helps to develop meaning. • Require some degree of cognitive effort. Although general procedures may be followed, they cannot be followed mindlessly. Students need to engage with the conceptual ideas that underlie the procedures in order to successfully complete the task and develop understanding. *Doing Mathematics Tasks* • Require complex and non-algorithmic thinking (i.e., there is not a predictable, well-rehearsed approach or pathway explicitly suggested by the task, task instructions, or a worked-out example). • Require students to explore and to understand the nature of mathematical concepts, processes, or relationships. • Demand self-monitoring or self-regulation of one's own cognitive processes. • Require students to access relevant knowledge in working through the task. • Require students to analyze the task and actively examine task constraints that may limit possible solution strategies and solutions. • Require considerable cognitive effort and may involve some level of anxiety for the student due to the unpredictable nature of the solution process required.

tives on factors related to their implementation of high cognitive demand tasks, and what aspects of the professional development supported this endeavor.

BACKGROUND

The challenge for those designing and providing professional development is to identify the format that adequately supports teachers in enhancing their instruction. Through extensive analyses on prior professional development experiences for teachers, researchers have suggested professional development guidelines in order to maximize teacher learning and help teachers become more comfortable with implementing new instructional practices (Desimone, 2011; Feiman-Nemser, 2001; McGee, Wang, & Polly, 2013). These effective professional development practices include promoting collaboration among teachers, addressing both content and pedagogical knowledge, making connections to teachers' classroom practices, and ongoing, job-embedded support to provide continuity for teachers.

More specifically, researchers have studied the nature of professional development focused on teachers' selection and implementation of high cognitive demand tasks as well as whether teachers perceived the professional development provided to increase their use of high cognitive demand tasks (Boston, 2013; Foley, Khoshaim, Alsaee, & Er, 2012; McGee et al., 2013; Polly, Neale, & Pugalee, 2014). One common component is that these types of professional development tended to be throughout the year. What constitutes sustained professional development can vary. For example, some of these experiences consisted of day-long sessions throughout the year (Boston, 2013) and others involved teachers first participating in summer institutes and then attending follow-up sessions throughout the year (Foley et al., 2012; McGee et al., 2013). The professional development models that incorporated summer institutes each had two-week institutes during the summer and then follow-up sessions during the year. Teachers who participated in this type of professional development reported being more comfortable teaching high cognitive demand tasks at the end of the year, and the researchers' observations confirmed this claim (Boston, 2013; Foley et al., 2012; McGee et al., 2013). Providing focused professional development and sustained support throughout the year can help teachers become more comfortable implementing instructional practices and curricula that are new to them (Boston, 2013; Feiman-Nemser, 2001; Foley et al, 2012; McGee et al., 2013). Desimone (2011) suggested the duration of a professional development should include at least 20 contact hours spread over time.

Another commonality with professional development aimed at helping teachers enact high cognitive demand tasks was engaging teachers in analyzing the level of demand of tasks and then reflecting on how to utilize those tasks in their classroom instruction (Boston, 2013; Foley et al., 2012; McGee et al., 2013). Boston (2013) described professional development in which teachers solve tasks from their curriculum in order to provide them with the opportunity to be learners and remember what it can be like to struggle with a task. This provided teachers with an experience their students might have when engaging with such tasks. Boston found that at the end of the professional development series there was a statistically significant increase in teachers' knowledge of high cognitive demand tasks.

When looking at obstacles that prevent teachers from implementing instructional practices learned during professional development programs, common factors included a lack of time and curricular alignment (Foley et al, 2012; Johnson, 2006; Handal & Bobis, 2004; McGee et al., 2013; Wachira & Keengwe, 2010). Teachers claimed an impediment to implementing instructional practices was the mandate to cover specific content during the year and the lack of fit between the instructional practices from the professional development, the curriculum, and the state assessments (Foley et al, 2012; Handal & Bobis, 2004; Johnson, 2006; McGee et al., 2013). In some cases, while the teachers initially implemented aspects of the professional development, they reverted to more traditional test preparation the second half of the year claiming that in order to prepare students for tests, they needed to supplement the instructional practices with multiple-choice questions to prepare students for those types of test questions (Johnson, 2006; McGee et al, 2013). Teachers often cite not having enough time to implement the learned instructional practices (Foley et al, 2012). Time as a barrier could relate to the time it takes to plan for the instructional practice (Johnson, 2006; Wachira & Keengwe, 2010) or time in the classroom to implement the instructional practice (Foley et al. 2012). Another time restriction is not having the time to plan and collaborate with peer teachers to practice the learned instructional activity (Johnson, 2006, Wachira & Keengwe, 2010).

Many of the prior studies on the effectiveness of professional development are often from the perspective of the researchers (e.g., Boston & Smith, 2009; Henningsen & Stein, 1997; Stein et al., 1996). Studies from the researchers' perspectives include narratives only from the researchers' point of view

on the effectiveness of the professional development based on interviews and classroom observations. Stein and colleagues (1996) and Boston and Smith (2009) studied teachers who chose and enacted high cognitive demand tasks, but they did not include the teachers' perspectives on the implementation process. Henningsen and Stein (1997) identified factors contributing to the change of cognitive demand of enacted tasks, but they looked at archival data and so were unable to ask teachers about the factors they attributed to the change in demand.

While research that examines teachers' perspectives seeks to give voice to teachers and aims to fill a gap and give voice to those often not heard in research (Handal & Bobis, 2004; Wachira & Keengwe, 2010). While researchers may argue that integrating certain instructional practices in the classroom can improve student learning, studies that illuminate factors teachers identify as preventing them from implementing such practices can help professional developers provide targeted support to assist teachers in overcoming perceived barriers. Thus, the goal of this study was to give voice to teachers who were trying new instructional practices after participating in professional development and to gain their perspectives on aspects of the professional development that they found positively impacted their practice. This research provides professional development providers insight into the strategies teachers perceive as supportive when implementing new instructional practices --in this case using high cognitive demand tasks --in their mathematics classrooms.

This study was positioned using research on the implementation of high cognitive demand tasks. The task implementation framework by Stein and colleagues in 1996 (see Figure 2) frames this study. The task implementation framework "proposes a set of differentiated task-related variables as leading toward student learning and proposes sets of factors that may influence how the task variables relate to one another" (Stein et al, 1996, p. 458). The framework emanates from the work of Doyle (1983) and his view that a curriculum is defined by a collection of tasks, and what students learn is a product of the tasks with which they engage. The definition of a mathematics task for this study was "a classroom activity, the purpose of which is to focus students' attention on a particular mathematical idea" (Stein et al., 1996, p. 460). Stein et al. proposed the task implementation framework to account for the fact that the cognitive demand of tasks may change throughout the different stages of implementation, and ultimately students may not engage with the task at a high cognitive level due to multiple factors. The task implementation framework included factors that changed the cognitive demand of the task as it was implemented in a mathematics classroom. While a task may start out at one level of cognitive demand, the level of demand may change between successive phases of implementation due to the factors listed in the framework. Factors that influence the setup include teachers' goals, teachers' knowledge of subject matter, and teachers' knowledge of students.

The task setup is the task as introduced by the teacher. The task setup can be elaborate, with the teacher giving a lengthy introduction, or as simple as telling students to get started on the problem in front of them. The task as implemented by students refers to what happens when students engage and attempt to find solutions for the task. Factors that affect how students engage with the task, whether as intended or not, include task features, cognitive demand, classroom norms, task conditions, teachers' instructional dispositions, and students' learning dispositions. The task implementation framework was used to identify factors affecting implementation when the participants in my study enacted high cognitive demand tasks.

From the task implementation framework, Boston and Wolf (2004) developed the Instructional Quality Assessment (IQA), a rubric-based tool used to measure the academic rigor of mathematics classrooms. The IQA is based on the fact that in order for students to engage in rigorous mathematics,

Figure 2. Task implementation framework
(Stein et al, 1996, p. 459)

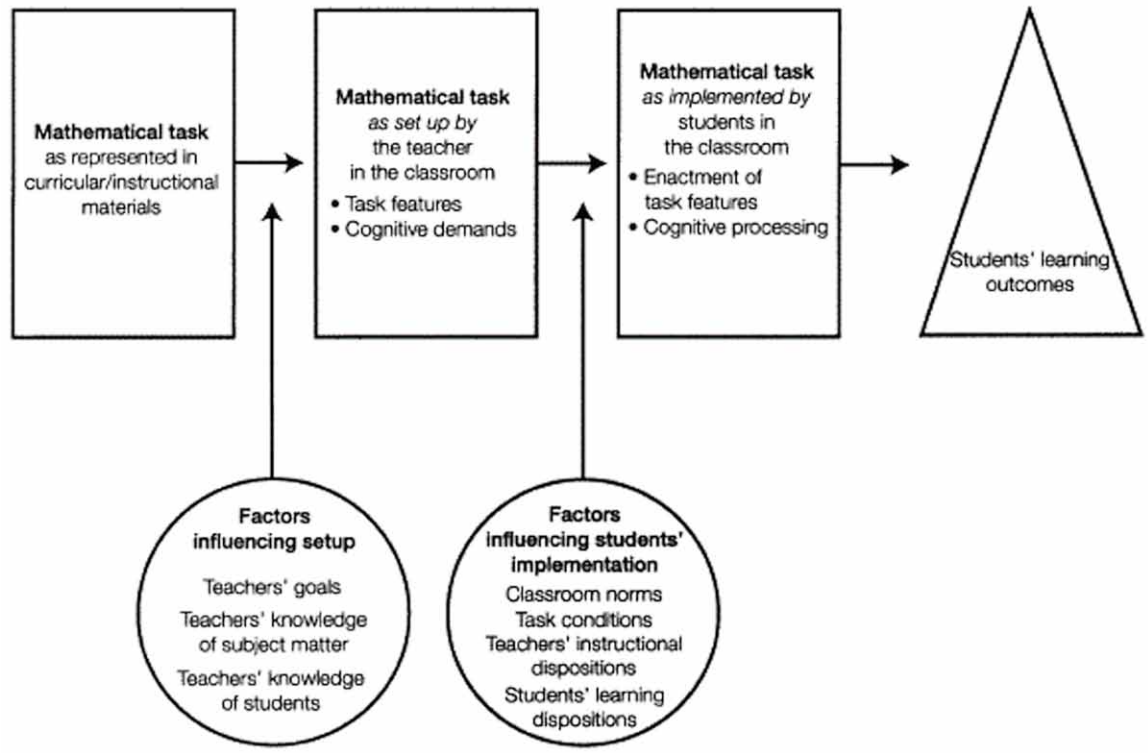
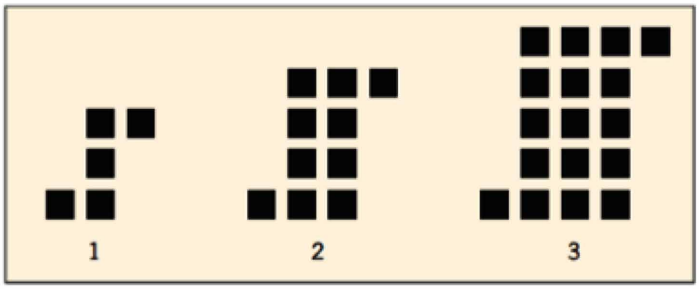


Figure 3. Figure S task
(adapted from Smith, Hillen, & Catania, 2007, p. 41)

"Figure S" Pattern Task



a. Assume the pattern continues, and draw the next step in the pattern.
b. How many squares will be in step 5?
c. If the base is 10 squares long, how many squares will there be?
d. Write a rule to find the number of squares in any step.

they must have access to the type of problems that will allow such engagement (Boston & Wolf, 2004). The rubrics of the IQA are based on the Stein et al. (1996) task implementation framework. Boston and Wolf stated that the rubrics "were created to consist of four dimensions critical to assessing students' opportunities to learn mathematics with understanding: potential of the task, implementing of the task, student discussion or students' written responses; and teachers' expectations" (p. 10). When using the rubrics, a researcher observes a lesson and rates the initial cognitive demand of the task presented as well as the implementation level of the task. The main focus was specifically on the implementation of tasks; therefore, only rubrics that pertained to the implementation of high cognitive demand tasks in the classroom were used. The Academic Rigor 2 (AR2) rubric on task implementation and the checklist that accompanied the rubric (see Figure 4 and Figure 5) were used to assess the level at which the teachers engaged students with each task.

When thinking about how to help the participants plan and implement high cognitive demand tasks, this study relies on the work of Smith and Stein (2011) and five practices for orchestrating discussions around high cognitive demand tasks. The five practices are anticipating, monitoring, selecting, sequencing, and connecting, and provide structure when planning and implementing high cognitive demand tasks. The first practice, anticipating, involves teachers predicting possible student solutions for the task. The solutions should include both correct and incorrect approaches. Along with anticipating student solutions, teachers should prepare possible questions to aid students if they are stuck or are on an incorrect solution path. Teachers should also anticipate questions that can extend students' thinking or provide scaffolding. The second practice, monitoring, involves observing students' mathematical thinking as they engage with the task. Teachers should circulate around the classroom and make note of how students approach the problem. Teachers should identify different representations of the problem and start to think about which solution methods to share with the class. Based on what the teacher observed while monitoring, the teacher then selects students to present their solutions. There is no correct way to select, but selecting is based on the teacher's goals for the lesson. Teachers may call on specific students or combine asking for volunteers and asking students who have a specific method the teacher wants shared. While selecting student solutions to share, teachers may choose to sequence the presentation of solution methods. There is no correct way to sequence solutions, but it is again based on the goals of the teacher. A teacher may want to start with the least complex solution and move toward the most complex. A teacher may want to start with incorrect solutions and initially address misconceptions. After students have presented the solutions, teachers should connect between student solutions. Teachers should draw connections between different representations presented and help students connect solutions to other mathematical ideas. When teachers utilize the five practices, they can orchestrate mathematical discussions during the implementation of high cognitive demand tasks and can increase student engagement with tasks.

METHODS

In order to understand the teachers' perspectives, this research utilizes a multiple case study (Yin, 2003) to answer questions about teachers' perspectives with respect to the phenomenon of implementing high cognitive demand tasks. Multiple data points were collected around each teacher case including interviews, classroom observations, and data from team planning meetings. Each teacher's data was analyzed individually and then across all three teachers to find similar themes. Of particular interest were teachers' perceptions of challenges, successes, and supports during implementation of high cognitive demand

Figure 4. Academic rigor 2 rubric
(Boston, 2012, p 20)

4	**Students engaged in exploring and understanding the nature of mathematical concepts, procedures, and/or relationships, such as:** • Doing mathematics: using complex and non-algorithmic thinking (i.e., there is not a predictable, well-rehearsed approach or pathway explicitly suggested by the task, task instructions, or a worked-out example); OR • Procedures with connections: applying a broad general procedure that remains closely connected to mathematical concepts. **There is explicit evidence of students' reasoning and understanding.** For example, students may have: • solved a genuine, challenging problem for which students' reasoning is evident in their work on the task; • developed an explanation for why formulas or procedures work; • identified patterns, formed and justified generalizations based on these patterns; • made conjectures and supported conclusions with mathematical evidence; • made explicit connections between representations, strategies, or mathematical concepts and procedures. • followed a prescribed procedure in order to explain/illustrate a mathematical concept, process, or relationship.
3	**Students engaged in complex thinking or in creating meaning for mathematical concepts, procedures, and/or relationships. However, the implementation does not warrant a "4" because:** • there is no explicit evidence of students' reasoning and understanding. • students identified patterns but did not form or justify generalizations; • students used multiple strategies or representations but connections between different strategies/representations were not explicitly evident; • students made conjectures but did not provide mathematical evidence or explanations to support conclusions • students engaged in doing mathematics or procedures with connections, but the underlying mathematics in the task was not appropriate for the specific group of students (i.e., too easy or too hard to sustain engagement with high-level cognitive demands).
2	**Students engaged in using a procedure that was either specifically called for or its use was evident based on prior instruction, experience, or placement of the task.** There was little ambiguity about what needed to be done and how to do it. **Students did not connections to the concepts or meaning underlying the procedure being used.** Focus of the implementation appears to be on producing correct answers rather than developing mathematical understanding (e.g., applying a specific problem solving strategy, practicing a computational algorithm). OR There is evidence that the mathematical content of the task is at least 2 grade-levels below the grade of the students in the class.
1	**Students engage in memorizing or reproducing facts, rules, formulae, or definitions. Students do not make connections to the concepts or meaning that underlie the facts, rules, formulae, or definitions being memorized or reproduced.**
0	**Students did not engage in mathematical activity.**
N/A	**The students did not engage in a task.**

Figure 5. Mathematics lesson checklist
(Boston, 2012, p. 21)

A ↑ Lesson Implementation provides **opportunities** for students **to engage** in **high-level thinking and reasoning**:	**B** ↓ Lesson Implementation provides **opportunities** for students **to engage** in **low-level thinking and reasoning**:
▫ Students use multiple strategies and representations. ▫ Students communicate mathematically with peers. ▫ Teacher provides scaffolding that supports students to engage with the high-level demands of the task while maintaining the challenge of the task. ▫ Students engage with the task in a way that addressed the teacher's goals for the lesson. ▫ Teacher provides sufficient time to grapple with the demanding aspects of the task and for expanded thinking and reasoning. ▫ Teacher holds students accountable for high-level products and processes. ▫ Teacher provides consistent presses for explanation and meaning. ▫ Teacher provides students with sufficient modeling of high-level performance on the task. ▫ Teacher provides encouragement for students to make conceptual connections. ▫ Other:	▫ The original task was rated a 1or 2. ▫ The original task was rated 3 or 4 but was not complex enough to sustain student engagement in high-level thinking. ▫ Students are not pressed or held accountable for high-level products and processes or for explanations and meaning. The scaffolding is too directive and serves to remove or reduce the challenging aspects of the task: ▫ Teacher provides a set procedure for solving the task ▫ The focus shifts to procedural aspects of the task or on correctness of the answer rather than on meaning and understanding. ▫ Feedback, modeling, or examples are too directive or did not leave any complex thinking for the student. Students are not provided with enough scaffolding to make or sustain progress on the task: ▫ Students are not given enough time to deeply engage with the task or to complete the high-level aspects of the task. ▫ Students do not have the prior knowledge necessary to engage with the task at a high level. ▫ Students do not have access to resources necessary to engage with the task at a high level. ▫ Other:
C The **Discussion** provides opportunities for students to engage with the high-level demands of the task:	
▫ Students use multiple strategies and make explicit connections or comparisons between these strategies, or explain why they choose one strategy over another. ▫ Students use or discuss multiple representations and make connections between different representations or between the representation and their strategy, underlying mathematical ideas, and/or the context of the problem ▫ Students identify patterns or make conjectures, predictions, or estimates that are well grounded in underlying mathematical concepts or evidence. ▫ Students generate evidence to test their conjectures. Students use this evidence to generalize mathematical relationships, properties, formulas, or procedures. ▫ Students (rather than the teacher) determine the validity of answers, strategies or ideas. ▫ Other:	

tasks in relation to the following research question: What factors do teachers identify as affecting the implementation of high cognitive demand tasks during all phases of the task implementation process?

Setting and Participants

The participants in this study included three seventh grade teachers at a public middle school in the Southeastern United States with approximately 700 students. The participants reported that 75% of the school's students were eligible to receive free and reduced-price lunch and 4% of the students were English language learners. The racial demographics of the school were 60% African-American, 25% White, 7% Latina/o, 4% Asian, and 4% multi-racial. A team of teachers was chosen in the hopes they could continue to collaborate and plan throughout the school year even after the conclusion of the professional development. The three teachers, who have been given pseudonyms, included Mr. Cone, Mrs. O'Neill, and Mr. Fielder.

Mr. Cone was a mathematics and social studies teacher in his fifth year of teaching. Mr. Cone received both his bachelor's and master's degrees from the same university, which was a large public university in the southeastern United States. For his bachelor's degree, Mr. Cone double majored in social studies education and history. After student teaching in a high school, he decided he was not ready to teach and applied to graduate school. Mr. Cone was accepted into a middle grades master's degree program and took courses to add mathematics as a certification area. Mr. Cone explained that he added mathematics because he enjoyed mathematics and found many students did not; he wanted the challenge of teaching the subject.

Mrs. O'Neill was a mathematics teacher in her third year of teaching. Mrs. O'Neill said that she never thought she would be a teacher because her parents pushed her in every direction except teaching. Her bachelor's degree was in biology with a minor in mathematics. Mrs. O'Neill got married right after graduating college and worked as a substitute teacher during her first couple of years of marriage, but after having children decided to stay home. After 25 years of being a stay-at-home mom and working as a substitute teacher again during the last couple of years, she decided she liked being in the middle school and high school and pursued a teaching degree. In order to receive her teaching certification, she took the state licensing test in both biology and mathematics for middle school and went through the state Teacher Academy for Pedagogy and Preparation (TAPP) program to earn her initial teaching certificate. TAPP is a state program that gives teaching certificates in 1 or 1.5 years to those who pass the state certification exam and have been hired by a school district. Mrs. O'Neill was hired to teach mathematics and received her certificate in one year through the program. At the time of the study Mrs. O'Neill taught four mathematics classes. Mrs. O'Neill also had administrative responsibilities that included being 7th grade team leader and data team leader, she was a mentor to a first year teacher, and had a preservice teacher intern who was in her classroom all day on Tuesdays and Thursdays.

Mr. Fielder was a mathematics teacher in his first year of teaching. He graduated from a large public university with a middle school degree, concentrating in mathematics and social studies, and did his student teaching the previous year in Mr. Cone's classroom. During his student teaching, Mr. Fielder taught and planned the mathematics lessons, and Mr. Cone taught and planned the social studies lessons. At the time of this study Mr. Fielder's course load consisted of four mathematics classes.

The Professional Development

The purpose of the professional development was to provide support on the selection and implementation of high cognitive demand tasks. In designing the professional development, consideration was given to McGee et al.'s (2013) list of effective professional development practices (e.g. promoting collaboration among teachers, addressing content and pedagogy, making connections to teachers' classroom practices, and ongoing support) in addition to aspects of professional development specific to implementing high cognitive demand tasks. While a comprehensive professional development plan was conceptualized, local school circumstances meant that the enacted professional development consisted of a half-day session before the beginning of the school year and sporadic interventions throughout the first semester of the school year.

A limitation to the design of the professional development and this study in general was access to the teachers. The teachers had many outside responsibilities which included having preservice teacher interns in their classrooms twice a week, participating in other professional development programs, being team leaders, data team leaders, and being a part of two different content teams. The original plan was to have a longer professional development session with the teachers during the first week of school, but was ultimately trimmed to a single four-hour session. This shortened time scaled back what was covered, and shortened the professional development activities with the teachers. There was also difficulty in scheduling planning meetings with the teachers. The original plan was to meet on Thursday mornings during the teachers' common planning, but as the study got underway often only part of the meeting was spent talking about the implementation of tasks, or the meeting was canceled altogether. The teachers canceled meetings because other activities were scheduled at the last minute, including meetings with parents, administrators, or academic coaches. A new plan included meeting Friday mornings before school, but this, too, only lasted for 6 meeting times and professional development meetings at 7 a.m. on Fridays were not ideal. While there was good quality planning time with the teachers toward the end, the PD included less time overall than originally intended.

The structure of the professional development was to first provide teachers with an overview of the characterization of high cognitive demand tasks, give teachers a frame to help with the planning and enactment of high cognitive demand tasks, and end with selecting and planning a task the teachers could implement with their students. During the initial half-day session, three articles from *Mathematics Teaching in the Middle School* were used to guide the professional development. The first activity was adapted from the article *Selecting and Creating Mathematics Tasks: From Research to Practice* (Smith & Stein, 1998) to introduce the notion of cognitive demand. Based on an activity described in the article, the teachers engaged in a task sort in which they first classified tasks as high or low in cognitive demand based on their own definitions and then discussed how they determined the level for each task. The teachers were introduced to the levels of demand provided in the article followed by a brief discussion about each of the levels and examples of tasks that were classified at each level. The teachers reviewed the task sort, and labeled the tasks using the four levels of demand as defined by Smith and Stein–memorization, procedures without connections, procedures with connections, and doing mathematics. A short discussion followed this activity about how they re-sorted the tasks and how using the four levels of cognitive demand changed their conceptions of tasks.

The second activity in the session considered the five practices– anticipating, monitoring, selecting, sequencing, and connecting–utilizing the *Orchestrating Discussions* article by Smith, Hughes, Engle, and Stein (2001) to frame the implementation of high cognitive demand tasks. One aspect of implement-

ing high cognitive demand tasks that is challenging for teachers is creating productive discourse around mathematical concepts with students (Stein, Engle, Smith, & Hughes, 2008). Teachers often either lead too much of the conversation or just tell students about the concepts without much discussion. To help novice teachers achieve productive discussions, Stein and colleagues proposed a set of practices that could be used as a tool to plan and implement a high cognitive demand task without lowering demand. The participants in my study all had less than five years' experience teaching, thus falling into the novice category. Smith, Stein, and their colleagues identified five instructional practices in which teachers should engage when implementing high cognitive demand tasks in the classroom (Smith & Stein, 2011; Stein et al., 2008).

The professional development session concluded with the article *Using Pattern Tasks to Develop Mathematical Understandings and Set Classroom Norms* by Smith, Hillen, and Catania (2007). The teachers discussed how using a patterning task to create norms in the classroom allowed students to become comfortable when engaging in high cognitive demand tasks. The Figure S task (see Figure 3) was chosen by the teachers from the article to implement during the first week of school. Collectively the teachers planned to implement the Figure S task by working through the five practices as a frame for implementation. Together the teachers worked through the Figure S task and came up with multiple solutions methods. From these solution methods the teachers anticipated possible correct and incorrect student solutions. A recording sheet was created to monitor students during the task implementation based on the anticipated student solutions and the teachers used this sheet during the task implementation. The session concluded with the teachers talking through how they would use the anticipated solution methods and monitoring sheet to select, sequence and connect student solutions during the actual lesson.

The conversations around the articles developed a vocabulary and shared understanding of terms used during future intervention cycles with the teachers. During planning meetings throughout the semester, the teachers and author went through a particular implementation cycle. An implementation cycle included planning for the implementation of a high cognitive demand task, the implementation of that high cognitive demand task, and an interview reflecting on the implementation of that high cognitive demand task. During the planning of a high cognitive demand task, the author would provide the teachers with a high cognitive demand task that fit into their curriculum and class time schedule in order to circumvent the possible barrier of time and curriculum as reported by Foley et al. (2012). The teachers told the author of an upcoming topic in which they wanted to implement a high cognitive demand task, and the author would then find a corresponding high cognitive demand task. Then the author and teachers discussed the cognitive demand of the given high cognitive demand task. The next step involved the utilization of the five practices to plan for the implementation of that high cognitive demand task and concluded with the teachers then implementing the high cognitive demand task. The researcher would observe these lessons and reflect with each teacher on his or her perception of the implementation of the task.

Data Collection and Analysis

To analyze the data the author relied on the task implementation framework (Stein et al., 1996), the IQA AR2 rubric (Boston, 2012), and the five practices (Smith & Stein, 2011) as the basis for coding interview transcripts and classroom observations. Data collection included classroom observations, interviews, and notes from team meetings. Teachers were observed multiple times throughout the semester and each

teacher was interviewed three times, with each interview lasting about 60 minutes. The interviews were semi-structured (Patton, 2002) and included questions on the teachers' conceptions of high cognitive demand tasks, factors that affected the implementation of high cognitive demand, and their ideal conditions that supported their use of tasks.

The goal for the data analysis focused on gaining the teachers' perspectives of implementing high cognitive demand task. Transcripts were examined line-by-line searching for instances where the teachers made comments about factors that affected their use or implementation of high cognitive demand task. Narratives for each teacher were created, separating the data into instances where the teacher cited factors that led to the decline of demand (e.g. students' instructional dispositions, classroom norms), instances where the teacher cited factors that maintained the demand of the task (e.g. teachers' instructional dispositions, task features), and instances where the teacher cited factors that affected his or her decision to use high cognitive demand tasks (e.g. teachers' knowledge of students, time, district requirements and curriculum). Then interviews were coded for teachers use of each of the five practices. Ech transcript was coded for teachers specified use of a practice and how that practice affected their use of high cognitive demand tasks. Team meeting notes were used to look for instances where a teacher cited a factor affecting implementation and included it in that teacher's narrative. Once the narratives were completed, they were coded using factors from the task implementation framework as well as looking for codes outside the task implementation framework. Each teacher's narrative was coded individually first and then examined for common themes across all cases, making notes of where the teachers had common barriers and support. Finally, factors each teacher individually pointed to as being a barrier or a support were named and themes were created from the data.

To analyze if the level of cognitive demand was maintained, the observed lessons were rated using the AR2 rubric as seen in Figure 4 from the IQA (Boston, 2012). The IQA protocol involved using a mathematics lesson checklist, as seen in Figure 5, to identify features of the teacher's and students' interactions during task implementation. The checklist then mapped onto categories of the rubric. A score of 4 meant the checklist had mostly items checked off in Box A meaning teachers maintained student's opportunities to engage with a high level task and there was strong evidence of at least one item checked off in Box C meaning the whole class discussion provided opportunities for students to engage with task at a high level or in small groups students consistently provided justification of their mathematical thinking. A score of 3 meant items were mainly checked off in Box A but there were no items checked off in Box C. A score of 2 means students opportunities to engage in the task at a high level were diminished, which occurs when items are mostly checked off in Box B and there were no items checked off in Box C. Scores of level 3 and level 4 can have a couple items checked off in Box B, however the majority of checked items need to occur in Box A and there needs to be evidence of student discussion from Box C.

The AR2 rubric was used to rate the two patterning tasks. There was incomplete data from one of Mrs. O'Neil's lessons and as such the lesson was not analyzed using the AR2 rubric. For the rest of the lessons, the mathematics lessons checklist was used to document instances where the teacher provided opportunities for students to engage in high-level thinking, instances where the teacher did not provide opportunities for students to engage in high-level thinking, and instances where the class discussion provided opportunities to engage in high-level thinking. Using AR2 protocol, the checklist was applied to the rubric and each teaching episode was rated using one of the four levels. If teachers scored a level 3 or 4, they maintained the cognitive demand and if they scored a level 0, 1, or 2, they lowered the demand of the lesson.

FINDINGS

The teachers discussed three main aspects of the professional development that supported their use of high cognitive demand tasks in the classroom, including time to plan high cognitive demand tasks, the use of the five practices – anticipating, monitoring, selecting, sequencing, and connecting– as a way to frame the implementation, and the provision of high cognitive demand tasks that seamlessly fit into the curriculum. In the following sections each of these three themes is discussed in depth.

Time for Planning

The aspect of the professional development teachers found most supportive was the time the facilitator provided for them to plan high cognitive demand tasks as a team. When the team had time to plan and discuss the implementation of a high cognitive demand task, the teachers thought the implementation of those tasks extremely successful. Mr. Cone thought implementation was more successful when the team had time to talk and plan the tasks ahead of time because they could all look at the mathematics involved and be more prepared to help students.

The chance to work on a task together … like we did the one day and so we got all of our different solutions, that was incredibly helpful. I think we are just not very good about making time for that unless we make time. We are not good doing it out on our own and then exchanging our work for example, so the chance to [plan] together.

Mr. Cone explained that the seventh grade team often did not have the time to plan tasks and anticipate possible student solutions. He said they were often pressed for time and if they did find some time, they typically talked generally about how to implement tasks. He said more often than not, there was no time for common planning and that led to each teacher implementing the task in his or her own way. This, in turn, meant that teachers were unable to get ideas from one another. Mr. Cone said ideal conditions to implement tasks included protected planning time each week where the team could collaboratively plan lessons. When asked what he'd need to consistently implement high cognitive demand tasks, Mr. Cone discussed the importance of time with his colleagues to plan for the enactment of these tasks.

I need, um, I need time to plan those tasks and do them with my colleagues beforehand…I think part of the problem is that we feel overwhelmed because when we get together, if we want to talk through a week's worth of lesson plans …we can't do it in an hour and so we, [we are] not paralyzed by fear, but paralyzed by being overwhelmed by the things that can be that, or we want to do in that time and know we can't do it. So ideally time to plan those lessons and then not just plan them, but plan them so we have time to look at it and maybe reflect on it before we implement it, because plenty of times we've come up with an idea, done a couple of, you know, had a couple days to ponder and then, made some changes, with the intention of making it better.

Similarly, Mrs. O'Neill said that being able to discuss the task with the seventh grade team was extremely helpful when implementing tasks. When asked if the team could replicate the planning done during the professional development on their own, she said, "I know we certainly could, the big obstacle is having the time to be able to find something that is good … the time to plan it, and the time to prac-

tice it." Mrs. O'Neill enjoyed common planning times because the team could throw around ideas and get good things going, but they often did not have that chance outside of the professional development. She also commented that she needed her own individual time to think through the lesson and prepare mentally when giving a task. Mrs. O'Neill said she was frustrated with the lack of quality uninterrupted time. She wanted both time to plan with the seventh grade team as well as individual time to plan alone. When asked about ideal conditions to plan and implement tasks, Mr. Fielder explained it would be beneficial to have more structured planning time with his team. Mr. Fielder said his struggles included being "bogged down by what teachers have to do," which included paperwork, meetings, and detentions.

Mr. Fielder's sentiment summarized all three teachers' feelings on what was required of them on a weekly basis that kept them from their planning. The teachers ultimately said they were more inclined to implement high cognitive demand task when they were given time to collaborate and plan. When asked what the ideal conditions would be to implement more high cognitive demand tasks, both Mrs. O'Neill and Mr. Cone claimed having the time to sit down as a team and plan and work out the task together would allow for the implementation of more high cognitive demand tasks into their classrooms.

Using the Five Practices

The teachers thought that the use of the five practices – anticipating, monitoring, selecting, sequencing, and connecting– (Smith & Stein, 2011) as a frame for planning and implementing high cognitive demand tasks contributed to successful implementations of high cognitive demand tasks. Anticipating and monitoring were cited as most often contributing to what the teachers thought to be successful implementation of tasks.

The first practice, anticipating possible student solutions and misconceptions was cited by the teachers as being helpful when preparing lessons that included high cognitive demand tasks. Mr. Cone explained planning how to implement the lesson, deciding on questions to ask students and talking about how to introduce the lesson was helpful because the teachers talked about it in advance and decided on what to do and say. When the teachers planned together, they found multiple solution methods to a task and anticipated possible student solutions and misconceptions. Mr. Cone explained how anticipating helped him and the other teachers maintain the demand of a task saying:

We talked about the problem before hand, the math teachers, we came up with our solutions, and then we put them on one sheet of paper, so we all had a piece of paper that had 6 solutions on it which was kind of the ideal number that we had to put up on the board for the students to choose from. So being able to [plan] together and then looking at [the task] briefly beforehand, alright so we are going to ask this question at the beginning, we are not going to give them any more prompts, then we are going to this one, and then we are going to do this one.

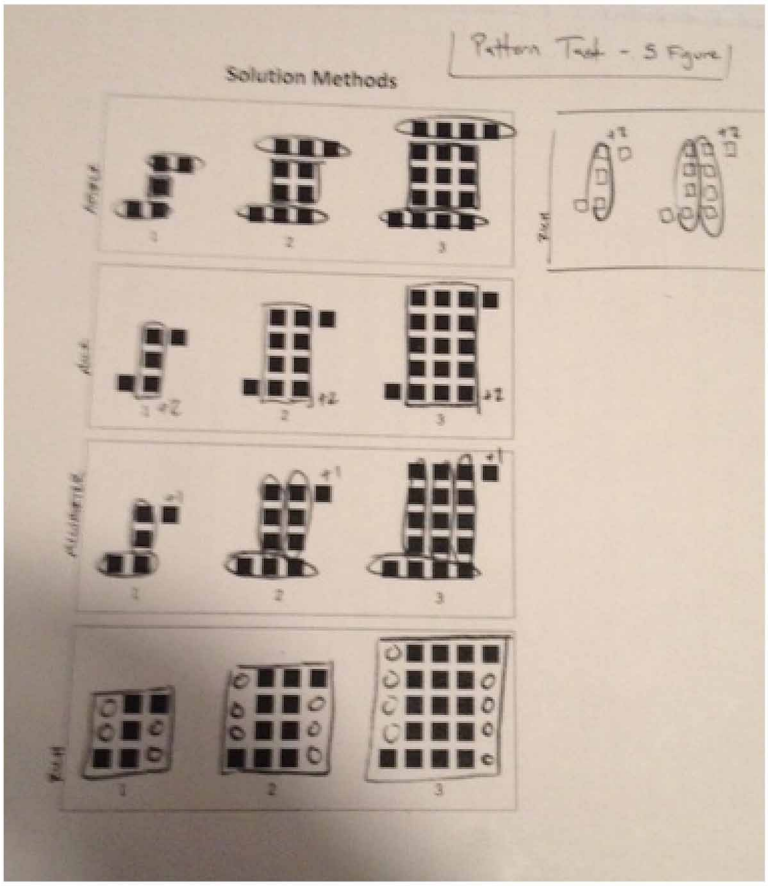
Mr. Cone said having anticipated the solution methods and questions was helpful to have before going into the lesson because he was able to remind himself of the questions and prompts he was going to give students without lowering the demand of the task and giving students the answers. Mr. Fielder also commented on how anticipating possible student solutions allowed him to maintain demand and helped with the setup of the lessons. He explained that by talking with the team about the different solution methods, he realized that students did not always need a long introduction to a high cognitive demand task and could just start working on the problem at the beginning of class. During one lesson, he said

his plan was to give students very little prompting in the beginning, but then guide them as they went further into the problem.

Monitoring, the second of the five practices helped the teachers to maintain the demand of the tasks as explained by the teachers. During planning, the teachers used the anticipated solution methods to create monitoring sheets. These sheets were then used to monitor and track students' use of solution methods during instruction. An example of a monitoring sheet can be seen in Figure 6. Mr. Cone explained how the monitoring sheet helped structure class because it gave an ideal number of solutions to look for when students were working on the problem Mrs. O'Neill explained how she gave time for students to work in pairs or individually so she could monitor what the students knew or did not know and then use this information to adjust the discussion.

Thinking about connecting student solutions helped Mr. Cone when he implemented high cognitive demand tasks. When talking with Mr. Cone about what he thought his students should be doing when engaging with high cognitive demand tasks, he explained he was more aware about students needing to make connections saying, "I want [the students] to be thinking about how whatever we are doing is connecting to whatever we've been doing recently. I am thinking much more about [the students] connecting to whatever we have been doing."

Figure 6. Figure S task monitoring sheet



Although the teachers only discussed how anticipating, monitoring, and connecting positively affected their use of high cognitive demand tasks, the observation of the successful lessons yielded evidence that all the practices except sequencing were present.

Tasks Aligned to Curriculum

The third theme that teachers identified as helpful in their implementation of cognitive demand tasks was being provided with specific high cognitive demand tasks that fit seamlessly into their curriculum. The teachers sometimes had difficulty finding time during instruction to implement the high cognitive demand tasks because they felt pressure to cover the curriculum. District requirements, including the district-imposed curriculum, resulted in a factor that affected the teachers' implementation of tasks because they felt the curriculum was so expansive and with district required testing, there was not the space to implement high cognitive demand tasks. Mr. Cone identified the pressures of implementing the curriculum as a factor when thinking about implementing tasks. He claimed that he typically implemented tasks when there was an extra day and he did not have a specific curricular goal in mind. Mr. Cone also said one barrier in preventing him from implementing high cognitive demand tasks was not having the knowledge of which high cognitive demand tasks existed and fit into the curriculum. Mrs. O'Neill explained that the curriculum needed to be covered, and testing often disrupted the schedule. She said she struggled to find tasks that seamlessly fit into the curriculum and claimed that the students needed to know the tested skills. She decided to focus more time on skill practice instead of implementing high cognitive demand tasks.

One way to circumvent this difficulty was to bring in high cognitive demand tasks that matched the content the teachers were currently teaching and use the planning process with the team. The author found tasks that aligned with the curriculum, usually specific to the unit they were teaching at the time, taking that burden away from the teachers. When asked what successes they had with implementing tasks, the teachers pointed to the inclusion of a task to use and having a knowledgeable facilitator to assist them with preparing the task. Mrs. O'Neill summed it up best when she said:

If somebody could help me find the resources, and then kind of, ok let's pretend we are doing the lesson, kind of walk through it, like what we did, that was awesome. But me trying to plan the lessons, and do this, do this, do this. There is not enough time. There is not enough time.

Mr. Cone said, "One of the things that we've enjoyed this year is you having the time to say 'Here is a task that fits" and then bring it to us." Mrs. O'Neill noted the importance of receiving tasks aligned to the curriculum. She claimed implementing the two high cognitive demand tasks that they planned together as a team went well because she did not have to find the tasks and their discussion that focused on implementing the tasks. She said that if someone could help her find a task and plan it out, she could pretty much implement any task saying "it might not be beautiful, but that I could do it." When Mr. Fielder elaborated on what it meant to have more structured planning time, he explained planning should not be used to think of what high cognitive demand tasks to do, but rather to come to the planning meetings with a high cognitive demand task and then be able to plan out the implementation with the team. He explained that oftentimes the team would sit and think about which high cognitive demand tasks would fit and come up with a few ideas, but there was little follow-up because the next time they could plan again was a few days later and often by then the ideas got lost. This aligns with bringing

teachers curricular-aligned tasks so the planning time can then be used to plan that specific task instead of spending the little time they have thinking of a task and then planning it.

Example of a Teacher's Success

During observations on the implementation of the two tasks planned together using all three themes, each teacher maintained the cognitive demand of the lesson throughout based on using the rubrics from the IQA (Boston, 2012) as seen is Figure 3. Both Mr. Cone and Mr. Fielder implemented their two high cognitive demand tasks with an IQA AR2 level of 3 and 4 respectively, indicating they maintained the demand of the tasks, and even improved their implementation over time. The one lesson with complete data for Mrs. O'Neill had an IQA AR2 level of 3, which means she maintained the demand of the task.

An example of when a teacher maintained the level of demand of a task was when Mr. Cone implemented the Figure S task as seen is Figure 3, which was given a rating of a level 3 (see Figure 4) according to the IQA AR2 rubric. Evidence from the lesson included students engaging with the Figure S task and communicating mathematically with peers. Additionally, the students had appropriate knowledge to access the task because it was a patterning task and had multiple entry points. The students had access to resources that supported their thinking because they had squares they could work with as well as their peers. Mr. Cone gave the students sufficient time to work on the problem. During the discussion time in class, the students identified patterns, made conjectures, and used evidence to test conjectures. During student presentations, Mr. Cone questioned students about how they arrived at their solution methods. The reason the implementation of the task cannot be rated a level 4 was although students used multiple strategies, no connection was made between strategies or to the mathematics in the problem. While students engage in the problem using complex and non-algorithmic thinking to solve the task, identify patterns, and create a generalization from the pattern, connections were not made between solutions (Boston, 2012). At the end of class, students provided explanations for finding the *n*th figure in the pattern but due to time constraints, there was little discussion around the generalization and class just ended. There was evidence throughout the lesson of Mr. Cone using the five practices (Smith & Stein, 2011) to frame his instruction. Prior to the lesson, Mr. Cone anticipated possible student solutions during a task planning session with the seventh grade team. He used these possible solutions to monitor students at the beginning of the lesson. Mr. Cone printed out the possible solutions and walked around the room, marking down when he saw instances of each solution method. He did select students to present their work, but it did not appear sequenced in a certain way. Perhaps due to the lack of time, there was no evidence of connecting between student solutions and connecting solutions to the mathematics of the task.

SOLUTIONS AND RECOMMENDATIONS

At the conclusion of the professional development, the teachers in this study maintained the cognitive demand of tasks when they were provided a high cognitive demand task that fit into their curriculum, had the time to plan that high cognitive demand task as a team, and used the five practices as a frame for implementation. The following section, highlights the teachers' success in implementing the two tasks where all these themes came together, interpret what these results mean from the teachers' perspective for those in professional development, and provide recommendations when implementing professional development with teachers.

Time

While the professional development and interventions with teachers in this study was short (approximately 10 hours of professional development contact time), the teachers had some success maintaining the level of demand when implementing high cognitive demand tasks after being provided with the task, given time to plan with their team and using the five practices as a frame. Previous findings indicated that after a sustained and targeted professional development on high cognitive demand tasks, teachers were successful in implementing high cognitive demand tasks (Boston, 2013; Foley, et al., 2012; McGee et al., 2013; Polly et al., 2014). This is consistent with research that teachers need sustained support over time, as though these teachers had some success, given more contact hours there may have been more instances where teachers successfully selected and implemented a high cognitive demand task. Researchers have stated that in order for professional development to be successful, it needs to be ongoing (Desimone, 2011; Feiman-Nemser, 2001; McGee et al., 2013). This recognition suggests a need for more sustained professional development throughout the year, at least 20 hours of contact time spread over time according to Desimone (2011), to assist teachers in implementing new instructional practices even when all three of these themes come together.

Feiman-Nemser (2001) stated "schools are not organizations for teachers to work together on a problem of practice in serious and sustained ways. With no tradition of inquiry, collaboration, or experimentation, there is a strong press to maintain the status quo" (p. 1021). To change the way teachers think about instruction, structures are needed that will allow for the type of inquiry and collaboration necessary to implement new instructional strategies with fidelity. The teachers in this research study identified common planning as critical to the success of implementing high cognitive demand tasks, yet they did not have much common planning time to devote to planning what they learned about in their professional development. This idea implies the teachers need the time and the structure to work productively with whatever they learned about in a given professional development session. Researchers have claimed that professional development can be more successful if teachers work in collaboration with each other (Desimone, 2011; Feiman-Nemser, 2001; McGee et al., 2013). The data from this professional development experience suggests after a given professional development session or series, teachers should be provided with the protected space in the week devoted to developing what they learned about, either by themselves or with other teachers, depending on the structure of the school.

Providing a Frame for Planning and Implementing

When Stein and colleagues (2008) presented the five practices as a tool for novice teachers to increase their student discussions during the implementation of high cognitive demand tasks, there has been little research on the use and effectiveness of these five practices with teachers. The teachers in this study often indicated that using the five practices helped them maintain the level of demand when implementing high cognitive demand tasks. This suggests a need for a specific frame for planning to help teachers think about students when planning tasks. During the professional development, when using the five practices as a frame for planning and implementing high cognitive demand tasks, there was more explicit interventions and discussion around the first two practices, anticipating and monitoring, and not as much discussion around selecting, sequencing and connecting. There was evidence that the teachers anticipated, monitored, and selected students to present, however there was never an instance of the teachers purposely sequencing those solutions. Also while there was some evidence of teachers

making connections between student solutions and making connections to the mathematics, this did not occur consistently. This suggests a need for more interventions and explicit discussions around how to select, sequence, and connect in a meaningful and consistent way. While the five practices may not be the only way to frame the planning and implementation of tasks, the findings from this study suggest teachers do need a structure to help integrate high cognitive demand tasks into their classroom practice more effectively.

Finding Curricular Aligned Tasks

Teachers need access to instructional practices and tasks that align with their enacted curriculum as teachers often cite the misalignment of curriculum as reasons for not implementing the instructional practices used in professional developments (Foley et al, 2012; Handal & Bobis, 2004; Johnson, 2006; McGee et al, 2013). The teachers in this research study were not only willing to implement the high cognitive demand tasks brought to them that fit in with the mathematics content they were teaching, they maintained the demand of those high cognitive demand tasks. The teachers in this study claimed they were unable to search for tasks on their own due to time constraints and their self-proclaimed lack of knowledge about quality resources which aligns with prior research on barriers related to time (Johnson, 2006; Wachira & Keengwe, 2010). When given a high cognitive demand task, the teachers were willing to implement it in their classrooms. This implies those working with teachers who are trying to implement high cognitive demand asks should provide examples of tasks and where those tasks fit into teachers' curriculum. In general, when providing professional development to teachers around using any type of instructional strategy or certain task, teachers should be provided with examples of the instructional activity that aligns with their curriculum. This way it takes the encumbrance from the teacher in having to find curricular- aligned materials and can use what the professional developer provides. If teachers do not see the tasks from the professional development as aligned to their curriculum, they are not likely to implement those tasks (Foley et al. 2012, McGee et al., 2013). This recognition suggests the need for professional developers to make sure materials given to teachers align to their curriculum to better ensure teachers will use those materials in their classrooms.

Another reason teachers need access to high cognitive demand task is because of the nature of high stakes testing. The teachers in this study felt pressured to cover their curriculum in order to prepare students for the end of the year tests. This is similar to what other researchers have found to be barriers for their teachers to implement instructional strategies learned during professional development sessions (Handal & Bobis, 2004; Johnson, 2006). Teachers claimed a reason they did not implement the instructional strategies they learned about in their professional development was that they felt it would not help students with end-of-year state tests (Handal & Bobis, 2004; Johnson, 2006). The teachers in this research study did not feel as though high cognitive demand task fit in with their curriculum the students needed for the end-of-year state test and did not want to lose a day of instruction with high cognitive demand tasks. This finding is consistent with previous research on implementing high cognitive demand tasks (Foley et al, 2012; McGee et al., 2013) implying that in order to get teachers to implement more, professional developers need to find high cognitive demand tasks that seamlessly fit into teachers' curriculum.

FUTURE RESEARCH AND TRENDS

While the teachers in this study identified three themes that they attributed to the successful implementation of lessons, it is not clear if all three of these need to be in place, or what iterations of these themes need to occur in order for teachers to successfully select and implement and maintain the demand of tasks. There could also be other themes that contribute to teachers' successful implementation of high cognitive demand tasks that was not identified in this study. Although there is research on elements that should be incorporated into professional development including promoting collaboration among teachers, addressing both content and pedagogical knowledge, making connections to teachers' classroom practices, and ongoing, job-embedded support to provide continuity for teachers (Desimone, 2011; Feiman-Nemser, 2001; McGee, Wang, & Polly, 2013), these elements do not address what seemed to be the teachers most pressing issue of time as a barrier for the implementation of high cognitive demand tasks. The teachers in this study often claimed time was a barrier to their implementation of tasks. They claimed they did not have the time to look for tasks that aligned with curriculum as well as the time within the school year to implement tasks and still address all aspects of their curriculum. The teachers seemed to perceive that high cognitive demand tasks were extra tasks that needed to be fit into their curriculum instead of seeing tasks as means to teach their curriculum. Future research on teachers' perceptions of high cognitive demand tasks may shed light into how professional developers can help teachers more seamlessly fit high cognitive demand tasks into their curriculum.

CONCLUSION

Conducting professional development with teachers is a complex process. While extensive professional development may be conceptualized, circumstances may lead to a shortened professional development experience with teachers. While the process of working with teachers may be challenging, it is ultimately rewarding to work with teachers in a professional development capacity, especially when the teachers show success in implementing the instructional strategy. Gaining teachers' perspectives of what supports helped implement aspects of the professional development is helpful in planning future professional development experiences. If professional developers want teachers to implement certain instructional practices in their classrooms, listening to teachers throughout the process to gain an understanding of what supports are necessary to implement those instruction practices may help teachers continue to utilize these practices, even after the professional development has concluded. Even though this was a multiple case study of three teachers, there is still value in listening to their voices and using the example of their success when thinking about providing professional development to teachers.

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Chapter 31
Defining Effective Learning Tasks for All

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ABSTRACT

An effective mathematics program may be defined as one in which classroom teachers implement tasks and activities that allow all students opportunities to engage in high levels of mathematical thinking and reasoning (NCTM, 2014). In the chapter, we describe background information regarding the preparation of practicing and prospective teachers when implementing research-based practices in the inclusive classroom. Specifically, we provide explicit background information from the extant literature regarding: 1. Equity, 2. Universal Design for Learning, and 3. How to use games as classroom activities to promote the development of mathematical concepts, skills, and conceptual reasoning.

INTRODUCTION

An effective mathematics program may be defined as one in which classroom teachers implement tasks and activities that allow all students opportunities to engage in high levels of mathematical thinking and reasoning (NCTM, 2014). However, many teachers claim they are ill prepared when asked to meet the needs of students in inclusive classrooms (Rose & Meyer, 2000; Spencer, 2011). A key factor that negatively impacts students' mathematical development is the contrast that often exists between the needs of individual students and the type of instruction received (Buchheister, Jackson, & Taylor, 2014; Kroesbergen & Van Luit, 2003). While each and every child that enters a classroom should be provided the "opportunity to reach his or her potential, the current education system does not adequately address these needs. [In fact], the traditional methods used by teachers often focus on exposing and remedying

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deficits; setting up some students for a pattern of failure" (Subban, 2006, p. 938). Classrooms today reflect widespread diversity including students with disabilities, students exceeding grade level expectations, students from various cultural backgrounds, and students whose home language is not English (Subban, 2006), and unfortunately, many general education classroom teachers have a dearth of knowledge regarding specialized practices that provide students access to high quality mathematics instruction (Macinni & Gagnon, 2006). Consequently, it is integral that professional development and teacher education programs help teachers acquire knowledge and skills necessary to provide all students—regardless of mathematical understanding, language proficiency, or cultural experience—with the greatest opportunity to learn.

Universal Design for Learning (UDL) defines a framework to aid practicing and prospective teachers in providing access and opportunity to high quality mathematics. In addition, with many variations and various mediums, mathematical games naturally provide multiple modes of presentation and expression while simultaneously engaging and motivating students to participate in discussions of key mathematical ideas. Thus, games, as viewed through a UDL lens, are tasks that provide learning for all. In this chapter, the authors describe how the theory of UDL may be incorporated into the general education classroom through the use of mathematical games as lesson activities. Game play not only provides a context for students to use critical thinking skills that reflect mathematical proficiencies (e.g., communication, modeling, quantitative reasoning), but the strategic implementation of games allows for multiple entry points so students with a wide range of mathematical experience are empowered to participate in the problem solving process (Jackson, Taylor, & Buchheister, 2013). With knowledge of effective planning strategies through the integration of UDL (Courey, Tappe, Skiker, & LePage, 2012), teaching and learning of mathematics would embody the elements of equitable instruction. The authors conclude the chapter with practical implications for teacher education, professional development, and subsequent research to further support the teaching and learning of equitable mathematics using UDL as a framework to define learning tasks through game play.

Equity in Mathematics Education: What Is It?

Equity has ranged in meaning from issues of access to making content culturally relevant to disrupting structural norms (DiME, 2007; Gates & Jorgensen, 2009). Equity may also be viewed as a process or as a product (Crenshaw, 1988; Gutiérrez, 2002; Martin, 2003; Rousseau & Tate, 2003). Essentially, seeing equity as a process means treating all students equally, without regard to race, ethnicity, or economic background. On the other hand, seeing equity as a product means differentiating instruction based upon students' needs in order to promote equal learning outcomes. Differentiated instruction is a teaching strategy designed to recognize and address students' learning preferences, strengths, and weaknesses (Subban, 2006), which should be a standard "component for teachers' professional development in order to maximize effectiveness" (Chen & Herron, 2014, p. 24). Thus, implementing this level of instruction requires the dedication and knowledgebase of a well prepared teacher (van Garderen, Scheuermann, Jackson, & Hampton, 2009; Morgan, 2014).

The authors adopt the view of equity as a product, and define teaching mathematics for equitable outcomes as approaches to teaching mathematics that are respectful of students' ethnic, racial, and economic backgrounds that promotes equal learning outcomes. More specifically, the authors draw on Gutiérrez's (2007; 2009; 2012) definition of equity, which include access (i.e., resources that provide students an opportunity to learn and participate in the learning of mathematics), achievement (i.e., student outcomes), identity (i.e., drawing on students' cultural frame to see themselves and the broader society

in mathematics), and power (i.e., social transformations such as voice, who is being privileged, and using mathematics to read and change the world). Gutiérrez argues equity encompasses the power of *not* predicting students' outcomes (e.g., participation, achievement, ability) based on their background, race, class, or gender. Instead, equity embodies how students are positioned and the power they are given in the mathematics classroom as their identities evolve through discourse and social interaction.

The National Council of Teachers of Mathematics (NCTM) asserts that in order to teach in an equitable manner, teachers and schools must maintain "high expectations and strong support for all students" (NCTM, 2000, p. 11), meaning that mathematics teachers must provide opportunities for students to learn challenging mathematics regardless of their students' "personal characteristics, backgrounds, or physical challenges" (p. 12). Moreover, to address issues of equity, mathematics teachers must include aspects of the student's culture and language to support mathematics learning for all students (NCTM, 2014).

Some mathematics teachers have been unsuccessful in supporting students from cultural and linguistic backgrounds to achieve in mathematics (Suleiman, 1997), and maintaining the status quo will only continue to "widen the gap between teachers and children in schools" (Sleeter, 2001, p. 96). Yet, many mathematics teachers contend issues of equity are not relevant factors in the mathematics classroom because they view mathematics as a universal, culture-free subject (Rousseau & Tate, 2003). However, there is a growing body of mathematics education researchers who understand mathematics and mathematical knowledge are neither universal nor culturally neutral, but are situated in a sociocultural framework (Ukpokodu, 2011). Gay (2000) argues that if we "decontextualiz[e] teaching and learning from the ethnicities and cultures of students [it] minimizes the chances that their achievement potential will ever be fully realized" (p. 23). Thus, transitioning to an equity-centered paradigm in mathematics education requires that the mathematics education community "value the cultural and lived experiences of all children…[and] the belief that all children possess strong intellectual capacity and bring a wealth of informal, out-of-school knowledge to the teaching and learning process" (Lemons-Smith, 2008, p. 913). It is imperative that mathematics teachers are given the opportunity to develop this equity-centered orientation toward mathematics teaching and learning to effectively instruct all students.

In order to effectively accomplish the goal of teaching mathematics from an equity stance, teachers must understand that students from diverse backgrounds come into the mathematics classroom with different world-views. Additionally, teachers must be willing to move beyond teaching mathematics from a Eurocentric viewpoint and practice pedagogy related to equity by building relationships, setting high expectations, and helping students maintain their identities (Ladson-Billings, 1994; 2001; Malloy 2002; 2009; Matthews, 2005).

Universal Design for Learning

Universal Design for Learning is an equitable approach, which serves as a planning framework teachers may use to analyze the structure and content of the curriculum in order to embed appropriate accommodations (Subban, 2006) that meet the needs of students with a broad range of interests and skills. The principles of UDL are grounded in research of learner differences and highly effective pedagogy (Israel, Ribuffo, & Smith, 2014; Jimenez, Graf, & Rose, 2007); and thus support the premise of equitable instruction and provide a framework that educators may use to develop instructional activities that are appropriate and challenging for all students. While the initial focus of the theory attended to students with special needs, it is important to recognize that analyzing activities and planning through the UDL framework benefits all students.

It is compulsory that effective teacher preparation programs and professional development reflect empirical evidence that responds to the needs of an ever-changing population of students and dedicates explicit methods to provide prospective and practicing teachers with the knowledge and skills necessary to successfully instruct diverse students. By anticipating potential barriers, classroom teachers may embed instructional strategies and scaffolds that support students' needs; thus, providing opportunities that allow all students, including those who struggle with mathematics, access to the general education curriculum (Buchheister, Jackson, & Taylor, 2014; Jimenez, Graf, & Rose, 2007). The three components of UDL include multiple modes of: (a) presentation (e.g., multiple modes of representation), (b) expression (e.g., sharing thinking through various student-selected modalities), and (c) engagement (e.g., incorporating students' strengths and interests) (Basham & Marino, 2013; Israel, Ribuffo, & Smith, 2014). Each tenet of UDL focuses on the how (expression), what (representation), and why (engagement) of learning, which are the central tenets of the network of the brain (National Center on Universal Design for Learning, 2014).

Incorporating multiple means of presentation into the lesson supports students by representing mathematical content in various modes including discussions; stories, songs, or poems; virtual manipulatives; concrete objects; or real world contexts. Representations "embody critical features of mathematical constructs and actions" (NCTM, 2014, p. 24) and serve as tools to externalize, share, and preserve one's understanding of mathematical ideas (NRC, 2001). Moreover, working through multiple representations of mathematical ideas promotes sense-making as students analyze, evaluate, select, and use multiple representations (NCTM, 2014). However, traditional mathematics texts or activities often represent content through equations or word problems that seem irrelevant to the lived experiences of children in the classroom (Polikoff, 2015). As a result, students often perform isolated drills and practice without ascribing deep meaning to the operations or analyzing the mathematical context underlying the word problem. The initial barrier is within the representation of the mathematics and the expectation of a specific interpretation of the mathematical convention; thus, instruction may be negatively affected. However, when content is presented through a variety of instructional materials and represented through various mediums, such as games, students have the opportunity to not only conceptualize the content in a way that corresponds to their learning preference and previous experiences, but this method of integrating multiple representations of mathematical content through modalities including hands-on experiences, illustrations, diagrams, or audio and visual supports also provides students with opportunities to translate the content across multiple representational forms; thus developing a deeper conceptual understanding of the underlying mathematics (Taylor, Buchheister, & Jackson, under review). For example, when students share strategies for determining the number of "bears in a cave," a missing addend problem, students may use concrete objects, pictorial representations, algebraic equations (both addition and subtraction), and oral language to solve the contextual situation.

Universal Design for Learning not only includes various ways to present content to learners, but it also encourages the learner to *express* his or her understanding through means other than traditional pencil and paper formats such as mathematical worksheets or practice pages filled with computational exercises. Solely providing students with opportunities to express mathematical knowledge through a single mode may be a barrier to effectively evaluate students' progress and understanding. An integral component of learning involves the student's construction of representations to express ideas. As van Scoy (1995) argues, these expressions define learning opportunities because the learner may choose from a variety of modalities (e.g., words, pictures, numbers, language, technology) to clarify their thinking. Moreover, as students record their thinking and reasoning it allows them to re-examine their ideas and revise their

understanding. When they are attempting to meet a particular goal in the context of game play, they find ways to describe their strategies, communicate observed patterns, and compare relationships. Allowing students to present their mathematical thinking through various mediums (e.g., words, numbers, pictures, tangible objects) supports effective evaluation and developmentally appropriate practice by promoting individual appropriateness through respect for individual students and their unique learning needs.

Finally, supporting the mathematical development of all learners also includes attending to the students' affect. By considering how to effectively engage a diverse population of students through multiple means of engagement, teachers provide methods that promote interactions that empower students in the learning process. In the following section, the authors describe how the three elements of the UDL framework may be used as a foundation to analyze mathematical games and subsequently ensure that students in early childhood and elementary grades have access to the general education curriculum by developing robust learning experiences (Jimenez, Graf, & Rose, 2007) grounded in rigorous mathematical content.

GAMES IN THE MATHEMATICS CLASSROOM

van Oers (1996) argued that the socio-cultural context of mathematical instruction was vital to mathematical learning, and that students should be motivated to participate, not only because the activity is of interest to them, but also because the task is open so that students with a range of mathematical experiences may be engaged. Mathematical games embody each of these assertions. Even with rules, games are flexible and embody multiple variations to accommodate students' individual needs' and interests, especially when integrated with discussion questions that encourage reflection and representation (Buchheister, Jackson, & Taylor, 2015; Dockett & Perry, 2010; Jackson, Taylor, & Buchheister, 2013). Consequently, as students engage in game play, they are building and extending their mathematical language and communication through rich mathematical discussions that occur during the game, and they are engaged in critical thinking related to specific mathematical concepts (Jackson, Taylor, & Buchheister, 2013). Games may be used as a forum through which classroom teachers may "look at or listen carefully to the talk, the writing, and the actions through which pupils develop and display the state of their understanding" (Black & Wiliam, 1998, 143). And, knowing how students view mathematical ideas provides a solid foundation on which classroom teachers may develop questions and tasks that will expand the mathematical understanding of all students.

Moreover, games provide opportunities for all students to engage in the learning of mathematics because games have multiple entry points and incorporate the use of multiple strategies so all learners may participate. Smith and Backman (1975) argued that games may develop mathematical concepts, improve perceptual abilities, and encourage problem solving and logical thinking. When teachers use mathematical games that are:

1. Grounded in mathematics,
2. Self-directed and engaging, and
3. Appropriate and challenging to all students, they provide students with opportunities to extend their mathematical reasoning and understanding (Jackson, Taylor, & Buchheister, 2013).

More specifically, games provide multiple means of presentation to support the ways in which meaning is assigned to what we see and recognize (i.e., what we learn), multiple means of action and expression

to support strategic ways of learning (i.e., how we learn), and multiple means of engagement to support affective learning (i.e., why we learn). In addition, games provide the opportunity for learners to connect on a cultural level. In the following section, the authors further describe how mathematical games, when implemented strategically through an equitable lens, incorporate the three tenets of UDL: presentation, expression, and engagement.

Analyzing Games Through the Universal Design for Learning Framework

In order to overcome some of the obstacles students who struggle with mathematics face, classroom teachers need the pedagogical knowledge from teacher preparation programs and professional development to become cognizant of and gain experience with early interventions and effective strategies that may be implemented to provide all students with the greatest opportunity to learn. One support includes providing an explicit framework for curriculum analysis, lesson planning, and implementing instructional strategies based on the principles of UDL. This framework provides a specific lens through which teachers can deeply consider potential barriers that restrict equitable access to the mathematics in the lesson, and identify strategies to "support student engagement by presenting information in multiple ways, and allowing for students to access and express what they know in a variety of ways, [while also including] accommodations that should not alter the standards nor lower the expectations for students" (McNulty & Gloeckler, 2011, p. 6). The tenets of UDL provide valuable guidelines teachers can use in conjunction with their knowledge of student learning progressions and effective instructional strategies to use mathematical games as effective tools for engaging a diverse population of students in high quality mathematics.

Teachers need to be able to anticipate and identify potential barriers young students may experience when engaging in any mathematical task or activity. This applies to mathematical games as well. According to the principles of UDL, by anticipating potential barriers, classroom teachers may embed instructional strategies and scaffolds that support students' needs; thus, providing opportunities that allow all students, including those who struggle, access to rigorous mathematics. In Table 1, provides an overview of potential barriers for each game discussed later in the chapter and its corresponding solution strategies. While the provided list is not exhaustive, the overview reveals how identifying such difficulties from the outset can direct classroom teachers to purposefully embed additional scaffolds or prompts that appropriately challenge students, while also including the necessary supports that provide access to the rigorous mathematics and problem solving tasks both at the forefront and throughout game play.

Furthermore, the UDL framework guides the discussion of possible solutions to address anticipated obstacles in each of the four focus games using elementary (age 5 to 12) students' experiences, work samples, and conversations to explicitly describe and attend to:

1. Translating multiple solutions or strategies,
2. Accepting varied modes of expression, which allow for multiple entry points that stimulate rich mathematical discussions, and
3. Generating increased students' interest and participation.

In the subsequent discussion the authors provide specific examples and dialogue from actual classroom episodes to provide a clear look into how the principles of UDL may be integrated into curriculum as a

Table 1. Potential barriers for the focus games

Game	Potential Barrier	Solution Strategy	Corresponding UDL Tenet
The Ants Go Marching	Tiles may slide during play causing measurement error	Grid paper, trace on edge of butcher paper, stop motion animation	Multiple modes of expression
	Difficulties connecting numeral to quantity	Recreate dot pattern from die with blocks before placing blocks	Multiple modes of presentation
	Students measure incorrectly such as using different units of measure or include gaps or overlaps	Create rulers and connect comparable non-standard units to rulers	Multiple modes of presentation
	Activity is not challenging to students	Investigate various units and include prompts related to inverse relationship between size of unit and number needed to traverse length	Multiple modes of engagement
Wipeout	Students have difficulty pressing buttons on the calculator	Have calculators on iPads or large button calculators for children to use	Multiple modes of presentation
	Students do not understand place value	Allow children to incorporate place value chart or Base 10 blocks as they explain their thinking with the calculator	Multiple modes of expression
Geoboard Battleshape	Students have fine motor difficulty with the Geoboard bands and pegs on the board	Use Geoboard paper for students to draw, which can be copied at different sizes	Multiple modes of expression
Roller Derby	Difficulty with numeral recognition	Develop Roller Derby board on a number line	Multiple modes of presentation

lens through which teachers, both practicing and prospective, may analyze, modify, and apply pedagogical strategies focused on developing the mathematical knowledge and skills of all students.

The Ants Go Marching: Measurement

The game, The Ants Go Marching, may be used with a range of learners to reinforce measurement skills. In the activity, each student has an ant that he/she races from one end of the paper to the other. The ant moves according to the type of measurement unit selected (e.g., inch, centimeter) and the length of the measurement is determined by the roll of a die. To play the game, the teacher or student(s) first selects the measurement unit. Then, the students place their "ant" at one end of the paper. Each player rolls a die, and uses a provided manipulative (e.g., square inch tiles) to measure the traveled distance. Game play continues until one ant reaches the end of the paper.

Presentation

Students are presented with a measurement task through a game format, which often varies from traditional classroom measurement activities. Moreover, there are numerous alternate group formats (e.g., game played on the computer using virtual manipulatives). Students may use physical tools such as inch tiles, grid/graph paper, or rulers to provide different presentations of the selected measurement unit. Through the use of these tools, teachers provide scaffolds for students who may experience anticipated obstacles with measurement such as incorrectly iterating units.

In the following excerpt from a conversation among kindergarteners (i.e., 5 and 6 year olds), it is apparent that the presentation of the game stimulated the student's curiosity of the ruler. The classroom teacher addressed the students' inquisitive nature by introducing the ruler (with both centimeter and inches) and provided probing questions to help guide the kindergarteners to make connections between the two representations of the length measurement.

Teacher: James, I heard you say something about a ruler. What is a ruler?
James: You use it to measure things.
Teacher: Are you talking about a tool like this [pulls out standard ruler with inches and centimeter measurements]?
James: Yes. See you put it like this and it tells you how many you go. See [puts ruler next to the inch tiles from the game and teacher adjusts so the ruler aligns to the start of the tiles].
Vinny: 30?
Teacher: What is 30?
Vinny: It says 30 on the top.
Teacher: What do you think the 30 means? James was telling us that this tool is used to measure. What do you think the 30 means if we are measuring?
Vinny: How far?
Teacher: What do you mean how far?
James: The ruler tells us how big something is. But it's not that big. It's not 30.
Teacher: What's not 30?
James: This [points to the inch tiles]. We didn't get to 30. We just count 11 on my book.
Teacher: So what did 11 tell you?
Vinny: That's how many blocks our ant went.
Teacher: So did the 11 help us measure how far our ant walked in the game?
James: Yes. But, not to 30.

In this example, the students begin to make the connection between the ruler, the standard measurement tool, and the non-standard units of measure – the square tiles used in the game. Although the ruler was not used during game play and the conventions of the ruler were minimally discussed, the students had the opportunity to begin making connections between the different measurement tools. Therefore, the presentation of the measurement concept was conducted in two distinct formats.

In the summary portion of the lesson, the teacher led a guided discussion based on the discoveries of Vinny and James. Specifically, she acknowledged what the students found as they played the game and use guided prompts and questions to explicitly point out the relationship between the conventional ruler and the square tiles. Moreover, she addressed common misconceptions by reminding students that the tiles (i.e., units) should be placed end to end with no gaps or overlaps. Using purposeful errors of leaving a space between two of the tiles, she helped students see how the exact measurement was altered when these common mistakes occurred. For example, during the summary, the teacher re-measured the "distance of 11 tiles" and included additional space between the tiles. As a result, the teacher asked the question, "Does this still measure 11 tiles?" In the discussion, two students recalled events and expressed their understanding from their shared experience during the game.

Expression

Students express their understanding in multiple formats, such as engaging in discussions of noted patterns or translating their thoughts in math journals using words, numbers, or pictures. Teachers may facilitate discussions where the class creates new challenging rules or analyzes strategies for measurement and strategic game play.

As previously discussed, the summary component of the lesson—after the class had the opportunity to play the game and the teacher monitored strategies and solutions—allowed the students to reflect on their experience and express their understanding of the measurement concept. When the teacher prompted students with the question, "Does this still measure 11 tiles?" some students said yes because "it's still 11 blocks." However, one group responded "no" and were able to describe why they thought it would be different.

Charlie: No, no, no. It can't be eleven. We were kind of doing extras in our game and I saw it was cheating.
Teacher: What do you mean?
Charlie: Well, we was putting our ant guy on the end of our blocks to measure. Then when we got a new number from the dice we put our blocks in front of our ant guy. But then I saw that when Angie moved her guy to the front again she cheated a little bit on accident because there was a big hole.
Teacher: Can you show us what you mean up on the document camera? [Teacher sets up document camera, blocks, and figure to represent the ant.]
Charlie: Yes. Can I have a dice please? [Puts out 3 blocks. Then puts figure for his "ant guy." Then rolls again.] See 5. So I put 5 blocks in front of my guy. 1, 2, 3, 4, 5. Then I move my guy. But when I watched Angie do it there was an extra space when she moved the guy. See right here [points to the space between the 3 initial blocks and the 5 new blocks added to the length measurement]. You can put another block here. So, really it's not the same. It's one more.
Teacher: So, what does that tell us about the spaces in between? Is it the same measurement?
Randy: It's the same number of blocks—still eleven.
Teacher: Yes, you're right that it is the same number of blocks. But we're now thinking about the distance our ant traveled. Did our ant go the same distance if we spread the blocks out?
Randy: No.
Teacher: So, when we measure we need to make sure that our tools are lined up right next to each other so that no other ones can fit in between them.
Charlie: Yeah, cause if you skip a space like we did it's kind of cheating because it's not the same number.

In this conversation, students were allowed to express their ideas and explore the misconceptions through experiences they had in the game. Moreover, students were encouraged to represent their thinking by recreating the game scenario and connect the idea to the question posed by the teacher. Following up the discussion with independent reflections in math journals using words, numbers, or pictures may provide an additional opportunity for students to consider the question and the responses of his or her peers. The teacher's question built upon a common measurement misconception expressed by students and stimulated students' further thinking about the key concept. In subsequent activities and discussions students can continue to explore the critical idea of measurement with regard to iterating a unit with no gaps and overlaps. Moreover, common misconceptions such as utilizing different units of measure rather than iterating the same unit over the measured distance, may arise.

While the main focus of the lesson surrounds the concept of measurement, it is important to recognize that there may be additional barriers in the lesson related to constructs such as counting. For example, students may have difficulties connecting numeral to quantity. By anticipating this potential barrier using the principles of UDL, students who experience this difficulty could be supported by recreating the dot patterns on the die with the blocks before placing the blocks to represent the distance his or her ant would move on that turn.

Engagement

The game promotes appropriate modifications that stimulate higher order thinking for a diverse population of students. The game format may be readily altered to coincide with specific themes such as Fall, football, and school or community events. Furthermore, the game is flexible so modifications may be embedded in the game to appropriately challenge students who already demonstrate the foundational measurement and computational knowledge and skills. Teachers can incorporate multiple dice or encourage students to explore the inverse relationship between the size of the unit and the number of iterations to traverse a distance or space. Furthermore, students may use yarn to trace straight or curved paths to investigate the difference between the distance traveled.

While the game offers several possibilities for engaging students in relevant or meaningful contexts, stimulating mathematical thinking at appropriate experience levels, or extending the concept to developing strategies for measuring curved paths, students—even those as young as kindergarten—generate questions they want to investigate as they play the game. By stimulating further inquiries, the game serves as a catalyst for students to transfer the mathematical idea to novel contexts; thus potentially deepening the learner's understanding of the idea. For example, as kindergarten students played *The Ants Go Marching,* one child remarked to another, "What if an elephant walked this far? It would only take 3 steps and the ant would take 50 hundred steps." While this statement may initially seem innocent, the comment actually implies the child is making connections of the inverse relationship between the size of the unit and the number of iterations needed to measure an attribute such as length. Furthermore, capitalizing on this prediction and engaging students in a subsequent exploration to follow up the statement not only values the child's thinking, but also promotes continued interest in a critical concept in early mathematics.

Wipe Out: Number Sense and Base 10

Wipe out is a calculator game that emphasizes key concepts related to place value. Students begin by entering a number on a calculator with a predetermined number of digits. Initially each digit in the number must be different (e.g., 333 would not be permitted) and greater than zero. However, as students advance in the game some rules can be altered and the number may include repeated digits (e.g., 3,239 could be used).

The goal of the game is to Wipe Out the entire number, one digit at a time, by performing an operation that would result in particular place values reflecting zero. The game begins after each student has recorded the "target number" with a predetermined number of digits. For example, if the required number of digits is five the number 68459 could be used. Then a selected individual spins a 1 – 9 spinner and asks his/her peers to Wipe Out that digit. Students must attend to the place value of the digit in order to correctly input the operation and quantity. For instance, if the teacher calls out the number 5, the student

should subtract 50 in order to Wipe Out the 5 and have that place value reflect zero. The first person to Wipe Out their number to zero is the winner.

Presentation

Wipe Out may be played with or without a calculator. Using both methods provides an opportunity for students to explore the concept of place value and reflect on the conventions of the base-10 system. For instance, when students play the game without the calculator many will use the U.S. standard algorithm, or the column method, for subtraction and line up the digit on the spinner in the correct place value column many times without including the appropriate place holder zeros. While in the written version of the game, this mode of representation does not necessarily impede game play, when students transfer the game to the calculator mode the absence of the place holder zeros in the tens place or greater substantially impacts progress. Thus, requiring students to play the game with the calculator as another representational mode supports students' development of place value understanding to focus the students' attention on the mathematics involved. Moreover, by anticipating these difficulties and looking for how students attend to place value provides teachers with opportunities to discuss common misconceptions.

Expression

Throughout the game the students have an opportunity to use precise language and mathematical terminology to describe their strategies for wiping out designated numbers. In the following excerpt from a group of third graders playing the game, the multiple means of expression that students used to communicate their thinking encouraged rich mathematical discussions and allowed for multiple entry points so that students with varying levels of understanding could engage in not only the activity, but also the subsequent discussion.

Teacher: I think I heard someone say Wipe Out. Who has their number wiped out?
Marshall: Me! I wiped out my number.
Teacher: Tell us about how you—
John: No! I wiped out mine, too! I have just zero left!
Teacher: Okay, John. Let's have Marshall tell us about his number and then you can tell us how you wiped out your number. Marshall, talk about what number you started with and how you wiped out to zero.
Marshall: I picked the number seven two four six.
Teacher: What number is that? You told me a bunch of digits by themselves, but what number do we call that? How do we say that number?
Marshall (and some other voices): Seven thousand two hundred forty-six.
Teacher: Marshall, how do you know that number is seven thousand two hundred forty-six?
Marshall: I used my columns. I put the chart at the top of my paper and then I put the number I wanted in the columns. Then I colored the ones and tens and hundreds to remember those go together and then the other one was the thousands.
Teacher: How did you think about how to put those columns together when you read it?

Marshall: Because the thousands just had 7 so I know that's seven thousand. Then I remembered that I read the ones and tens and hundreds together just like normal numbers. So there was a two and a four and then a six so that means it was two hundred forty-six.

John: I had the same numbers, but I made a different number with them. I picked a four for my thousands place and then I had the other ones. But then I wanted to make the biggest number so I made them seven thousand and then six hundred forty-two. So my numbers went seven, six, four, two. I made the flats and the rods and the dots and the cubes on my page on top of the numbers so I would remember them. (Teacher records the place value columns with the hundreds-tens-ones period all the same color and draws the base-10 block representation above each column. Then she writes each number below the values in the chart).

Madeline: [Teacher], I kept messing up in the first one because I forgot my zeros. But then I figured out a thing to do that would help me remember.

Teacher: How did you use your strategy, Madeline? Can you tell us what you did to help you think about the important place holder zeros?

Madeline: I made mine into an addition sentence. I didn't use the same numbers that they did, but I did my number like 5,000 + 200 + 90 + 4. In the first game, when you spun the numbers I would just do the minus with that number and I kept getting crazy numbers that didn't wipe out. So, then I saw somebody else do the addition sentences, and so I tried it. It worked. Then when you spun the 2 I remembered to put 200 in my calculator and not 2. But, it was funny because when you spinned [sic] the 4, I could still just do 4 because it was just ones.

In this excerpt from a third grade class discussion, the students were able to demonstrate their understanding through multiple modes of expression including place value charts, base-10 block references, and expanded form of multi-digit numbers. By allowing for multiple means of action and expression the classroom teacher supports his or her students' strategic ways of learning.

Engagement

During the game, students can engage in collaborative learning—playing the game with large or small groups. However, students can also play independently either to practice the game as indicated, or they can explore the frequency of the spins for each digit. With the game directions being minimal and the game objectives being clear (i.e., use place value knowledge to wipe out your digits so you end up with zero) several students were even more engaged adapting the game with their own "improvements." The following vignette features a conversation between two groups of students describing the different games they "made up" during the exploration component of the math workshop.

Teacher: So, what have you guys been talking about? I haven't seen much of the Wipe Out game over here.

Tara: That's because we're making a new game. Ours is still like Wipe Out, but not really the same. But Sam and Lennox made up a word game with theirs.

Teacher: Ooooh. A word game, huh?

Sam: Yeah. But, there's two ways to play it.

Teacher: Okay Lennox, why don't you tell me about your game? How do you play it?

Lennox: So, me and Sam found words we can make on our calculators. Like I did Bob. And then the game is I say Bob. And then Sam has to figure out how to make that word on his calculator, and then tell me what number I made. See, so Bob is eight zero eight. So, Sam had to tell me—

Sam: Eight hundred and eight.

Teacher: Eight hundred and eight what? Oh, you mean eight hundred eight?

Sam: Yes.

Rylen: And then Sam made the word go and Lennox put 90 in her calculator because the 9 was like a g and the 0 was like an o so it made go.

Sam: But now we can't think of any more words.

Teacher: Well, one thing I noticed is that when you were showing me things, I was looking at your calculator upside down. So the numbers look different upside down. I wonder if you can make more words if you put numbers in your calculator and then look at the calculator upside down. I think your game is neat!

In these scenarios the students were motivated to learn, which supported their affective development, or as the National Research Council (2001) discussed in their seminal work, *Adding It Up,* the students' productive disposition was stimulated. Games like Wipe Out that offer opportunities for exploration, extension, and transfer of concepts can reduce math anxiety, enhance students' inclination to view mathematics as having a purpose and being relevant and meaningful, and encourage perseverance.

Geoboard Battleshape: Geometry

Geoboard Battleshape reflects the traditional Hasbro game, Battleship©. In the geometry version, the goal is to sink the opposing team's Battleshape using knowledge of the coordinate system. While the game can be played in any—or all—of the four quadrants of the Cartesian plane, in elementary grades, the game is typically played in the first quadrant. To play, each one or two-player team has five shapes (e.g., triangle, square, pentagon, trapezoid, hexagon). The team secretly places the shapes on his or her geoboard. After all Battleshapes are placed, the opposing team attempts to "sink" the Battleshapes by calling out coordinates that "hit" the vertices of the opposing team's shapes. Once all vertices have been "hit," the ship is not sunk until the Battleshape is correctly, and precisely, named.

Presentation

Geoboard Battleshape may be played in many different formats to reinforce the concept of the coordinate plane and review shape names and characteristics. For example, students may represent the shapes on:

1. A Geoboard grid,
2. Geoboard paper, or
3. A life-size coordinate plane taped to the floor.

These multiple means of representations may support how students associate meaning to the concepts and direct interpretations toward the conventions of the Cartesian plane and the defining attributes of the shapes. Moreover, the critical vocabulary related to the geometric shapes or the Cartesian plane may be discussed in various formats through the game. While activating students' prior knowledge in relation

to their lived experiences is important during the introduction to the lesson, reiterating key terms such as plane or horizontal on the grid systems during game play can assist in illustrating the concepts and increase comprehension.

Expression

The conventions of the Cartesian system can be difficult for students to recall (Battista, 2007). Therefore, encouraging students to express their thinking supports strategic ways of learning that can be shared and compared as students play the game. Students can develop various ways to help them remember the coordinate sequence or to begin finding coordinates from the origin. These expressions not only highlight how the students learn and remember, but includes various formats through which students can demonstrate personally connected mnemonic creations in art, poetry, or multi-media. For instance, second grade students can share posters they have created with brief "memory strategies" such as "First, I go OVER to my friend's house, and then I go UPstairs to play," or "I run OVER before I can jump UP."

The conglomeration of various forms of expression supports all students and caters to unique ways in which they prefer to demonstrate their knowledge, while also offering a means to compare and evaluate different representations of the same mathematical concept in rich mathematical discussions. This process provides an appropriate challenge for all students because it allows for multiple entry points and engages individual interest both during and after the game.

Engagement

Because of the familiarity of the game in most communities, family members can reinforce key concepts at home as they play a new version of the classic. Furthermore, the game can be adapted to the community by altering the focus from geometric shapes to focus solely on coordinate systems and the Cartesian graph. Consequently, students may make connections between Social Studies standards related to geography or community by developing local maps and plotting different buildings or locations in the model of the area.

Roller Derby: Data Analysis/Probability

To play Roller Derby, students use knowledge of basic facts, decomposing numbers, and probability to compete in a game of chance involving the sums of the numbers on the dice. The game begins after each player places 12 markers into the columns of the game board (with columns 1 – 12) in any way he or she chooses. Once all players have distributed their markers, the players take turns rolling a pair of dice (youngest player rolls first). When the dice are rolled all players in the game find the sum of the numbers on the dice. If a player has a marker in the column that corresponds to the sum, he or she removes one marker from the game board. If that column is blank, the player cannot remove any markers. The first person to remove all of his or her markers wins.

Presentation

Although Roller Derby addresses content standards related to Data Analysis and Probability, one of its key constructs is finding sums of two single digit numbers. Young students may struggle with devel-

oping or applying strategies to compute the sums. Offering double ten frames and two color counters provides students another mode to present the mathematical idea; thus supporting all students. Moreover, to encourage the transition from solely focusing on the computation side of Roller Derby, classes can track the expressions rolled on the dice and record them—once the expression is recorded it cannot be recorded again—in the various Derby columns. The various records of generated data can help students recognize that the sample space can be represented in multiple ways (e.g. addition table, line plot, list).

As students play more rounds of the game they gather additional evidence that should generate questions and hypotheses as students analyze the data and teachers scaffold probability language such as "impossible," "most likely," "least likely," and "equally likely." Through this presentation, or idiosyncratic student representations, students recognize both the computation content and the data analysis concepts to assign meaning to these big mathematical ideas. Furthermore, additional game play contributes to students not only using different computation strategies, but also integrating various methods to arrange the counters in attempts to strategically win the Roller Derby championship.

Expression

As students participate in the Roller Derby challenge, there is a foundational construct through which students can express strategic ways of learning and demonstrate mathematical understanding—computation strategies toward developing fact fluency. The repetitive nature of the dice rolling provides ample opportunities for students to practice or reinforce their basic facts. As they are exposed to the same set of problems over and over, students will begin to notice patterns and relationships. Moreover, they may become inclined to look for more efficient ways to solve problems. From the following exchange between two first grade students, it can be argued that the game not only reinforces strategies to build fluency through repeated exposure to related problems in a set, but also that the social interactions during the game allow for opportunities to demonstrate understanding in multiple ways through the negotiation of meaning.

Myra: Hey! It's 5 again. Five and four.
Hank: I like fives. I can do them fast.
Myra: Me too. I just put up my five and then I can count four more. I'm really fast.
Hank: No. You don't have to.
Myra: What?
Hank: You don't have to count.
Myra; Yes, you do. It's a plus. Plus means you count bigger.
Hank: No. You don't have to count. You just do five [holds up five fingers on one hand] and then you do four [puts up four fingers on the other hand] and then you can just see it's nine 'cause one more [wiggles thumb] is ten.
Myra: I know. That's what I said.
Hank: No. You said you counted.
[Teacher calls out 3 and 4]
Myra: Three and four! I got this number, too, I think [quickly puts up group of three fingers on one hand and four on the other hand, then counts all fingers one by one].
Hank: See you counted.
Myra: No. I knowed [sic] it. I just was checking.

Hank: No. You counted. You know it. When [teacher] said it. I didn't have to count because I had my fingers up still. I just put my one finger down 'cause I did four.
Myra: I was still right. Did you get to take off "7"? I did.

The debate between the two first graders exemplified how they generated arguments to support their thinking and reasoning, and these justifications were further enhanced by the students' use of their fingers as manipulatives. Here, both students were able to engage in the game, whether they counted all to solve or were using more flexible number sense and numerical relations to find the sum of the two addends. Either way, the students were each able to participate in the mathematical conversation by expressing their thinking, while also feeling success in their proficiency in solving the given problems.

Engagement

The Roller Derby challenge encourages students to remain engaged as they work to identify patterns that can help them determine the most effective way to distribute their tiles. Providing students opportunities to hypothesize the "best" column(s) to place their tiles, test their prediction, and then alter their approach as they gain new information supports both a systematic and creative approach to the structure of the game. Furthermore, the game provides an additional forum to explore early algebra through discoveries in generalizations and patterns, and students have the potential to apply co-variation and compensation strategies as they experience related problems with a limited set of addends. In addition, students have an opportunity to begin investigating the principles of probability; noting that although theoretical probability exists, it does not always reflect the experimental results.

FUTURE RESEARCH DIRECTIONS

Research suggests that teacher preparation programs should provide new teachers with the opportunity to master initial attitudes, skills, and knowledge required to be successful as beginning teachers in inclusive classrooms (Loreman, 2010). Walton, Nel, Muller, and Lebeloane (2014) further support the idea of preparing prospective teachers for inclusive teaching in their preparation program. Although teacher education is a vital component of teacher preparation (e.g., Forlin, 2010), discussions related to improving the preparation of teachers have been framed broadly in teacher education, but also within specific disciplines such as mathematics education (Conference Board of the Mathematical Sciences, 2001; 2012).

To address the need to better prepare teachers, it is imperative that a critical evaluation be done to analyze programs for teacher preparation. However, a useful knowledge base for mathematics teacher education is lacking, even with years of research on mathematics teaching in grades K-12. For example, there is no shared professional curriculum for preparing prospective teachers of mathematics (Ball, Sleep, Boerst, & Bass. 2009; Zaslavsky, 2007). Moreover, the mathematics education research community knows very little about the practices of faculty who prepare teachers of mathematics (i.e., mathematics teacher educators), as these practices are not widely documented or disseminated (Bergsten & Grevholm, 2008; Even, 2008; Floden & Philipp, 2003; Hiebert, Morris, & Glass, 2003; McDuffie, Drake, & Herbel-Eisenmann, 2008; Schempp, 1995). Therefore, the next steps the authors propose are to generate evidence from mathematics teacher educators about effective instruction and pedagogical actions at the collegiate level in relation to using the UDL framework in teacher preparation programs.

However, more empirical evidence is needed regarding several outlying variables. Specifically, future studies that explore:

1. How UDL is—or is not—addressed in teacher education and professional development, and
2. The questioning teachers use within the tenets of UDL that provide additional opportunities for students by helping them connect representations, clarify means of expression, and extend opportunities for further engagement and transfer of knowledge to novel contexts.

CONCLUSION

Equity does not imply identical instruction, but focuses on instruction that includes appropriate accommodations, which provide opportunities for students to learn and be engaged in rigorous mathematics (NCTM, 2000). Therefore, it is crucial that researchers, mathematics teacher educators, and school district personnel recognize and act upon the need for explicit teacher preparation and professional development that incorporates the UDL framework, which may be used as a tool to more effectively instruct students who struggle with mathematics by providing strategies and practices that specifically address their needs.

Universal Design for Learning is an equitable approach to instruction that teachers may use to analyze mathematical tasks and subsequently include appropriate accommodations that meet the needs of students with a broad range of skills. Universal Design for Learning works under the premise that all lessons contain potential obstacles for students. Teachers who incorporate the key ideas of UDL in their planning by anticipating barriers and embedding effective strategies within the lesson that are intended to scaffold learners against these obstacles provide access and opportunity to all students in the classroom without compromising high quality mathematics instruction. Thus, UDL provides both practicing and prospective teachers with a valuable framework to analyze mathematical tasks, such as games, and effectively consider differentiation options that appease the needs of a diverse population of students. By disseminating specific applications of the preceding content in the context of teacher education and professional development, the authors believe this information will support the work of mathematics teacher educators and researchers in the field.

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Chapter 32
A New Understanding of our Confusion:
Insights from a Year-Long STEM Fellowship Program

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ABSTRACT

This chapter discusses the philosophies and practices that drive the MSUrbanSTEM Leadership & Teaching Fellowship Program. This multi-year project offers a professional development program to a selected cohort of K-12 STEM educators from Chicago Public Schools, one of the largest urban districts in the U.S. This chapter provides a holistic view of the program, shares the fellow selection process, and focuses on the strategically developed curriculum and the theoretical bases for the chosen pedagogy. This allows the authors to explore the psychological and philosophical principles, based on the idea of accepting confusion, and embracing failure in beliefs about pedagogy and STEM instruction, which are used to expand the skills and abilities of these selected urban school teachers. Finally, we provide some initial findings about the teachers' growth and development both in their efficacy and leadership abilities.

πόλλ' οἶδ' ἀλώπηξ, ἀλλ' ἐχῖνος ἓν μέγα
(A fox knows many things, but a hedgehog one important thing)
— Archilochus

He is in a new confusion of his understanding;
I am in a new understanding of my confusion
— Robert Graves, "In broken Images"

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'UNDERSTANDING' THE PROGRAM

How one frames a complex issue or problem has a significant influence on how they seek to understand or resolve it. Framing helps people interpret the world around them and helps them communicate these interpretations and understandings to others. It helps individuals to organize complex phenomena in somewhat coherent, understandable categories, helping persons to separate relevant aspects of a given phenomenon from irrelevant. Framing helps provide meaning.

The importance of framing becomes even more significant when looking at teacher education and teacher professional development. One approach to teacher professional development (PD) (which can be called the hedgehog approach) emphasizes the value of clarity and order; seeking to organize activities and plans. This approach emphasizes that teachers in training should know what teacher educators value. This hedgehog approach is clear in idea and is driven by theory, which becomes a lens for interpreting facts, and is ready for application. For instance, in the case of PD for science educators, the hedgehog approach may offer a singular focus on removing student misconceptions, or on modeling as being a critical component of learning science.

A contrasting frame towards teacher PD (which can be called the approach of the fox) assumes messiness, focuses on multiple theoretical perspectives, is tentative in application, comes with a belief in deconstructing and questioning what one thinks is fact, and is driven more by bottom-up notions of the richness of practice and the world within which it functions. This chapter is an attempt to describe a project that utilizes such a frame.

These contrasting frames (that of the fox or the hedgehog) can lead to different forms of PD with different goals and expectations, that vary from traditional formats of PD and hence different outcomes. The authors attempt to capture these contrasts within the title of this piece, an excerpt from Robert Graves' poem "In Broken Images," as well as with the quote from Archilochus with which the authors begin the article. The authors deliberately adopt the culminating lines of Robert Graves' poem as the title of the chapter, since this poem became representative of what the researchers were engaged in as a part of a year-long professional development program designed to help teachers grow their pedagogical and leadership skills to facilitate innovative STEM (Science, Technology, Engineering & Mathematics) instruction. To be clear, this idea (of getting a better understanding of our confusion) was not something that was imposed on the teachers who were part of the program, but, rather, was an emergent idea that grew organically as the participating teachers and program instructors worked together over a year.

Emphasizing the inherent messiness in teaching and professional development is not to suggest that the designers of the program were not deliberate or thoughtful in their approach, but rather, that in their planning they were sensitive to the disturbances and disruptions that could open up spaces for conversation and learning. In some ways, the poem argues that the ultimate goal that educators can aspire to, over time, when engaged with the wicked problems of teaching and learning, is "a new understanding of our confusion." This is not a pessimistic goal but rather a realistic one, respecting both the complexity of the task that this program is facing, and respectful of the ongoing effort to understand the complexity.

The program, described in great detail below, aimed to embrace an attitude of questioning and wonder, where failure and confusion were not only accepted, but expected; and where technology was not perceived as a solution, but rather as a context and tool for inquiry. In brief, the goal of this PD program was not to lead fellow teachers into a single solution, (in Robert Grave's words, to be "quick and dull" in "clear images,"), but rather to embrace ambiguity as well as the inherent messiness of the process and through that, accept the contingent and temporary nature of any understanding that is reached at

any given moment. It was about becoming "sharp, mistrusting our broken images." This chapter is an attempt to capture some of the richness and messiness of the one year of this three-year program.

Structure of the Chapter

More concretely, this chapter describes the Michigan State University Wipro UrbanSTEM & Leadership Teaching Fellowship (LTF) program (the MSUrbanSTEM project) as an innovative teacher PD program that uses iterative and design-based thinking along with the integration of technology into pedagogy and classroom practices. This program seeks to support a selected cohort of teachers, to develop strong STEM disciplinary and teaching skills; in developing their capacity to design transformative and innovative, multimodal instructional experiences; through enacting an active learning community of practice, all as means of enhancing the quality of instruction in the STEM disciplines. While describing the detailed pedagogy and curriculum that this program uses, the authors are purposeful in continuously framing it within a broader Deweyan approach of designing an experience that respects the knowledge of practice that the teachers came in with. This MSUrbanSTEM program also continuously considers the theme of wonder in its curriculum, asking that the fellows think beyond what is placed before them, even while respecting the deep knowledge of practice that the fellows bring to the program.

In order to provide a holistic view of this program, the authors will briefly describe the background and foundation of the program highlighting the fellow selection process, with a specific focus on the theoretical bases for the pedagogy used. Then the authors present the program's instructional approach, including the format and structure of the program, the pedagogical practices followed. Finally, the authors conclude by providing some initial findings about the teachers' perceptions of growth and development in various areas, and by sharing reflections that could be of interest in implementing a similar program.

THE CONTEXT OF THE MSURBANSTEM PROJECT

The MSUrbanSTEM program was created as a partnership between a private IT company - Wipro, a public university - Michigan State University (MSU), and the third largest public school district in the country - Chicago Public Schools (CPS), with some additional support provided by Microsoft. It is a multi-year project that focuses on a group of selected K-12 STEM educators who currently work in the Chicago Public Schools. The MSUrbanSTEM program was the result of years of ongoing discussion and relationship building between the global information technology company Wipro and MSU. Wipro as a company has a strong history of commitment to education, primarily in India, and was seeking to expand its work into the USA. MSU, with its land-grant tradition and commitment to both public schools and urban education, served as a good fit for this partnership. CPS emerged as a key partner in this process, given MSU's ongoing relationship with the school district. This partnership emerged through a range of interaction between these institutions, which helped develop understanding and trust while aligning shared interests and values. In addition, Microsoft, a late addition to the project, provided key technological support to the program through the donation of tablet devices to all the fellows.

CPS, like many large urban districts, is presented with numerous challenges when offering its students quality-learning opportunities. Some of these challenges exist outside the classroom, such as poverty or socio-political forces, while other challenges exist within the four walls of a school, including behavior management, poor teacher preparation, and underfunded teacher training. Ultimately, these factors

combine into a heavy weight bearing on under-represented students' shoulders, preventing them from learning opportunity and success beyond K-12 education. This is especially true when engaging students in STEM-related instruction where cultural, racial, economic, and gender divides are ever-present (DePass and Chubin, 2014).

The MSUrbanSTEM program seeks to respond to these challenges by working with CPS to identify diligent teachers working in these under-served schools, and to work with them over a year to develop their capacities as teachers as well as teacher-leaders.

Identifying the MSUrbanSTEM Fellows

CPS worked alongside designers, instructors, and researchers at MSU's College of Education to recruit K-12 teachers and administrators to apply for the program. In order to be eligible to participate in the fellowship, applicants were required to possess a current Professional Educator License with the Science and/or Mathematics endorsement. Additionally, applicants needed to have 3 full years of Licensed/Certified classroom teaching experience. Applicants were also asked to submit two professional letters of recommendation and a short essay that spoke succinctly to their desire to commit to this program. The directions for the essay read:

The essay can be formatted any way you creatively desire. Through your essay, please address the following questions: What innovative practices are you currently implementing in your STEM classroom? How will this opportunity connect to your classroom? What are your goals for participation? What are your expectations for participation in the program? How will your participation in this program help Chicago Public Schools in the short and long term?

The MSU selection committee (consisting of faculty and instructors at MSU) looked specifically for people who answered in a way that was aligned with the program goals, with a particular emphasis on leadership, a willingness to learn and share, and the potential for long-term impact of their work in their schools and district. In the selection process, the MSUrbanSTEM team also focused on the letters of recommendations submitted, and the applicants' ability to think in an innovative and creative manner about teaching and learning in the STEM disciplines.

The year-one cohort, the focus of this chapter, consisted of 25 STEM educators selected from a pool of 148 completed applications. The second cohort expanded to 49 new fellows and with the goal of accepting 50 more teachers in the next cohort. Each cohort experiences one full year of professional development starting in summer, while completing three Master of Arts in Educational Technology courses, with an emphasis on STEM learning and leadership. Upon successful completion, the fellows earn a graduate certificate in STEM and Leadership from Michigan State University.

THEORETICAL APPROACH TO CURRICULUM AND DESIGN

The design of the MSUrbanSTEM fellows' education curriculum is the most important and innovative aspect of the MSUrbanSTEM program and is based around the power of experience (Dewey, 1938), the knowledge of practice (Schön, 1983) and the understanding of best practices related to professional development for teachers in general, as well as those teaching in STEM disciplines and urban environ-

ments. Dewey was concerned not only with subject matter, but with subject matter as it relates to the student in a growing experience (Dewey, 1902). This program pursues this goal through the design of an innovative experience, for the fellows, which emphasizes a deep relationship with content, pedagogy, and technology (TPACK) and encouraging the idea of deep thought and wonder. The MSUrbanSTEM program does this through a combination of face-to-face and online work, starting with an immersive two-week face-to-face meeting in summer and continuing predominantly online (with four full day face-to-face meetings on Saturdays) through the fall and spring semesters. This structure allows the fellowship program to build relationships across and between the fellows and this structure allows the MSUrbanSTEM instructors to continue working with the fellows as they are back in school implementing their projects in their local contexts. It also aligns with the ideas expressed by Capraro et. al (2016) related to sustaining professional development initiatives in STEM for urban teachers. Some features that teachers felt contributed to success in their classrooms included the hands-on nature of the PD, the ability to readily turn their ideas into curriculum use, [and] the individual feedback they received from the PD trainers (p. 191). Kelley and Williams (2013) research around professional development of teachers supports these ideas and adds, "Teacher preparation and their continuing professional development need to incorporate time for teachers to learn content and to apply their new understandings into curricular plans. Teachers need to be active participants in their learning as they develop knowledge, skills, and dispositions related to students, learning, curriculum, pedagogy, and assessment" (p. 4).

John Dewey's concept of an educative experience is perhaps the most important part of his writings on education and learning. Experience, according to Dewey, is the essence of all learning. He described the example of using a map as a representative of learning. A map of land is an arranged view of previous experiences, which serves as a guide for future experiences. However, a map is not the same as experiencing the navigation through a body of land on your own. Though the map may be extremely accurate, it cannot take the place of the journey and, therefore, is limited in its ability to teach the viewer. This metaphor by Dewey serves as an effective illustration for understanding what experience means to the MSUrbanSTEM approach to the learning process.

In his paper, *Child and the Curriculum (1902)*, Dewey titles the paper with the two items that must come together through experience, in order for learning to take place. Experience alone is not simply education since not all experiences are necessarily educative in nature. To Dewey, the learner must immerse themselves with the curriculum, through real life experiences, in order to learn. "Subject matter, like students, is the changing history of human inquiry and invention. Disciplines and school subjects represent experiences of wonder, discovery, conjecture, and assertion conducted by human beings in their own quests for certainty and understanding" (Shulman & Quinlan, 1996; p. 402). This idea of not being limited to specific content but rather to alter and humanize the content to be taught so that students can connect to it via their own past experiences, and prior knowledge is key to understanding the design of the MSUrbanSTEM program. Additionally, the fellowship program brings this mentality to professional development activities treating the fellows as professionals who are continually seeking to grow and develop their knowledge even while recognizing that this requires an openness of spirit, a sense of vulnerability, and a tolerance of ambiguity as they move out of their comfort zones. The MSUrbanSTEM program recognizes that as learners, teachers are also creators and designers of educative experiences for their students. This approach is consistent with Lieberman and Pointer-Mace's (2009), idea that, "when professional development opportunities start with other people's ideas first, they deny what teachers know. Starting with teachers' practice invites them into the conversation and opens them up to critique, to learning and to expanding their repertoire." Desimone, (2009) adds, "Opportunities for teachers to

engage in active learning are also related to the effectiveness of professional development (Garet et al., 2001; Loucks-Horsley et al., 1998). Active learning, as opposed to passive learning typically characterized by listening to a lecture, can take a number of forms, including observing expert teachers or being observed, followed by interactive feedback and discussion; reviewing student work in the topic areas being covered; and leading discussions (Banilower & Shimkus, 2004; Borko, 2004; Carey & Frechtling, 1997; DarlingHammond, 1997; Lieberman, 1996)." The MSUrbanSTEM program, seeks to develop active learning approaches using all of the above strategies and more (described in greater detail below).

Enter Technology

Technology integration in the classroom is an important goal of the MSUrbanSTEM program. It is also an important issue in education (U.S. Department of Education, 2010), especially given the fundamental importance ascribed to developing technology and information literacy in students by 21st Century Frameworks (Kereluik et al. 2013; Partnership for 21st Century Skills, 2007). Technology integration and developing information literacy skills in students must begin by developing teachers' Technological Pedagogical Content Knowledge (TPACK) (Mishra & Koehler, 2006). This development however is an intricate and complex process, evidenced by the fact that most technologies are not designed for educational purposes (Koehler & Mishra, 2008). Teachers must adopt the role of designers to creatively re-purpose and re-design technology into educational technology to meet their specific classroom needs. Most importantly, TPACK promotes the creative and imaginative integration of technology into the classroom, and in the design of the year-long fellowship, partners with Dewey's concept of educative experience to create a year-long practice that not only changes fellows' approach to teaching, but also increases teacher abilities and skills within and beyond the classroom. The following section will highlight how the MSUrbanSTEM program integrates a range of ideas (including Dewey's idea of educative experience, TPACK, an encouragement of wonder, and an embracing of confusion and ambiguity) in their face-to-face summer program, and how they stimulate the fellows to do the same during the school year.

STRUCTURE AND CURRICULUM

The MSUrbanSTEM project is structured into three separate phases: summer, fall, and spring, that correspond to three graduate level courses leading to a graduate certificate. Each phase has a specific purpose. The five-week summer session is further broken down into two phases: an eleven-day face-to-face session followed by 3 weeks online. The summer face-to-face sessions, which go all day for 11 days over two weeks (excluding weekends), lays the foundation for building a sustainable learning community with a daily structure created to disrupt what the fellows had come to know as "adult learning," and to initiate the key concepts of wonder, and tolerance of ambiguity, even while building on their existing skills, knowledge and experience. During the fall and spring semesters most interaction with the fellows is online, with two day-long face-to-face sessions bookending each semester. The fall semester follows the summer with a focus on applying key program themes to fellows' daily practices, emphasizing the implementation of their individual teaching projects. Finally, the spring semester allows the fellows to reflect on their projects, and focus on leadership and opportunities to share their teaching experiences (see Table 1).

Table 1. Calendar structure of MSUrbanSTEM program

	Face to Face	Online	Theme	Key Concepts
Summer	11 days	3 weeks	Explore	Wonder & Confusion
Fall	2 days	15 weeks	Create	Individual Teaching Projects
Spring	2 days	15 weeks	Share	Reflection & Leadership

Through the curriculum, the MSUrbanSTEM instructors seek to explore a variety of topics and issues related to teaching and learning in the STEM disciplines and the potential of using educational technology to transform learning. This exploration included incorporating ideas related to the value of disciplinary learning, challenging misconceptions that people may have, promoting the importance of understanding the aesthetic aspects of teaching and learning, through pushing the fellows to engage in activities that emphasize backward design, performances of understanding, and playing with a range of technologies. In sum, the goal was to encourage transformational thinking amongst the fellows not just about content, or pedagogy or technology but rather all three considered together in an integrated manner. The MSUrbanSTEM team felt that the best way to do this was to provide integrative activities that allowed fellows to engage in structured, yet open-ended (and sometimes even intentionally disruptive) tasks that were purposely designed to challenge the fellows into expanding their zone of proximal development.

Summer: Introducing Confusion with Creative Pedagogies

During the summer face-to-face session, MSUrbanSTEM instructors introduced and encouraged a student-centered working environment. In order to do so, instructors acted in the role of a facilitator as opposed to the "sage on stage." This would include knowledge of activities that require students (fellows) to be active participants in class, influenced by the Deweyan approach, and drawing from what Wright (2011) said:

Working against this shift in role are the expectations of the students, who rely on the teacher to make all the decisions, as well as the pedagogical literature, which is preoccupied with teaching over learning, almost exclusively focusing attention on what the teacher should do. (p. 94)

There were several ways in which creative pedagogies were implemented in the instructional practices with the intent to positively disrupt the learning process for the fellows, to introduce a tolerance of ambiguity, and to encourage student-centered learning. Such practices were supported by an emphasis on wonder, the enactment of improvisation in the classroom, and arts-based learning strategies. The authors describe a few of these strategies below.

A World of Wonder

There are many reasons why STEM education is regarded as being important. Some of the more instrumental reasons have to do with preparing citizens for the jobs of tomorrow as well as maintaining U.S. competitiveness in an increasingly globalized world (Langdon, McKittrick, Beede, Khan, and Doms,

2011). A contrasting approach seeks to go beyond the idea of STEM knowledge as merely a tool that serves humanity, but rather sees the STEM disciplines as being among the greatest achievements of humankind. This perspective seeks to connect learners to the deep sense of "wonder" and curiosity that drives learning in science, mathematics, and engineering. Such a perspective builds on Dewey's (1980) sophisticated understanding of the role of aesthetics in learning. In particular, these approaches emphasize the beauty of STEM ideas, and seek to integrate the thoughtful with the visceral power of scientific ideas.

The MSUrbanSTEM program applied a range of strategies to instantiate such ideas of aesthetics and wonder into the fellowship. For instance, every day a group of fellows would share, what they called, a WOW (World of Wonder) moment with the class. This could be an everyday observation (about raindrops, or vending machines, or some mathematical pattern) that puzzled or stoked their curiosity. They would then have to follow up with some research and investigation to better understand these phenomena, and then share it with the class. The goal behind this activity was to stimulate fellows to view and question the world around them with a critical STEM lens, instilling a sense of wonder within the fellows. The philosophy is that if teachers do not share this feeling of wonder, it is difficult for teachers to authentically convey the message to their students. As the instructors described (and enacted), good teachers see their disciplines everywhere in the world around them. These WOW moments were the first activity of each day as the fellows shared their curiosities and investigations from daily life. By the fall semester, when the fellows went back to school, they were having their students share their stories of wonder. They created and curated "Walls of Wonder" where students could go and stick up stories of things that made them wonder. In fact, when the fellows interviewed authors for a book review (described below), they often asked these authors what made them wonder about the world. In some sense this emphasis on wonder came to be a powerful lens for thinking about the program throughout the year.

Improvisation in the Classroom

At the midway point of the summer session, MSUrbanSTEM invited Second City, a world-renowned acting troupe, to introduce the fellows to improvisational teaching methods. This method was developed through a collaboration of educators and actors with the idea that "the ensemble creates the experience, moment to moment, in an ongoing process of discovery" (McKnight and Scruggs, 2006, p. 7). Educators who use improvisational methods in their teaching classes recognize that they are teaching in increasingly diverse classrooms where it is critical for students to have "an active and engaged voice" (p.17). Teaching in this sense is an intelligent combination of planning and improvisation, where the teacher is both designer and performer, structured and idea-driven even while open to the contingent opportunities that emerge during a teaching session.

The MSUrbanSTEM instructors prepared their fellows for a 3-hour improvisational session by having them read *Creative Teaching: Collaborative Discussion as Disciplined Improvisation*, by R. Keith Sawyer (2004) which mentioned that "improvisation highlights the collaborative and emergent nature of effective classroom practice, helps the MSUrbanSTEM instructors to understand how curriculum materials relate to classroom practice, and shows why teaching is a creative art" (p. 12). Fellows were able to see how improvisation could encourage creativity in students. The fellows were asked to write summer reflections and one fellow named Lillian, made this note in her reflection paper:

I must admit that I initially balked at the idea and thought it was a waste of time. I thought the group was running out of things to teach and was using Second City as a fluff-filler for time. However, spending

half the day with Second City and learning improvisational exercises made me see how this can be used to encourage creativity in students. Not only were we being creative but also we were having tons of fun in the process! My thinking of "fluff filler" was challenged and made me see the usefulness in teaching!

As a result, Lillian began to consider how to incorporate improvisation into her teaching practice. Improvisation demands creativity and a tolerance of ambiguity—both attributes that MSUrbanSTEM believes are critical for teachers as they deal with the complexities of teaching and learning.

Quick Fires

Quick Fire challenges, originally developed by Leigh Graves Wolf in 2006, were inspired by the reality TV show, Top Chef, where the final challenge in each episode requires chefs to cook a dish with certain constraints (i.e. ingredients, themes) within a tight time frame. In a Quick Fire challenge, the fellows are given a limited set of tools, tight constraints of time and resources, and a difficult, open-ended goal. For instance, fellows would be asked to create, in just 45 minutes, a stop motion animation to explain a scientific misconception; or create, in 30 minutes, a photographic illusion to reflect some leadership tensions that had been previously discussed. These challenges were often seen by fellows as being "scary" because of the short amount of time allotted for the assignments but over time the fellows learned to collaborate and work together as a team, plan, delegate, and create the artifacts required. Over the first two weeks the fellows completed a range of challenges, which got increasingly difficult and constrained over time. In the first few Quick Fires, the goal was merely to complete the submission, but as time went on, and the fellows got more comfortable of these tight deadlines, and the frenzy of activity became exciting for fellows in pursuit of their goals. Additionally, the quality of work started to improve and fellows often went above and beyond meeting the initial challenges, to accomplish what was labeled as the "extra spicy" (i.e. optional items that were offered in addition to the original goal that would allow the fellows to enhance the final product). What started with intentional confusion for the fellows in the early days of introducing the Quick Fire, gradually turned into an understanding of this confusion on their part. The confusion or ambiguity, as in every teaching situation, never really goes away. It is not a problem to be solved but rather a dilemma that needs to be resolved. Over time, the fellows got more comfortable, recognizing the perpetual existence of these dilemmas, tensions and constraints (such as time or expertise), learned to embrace it, and in fact, to see it as a spring-board to greater creative freedom.

The Deweyan approach to learning is also highlighted by the activities that require the fellows and instructors to get out of their seats and think on their feet. The Quick Fire challenges and the improvisation are creative ways of using experience to not just learn or describe some ideas in STEM, but rather to be able to instantiate them in some artifacts, such as short videos that help students understand common misconceptions in science and mathematics, parodies of nursery rhymes that also convey information about subject matter, or creative photography that helps highlight mathematical concepts. This is a powerful coming together of technology, pedagogy, and content— particularly given the limitations of resources and time. Further and more importantly, the MSUrbanSTEM instructors often participated in the challenges as well, thus becoming partners in the process of learning rather than being the "know it all" teacher. The timed Quick Fire activities forced fellows to (relatively) serenely accept completing an educational activity without all of the answers and/or resources at hand. This therefore endorses the mind-frame that it is ok to not have all of the answers and opens the door for more learning. This somewhat unorthodox teaching practice encouraged an ongoing process of discovery and the promotion of

art based learning strategies, admitting that neither the instructors nor the fellows, know everything that there is to know about pedagogy or content. It is indeed a process of becoming comfortable in the "broken images" (to quote Robert Graves again) and that is, more often than not, all educators have to work with.

Fall: Understanding Our Confusion in the Act of Teaching

As the summer session ended and the fall began, the goals of the instructors were to support fellows as they applied ideas from summer into their classroom practice and support their reflective and wonder-driven inquiry of their practice. Binder (2012) shares, "Teachers regularly make detailed inquiries through observations, field notes, collected samples, and "interviews" with students in order to inform their decisions about curriculum implementation" (p. 118). The key assignments for the fall aimed to provide a structured, supportive vehicle to perform action research in their classroom around ideas they believed to be important. Wilson and Peterson (2006) emphasize the importance of inquiry in a teacher's daily practice. Specifically, they note the importance of understanding that their students are as learners and the role of inquiry in resolving questions about their students. Additionally, they explain the importance of constantly engaging in inquiry around content knowledge so that they understand how to best represent knowledge to their students. The sections below describe some of the key projects that the fellows engaged in over the fall and spring semesters.

DreamIT

The DreamIT project was a year-long project that all the fellows were to implement in their classrooms. The five weeks in summer (two weeks face to face and three weeks online) allowed the fellows to set the foundation for this project, which was then instantiated in iterative cycles through the fall and spring. The emphasis in the DreamIT was the authentic implementation of the key ideas that had been discussed over the summer, as appropriate for their specific contexts and classrooms. It is important to emphasize that the main problem of practice that the fellows worked on emerged from their individual local context and their own interests and experience. Each fellow identified a problem related to teaching, learning, or leadership, in STEM, that existed in his/her teaching context that they wanted to explore over the course of the school year. They typically focused on big ideas such as seemingly intractable misconceptions in science and mathematics, students who are unmotivated to learn, pedagogical issues related to specific content, and other problems of practice.

Once the topic was identified, the fellows engaged in a backwards design activity by starting with the *big ideas* in their discipline that they wanted their students to "get" and then worked back from assessments of this knowledge, to what they would need to do to get their learners to succeed. The DreamIT project aims to lead to some sort of transformation or innovative change for teachers, students, and/or the learning environment. In order to implement the change, fellows were asked to get feedback from colleagues and students via the use of focus groups. Then fellows were to explain how the focus groups influenced the implementation of the DreamIT project.

Many of the DreamIT projects that were conducted were innovative and exciting. Pamela, from the 2014 cohort, shared a speech at the end of the year banquet, that highlighted the awesome work of her colleagues and how they met the goals of the MSUrbanSTEM program by integrating technology in the classroom, building content knowledge, collaborating, and embracing wonder. In her speech at the end of program banquet, she beautifully summarized her cohort's experience:

Jenny and Gillian's students learned the beauty of wonders as they tried to make meaning of the world around them by asking questions, investigating the answers, and publishing their findings… Johnson and his students reverse engineered vacuums and programmed robots as they explored the engineering design process… Doris' students participated in the Global Ozone Project in which they collected air quality data that was then shared publicly with scientists and students from 100 schools in 25 countries… and Diana's lesson plans were featured on the American Association of Chemistry Teacher's' website during the month of February.

Pamela's testimonial covers only some of the projects that the fellows did, but is representative of the scope and creativity that the fellows engaged with over the fall and spring semesters.

Book Reviews and Interviews

This aspect of the work done over spring was to maintain continuity with the idea of wonder and aesthetics that had been explored over the summer. Fellows were asked to choose 1 to 3 popular STEM-related books that were written by a living author. As they read the book, they were also asked to compile a list of questions that they might want to ask the book's author, or compile a list of related topics about which they wanted to learn more. Fellows were asked to seek out the contact information for the author (i.e., from the book's publisher, Google, LinkedIn, the author's homepage, the author's agent, etc.), contact the author, and request an interview. Based on fellows' proficiencies with social media, they were able to connect with the authors (as well as other readers of the book) via Twitter. The fellows published the interview on the website as well as their review of the book. Some students expanded on this idea by inviting their students to read the book and help in the development of interview questions. When possible, some authors agreed to Skype with classes and address the questions of the fellows and their students. While some fellows were quickly able to contact the authors of the books they read to secure a book review, others contacted several authors until they connected with an author who was available, during the fall semester, to discuss their book.

Some of the books that were read and authors interviewed, include: "A Planet of Viruses" by Pulitzer Prize winner, Carl Zimmer; "Secrets, Lies, & Algebra" by Wendy Lichtman who has published in many renowned national sources; "The Design of Everyday Things" by Dr. Don Norman, who sits on the editorial board for the encyclopedia Britannica, and "Guitar Zero" by Gary Marcus who was a New York Times editor's choice author. These are only some of the fascinating authors who were interviewed by the fellows, showing a range in STEM interest but all falling under the umbrella of wonder-driven topics.

DreamIT

The year-long DreamIT projects taken on by the MSUrbanSTEM fellows were ambitious, authentic, rich and complex, for exactly these reasons were not easily implemented and completed. The fellows often required more time, more resources than they had planned for, and sometimes the fellows realized that they had misjudged their students' and colleagues' interest in the project itself. Sometimes these factors emerged through the focus group sessions that the fellows conducted with students and/or colleagues. These discussions often pointed to issues and concerns but as often led to valuable feedback from their colleagues and students on how they could improve their projects. The focus group requirement was purposeful in the curriculum, as it supports the collaborative aspect of teaching, and the idea that the

teacher is not always right and that the teacher can grow. Many of the fellows had outstanding DreamIT projects, some had outstanding visions, while others were outstanding in execution, but they all faced challenges and were helped by their colleagues, fellowship cohort members, fellowship instructors, and their students to become more effective educators from their experiences. The MSUrbanSTEM instructors encouraged the importance of constantly engaging in inquiry and action even when challenged by events and unexpected constraints—once again reflecting the ongoing attempt to understand and embrace the complexity and ambiguity inherent in the educational process.

Spring: Teaching as a Public Practice

Wilson and Peterson (2006) describe learning as a social phenomenon, and point to various learning theories that draw their strengths from the social dimensions of learning, specifically, social constructivism, sociocultural theory, and activity theory. They also point to the idea that teaching is a form of inquiry, where teachers "must act as scientists, investigating students' thinking, finding ways to learn about how particular students are actively constructing their understanding" (p. 13). In order for this to take place, the authors argue that teachers must be given time to learn not only from their own experiences in class, and interactions with students, but also from their colleagues. Not only does this idea improve teaching practice, it allows teachers to actively participate in scholarship around the art and science of teaching. These ideas are instantiated in the fellowship program by pushing the fellows to engage in teaching as a public practice through the use of social media tools, as well as by encouraging the establishment or further development of a web presence. Though the fellows had already begun to share their experiences via social media in the summer and fall, it was in the spring semester that this aspect of their work was strongly foregrounded. Lastly in the spring, MSUrbanSTEM instructors asked the fellows to engage in personal, as well as collective, reflection around their teaching practice, and share those reflections as personal journal entries as well as publications to be shared with the world.

Social Media Integration

The MSUrbanSTEM program believes one way to help fellows to practice the idea of teaching publicly was to help them develop and/or foster the use of social media in their teaching practice as well as their professional development experiences. Ferriter (2010) makes several arguments why teachers should be proficient in the use of social media, specifically Twitter, in their teaching practice. He states, "teaching professionals have found ways to use Twitter to share resources and lend quick support to peers with similar interests." By building a network via social media of professionals in similar content or grade areas, a teacher can construct a repository of resources for various ideas, which include lesson planning, curriculum mapping, motivation and engagement strategies.

To integrate social media in the fellowship, MSUrbanSTEM instructors set up a private Facebook group that restricted membership to fellows and the leadership team of the program. The Facebook page was designed to be a safe space where fellows could share work they created collectively and individually while in the program, as well as resources they found that connected to STEM education.

Through Twitter, the instructors promoted the use of sharing images of their completed work or resources related to STEM with tags (including the #MSUrbanSTEM hashtag) that captured the essence of what they were trying to say. These included their World of Wonder stories as well, again an attempt to make public some of the key motivations for learning and doing STEM. The fellows were

also instructed to search via hashtags to find out what links and people were associated with different hashtags. Via this exercise, fellows were able to discover professional development communities that participated in live discussions via Twitter on a weekly or monthly basis. Twitter was also incorporated into other assignments. Fellows were encouraged to use Twitter as a way to connect with authors they were interested in interviewing, and sharing quotes they found meaningful.

Web Presence

At the time of starting the fellowship, while a few fellows had no web presence, some fellows used web space provided to them by their school/district in order to help facilitate communications between themselves and students, as well as parents. This was consistent with trends observed by Unal (2011): "Among the teachers that currently have a website, communication with students was stated as the most popular use (73%), followed by communication with parents (51%)" (p. 44). Other fellows had created sites using applications such as WordPress, Edublogs, Weebly, Wix, or Squarespace.

The fellowship program encouraged fellows to examine not only how they viewed themselves as leaders in their professional context, but also how they were viewed in out-of-school professional settings. This meant examining their professional virtual presence, as well as their networking strategies. Reminding fellows of the idea that teaching is a public practice, fellows were asked to re-envision their sites as a portfolio of their work in addition to supporting their teaching practice. Their websites now represents a repository where they can share all of their demonstrated learning, skills, pedagogical practices, competencies, and reflections in one central location. Fellows were also asked to consider integrating their social media accounts into their website. Connecting a stream of tweets related to their work, education, and STEM interest to their website, helps in the branding of their site as a professional resource for teachers interested in STEM educators.

Publishing Two Books

A few of the most interesting artifacts created by the fellows were the two books they collectively wrote. These books were written almost entirely by them, though scaffolded exercises supported by the instructional team. The first book, "Roots of STEM," was written in the first two weeks when the fellows met face-to-face. It consisted of a collection of exceptional lesson plans for STEM learning selected by the fellows from their own experiences. This was a purposeful decision to honor the prior knowledge and experience the fellows brought to the fellowship. The book began with a teaching demo that gave a snapshot of the fellows' experience. Each teacher selected a lesson that they felt showcased their best work and shared a condensed 30-minute version with a small group (4-5 colleagues) in the cohort. Upon completion the group engaged in dialogue about the lesson for 20 minutes using the Critical Response to Teaching Demonstration (CRTD) from Swenson and Mitchell (2006). The CRTD allows for participants to provide feedback on the lesson that is shared. The idea was that through sharing their best work, the fellows would have a collective opportunity to be exposed to new ideas in regards to pedagogical approaches and content approaches. The final products were collected and printed in a book titled, "The Roots of STEM".

The second book they created was in the spring semester and was titled "This I believe." In this book, each of the fellows shared a favorite quote, a favorite book, and a description of their experience with the MSUrbanSTEM project, and their plans for the future. Finally, each of their pieces ended with

a short statement about some deeply held belief about teaching and learning in the STEM disciplines that began with "This I believe…" Both of these books were printed (using an Espresso Book Machine) and shared with the fellows, the funders, and other administration and leadership at CPS. Though e-book versions of both books were available on the MSUrbanSTEM website, the tangible, printed book became a highly coveted artifact; its physicality in stark contrast to most of the digital work that the fellows were engaged in.

Leadership Identity

As Berg, Carver, and Mangin (2013) observed, over the past few decades, teachers have begun to play an increasingly important formal and informal leadership role in various contexts of their professional settings. However, "education research has not coalesced around the topic of teacher leadership, nascent theories are not tested across settings, and teacher leader-related policies and practices are generally not documented in ways that can inform others" (p. 196). In the spring semester, the fellows were asked to explore the idea of being "Tempered Radicals," by reading and exploring the ideas in a book of the same name (Meyerson, 2008).

As Meyerson describes it, Tempered Radicals "are people who want to succeed in their organizations yet want to live by their values or identities, even if they are somehow at odds with the dominant culture of their organizations." As 'outsiders within,' they have both a critical and creative edge. They speak new truths and they think "out of the box" because they are not fully in the box. Meyerson further defines Tempered Radicals, as, "Everyday leaders who are quiet catalysts and who push back against prevailing norms, create learning, and lay the groundwork for slow but ongoing organizational and social change." (Kindle Locations 3307-3309).

The Meyerson text helped provide the foundation for fellows to develop a personal manifesto—in the form of an essay and video through three stages. In the first stage, fellows were guided through a conversation, which asked the fellows to examine the type of leader, or radical they viewed themselves. Further, the fellows explored how they interacted with challenges in their professional context. Lastly, they reflected on the distinction between institutional (a narrow focus on tools, skills and plans) or missional thinking (a broader focus on goals and values) and each has a role to play in teaching and leadership. Using these ideas fellows were asked to develop short- and long-term professional S.M.A.R.T. (i.e. specific, measurable, achievable, realistic and time-bound) goals.

The fellows did not just engage in thinking and writing about leadership. In keeping with the MSUrbanSTEM approach of engaging in activity — the fellows worked in groups based on a range of STEM based themes, connected to ideas they had explored through the year long program. Finally these groups developed interactive presentations that illustrated how these ideas were enacted in their daily practice, which they presented at the 2015 Annual Conference of the American Educational Research Association (AERA). The ability to speak about their work to an audience of world-recognized researchers and scholars, at one of the most prestigious educational conferences in the world, was a significant achievement and a matter of great pride for the fellows (and the MSUrbanSTEM administrative, research and instructional teams).

Leadership as Sharing and Collaboration

During the spring semester the MSUrbanSTEM team continued to promote the mindset of accepting misunderstanding and understanding confusion when approaching teaching and learning. This message is deeply threaded in the fellows' efforts to share their work with the world and the fellowship program's conceptualization of wonder as a form of inquiry. The MSUrbanSTEM team specifically encouraged teaching to be seen as an art, informed by psychological and design principles but not determined by it. New approaches to pedagogy and representation of content can be creative, different, and even uncomfortable, and it is desired that the fellows share these practices with the world. So when the fellows shared their work on social media outlets, they didn't simply share their classroom successes and only discuss the ease of their project implementation, but they also were encouraged to share their challenges and to share what they learned as a result of the adversities they faced.

Many of the teachers found they had to reach outside of their classrooms to obtain the resources needed to accomplish their DreamIT projects. One fellow wanted her students to share her passion for mathematics. Specifically, when asked to write a reflection about her DreamIT project, she explained:

Every year I come across many students that 'hate' math or think it's such an impossibly complex thought process that only a few chosen students understand. I see students the first day walk in already given up with the lessons I haven't even taught. It is incredibly frustrating. (Kallie)

Her DreamIT involved encouraging students to see math everywhere by photographing instances of math in their world. The challenge arrived when making sure her middle school students had access to technology outside of the classroom to take pictures. She worked with administration, parents, as well as started a "GoFundMe" page in an effort to garner the funds necessary to get technology in her classroom. Her goal included having students share their work publicly, through Twitter, which was not encouraged by administration. Kendra was able to advocate with research and examples from her summer experience in MSUrbanSTEM as to how student learning could be benefitted by the use of social media. She collaborated with administration to develop a fact sheet aimed to help parents and students determine whether the benefits of using social media in the classroom outweighed the risk.

Further, in connection with teaching publically, all of the teachers did not share or use social media equally, and all fellows not utilize their web sites to the same capacity. However, all of the fellows received ideas from MSUrbanSTEM that allowed them to re-imagine and re-think their efforts and sometimes even their goals. Much like the term, "tempered radicals," the MSUrbanSTEM program always wanted the fellows to think differently when approaching their daily classroom practices. The end result, often discussed during the meetings both face-to-face and online, is not that the fellows had an absolute and complete understanding of the complexities of teaching but rather that they are progressing on the journey. The confusion inherent in wicked problems of teaching and learning in the STEM disciplines in urban contexts remain, but through the process, the MSUrbanSTEM team hopes to develop a more nuanced and thoughtful approach.

EVALUATION

While the program design and instruction may be the most exciting aspects of the program, the program designers also collected a range of data over time, to demonstrate if at all the program had made a difference to the fellows and their practice. Some of the findings shared in this chapter will concern the fellows' leadership qualities, teaching efficacy, knowledge and use of TPACK, and expertise in the use of technology as a result of being participants in this program.

The MSUrbanSTEM program aims for its fellows to develop abilities that will enhance the classroom experience and each of their students' quality of learning. The MSUrbanSTEM researchers used four separate instruments to measure the fellow's abilities, as well as conducted in depth qualitative analyses of the artifacts created by the fellows. They used a modified version of the TPACK instrument (Schmidt et al., 2009) for measuring technology integration into pedagogy of STEM content; the Teacher efficacy scale (TES, Woolfolk & Hoy, 1990) to measure fellows' beliefs in self-competence as a teacher, the Educational Leadership Self Inventory (ELSI, CSBE, 2001) for fellows' leadership and collaboration beliefs of self, and a Technology expertise survey that was created by the MSUrbanSTEM team.

In the first year, fellows were asked to take all four assessments at four times throughout the year to measure any changes in their self-perceptions as educators. The first cohort completed the surveys immediately prior to the face-to-face summer session, and once in September when starting their school year. They later took the surveys once in December to finish the first semester and then they completed the surveys in May/June of the following year. Overall, it is inferred that these measures can speak to the self-perception of the fellows, which offer an illustration of their own sense of competence and ability to be innovative, open minded, and effective educators.

Instruments and Findings

Teachers understanding of TPACK allows them to rethink their academic environment and more effectively use technological resources to their advantage (Koehler et al., 2011). The TPACK instrument is 47-item questionnaire with 10 sub sections including: technological knowledge (TK), content knowledge (CK) of four separate subjects (including math and science), pedagogical knowledge (PK), pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK), and TPACK. The TPACK has an alpha ranging from .75 to .92 for each of its sub sections.

TPACK findings from the first year show that there was a significant difference in scores at each time point. The MSUrbanSTEM researchers completed a one way repeated measures analysis of variance over four periods. Mauchly's test indicated that the assumption of sphericity was not violated, $\chi^2(5) = 4.177$, $p = .525$, therefore Greenhouse-Geisser tests are reported ($\varepsilon = .859$). The results show that the fellows' perceptions of their TPACK was significantly affected by their participation in the MSUrbanSTEM program $F(2.58, 41.24) = 18.8$, $p < .001$. Additionally, they saw statistically significant differences in all seven subscales, which represent that the fellows' ability to integrate technology into STEM content as well as their ability to integrate technology and STEM content into their pedagogy had increased as result of being in the MSUrbanSTEM program.

Further, in the measurement of technology use, the fellows were asked to complete an internally designed, MSU Educational Technology program's technology survey. This technology survey was created at MSU specifically to learn about the general technology competence, familiarity, and use of technological software and task capabilities. The survey includes questions about web skills and so-

cial media presence, ranging from questions like, "How confident are you putting an attachment in an email?" and "…protecting your computer from viruses?" to "How confident are you creating an app for a smart phone?" or, using "3-D printing capabilities." This survey has been used in the past to measure how master degree seeking students in educational technology have grown as a result of being in the master's program. This same survey was modified and used to measure the abilities and competence of the MSUrbanSTEM fellows as well.

The authors conducted a one way repeated measure analysis of variance across only two time points (July/beginning and June/end). Findings from the first year cohort's technology survey results show that the group significantly grew in their knowledge of and use of technology due to their participation in the MSUrbanSTEM program $F(1, 20) = 28.88$, $p < .001$.

Arguably the most important instrument used in this study was the Teacher Efficacy Survey (TES, Woolfolk & Hoy, 1990). The TES is a 22-question instrument where the participants are asked questions related to their view of their own teaching ability and impact on students despite circumstance. The questions are split into two categories, general personal efficacy, and teaching efficacy. Examples of questions from this survey include, "the influence of a student's home experience can be overcome by good teaching?" and, "I have enough teacher training to deal with almost any learning problem?" All questions were asked on a 6-point Likert scale from strongly agree to strongly disagree. The alpha for the teaching efficacy scale is .74 and the alpha for personal efficacy scale is .82.

Findings from the TES indicate that there was a significant difference in scores from at each time point. After completing a one way repeated measures analysis of variance over all four of the periods of time, Mauchly's test indicated that the assumption of sphericity was not violated, χ^2 (5) = 4.934, p = .425, therefore Greenhouse-Geisser tests are reported ($\varepsilon = .837$). The results show that the fellows' perceptions of their own efficacy as a teacher was significantly affected by their participation in the MSUrbanSTEM program $F(2.51, 42.69) = 3.046$, $p = .047$. Though significant, there were lesser effects (lower F statistic) of the efficacy instrument compared to the ELSI (soon to be discussed) and the TPACK, and this could be because only one of the subscales showed a significant change in the fellows perceptions of efficacy. Results show that fellows' perceptions of their general personal efficacy was significantly affected by their participation in the MSUrbanSTEM program $F(2.52, 42.88) = 5.995$, p = .003, but their perceptions of their teacher efficacy was not significantly affected by their participation in the MSUrbanSTEM program $F(2.63, 44.63) = 1.027$, $p = .382$. While personal efficacy had questions that reflected how well the fellows feel they can carry out a task, teacher efficacy had questions that reflected how confident a teacher felt in altering a student's outcome despite the student's home and family context. Therefore, indicating that the fellows may perceive themselves as more efficacious people as a result of being an MSUrbanSTEM fellow, yet they still understand the limitations of the context on the students they teach.

Finally, for the last survey, the MSUrbanSTEM researchers used the Educational Leadership Self-inventory (ELSI, CSBE, 2001). The ELSI was created by the Connecticut State board of Education and is based off of the principal instructional management scale (Hallinger, 1982) and was adapted in 1999. The ELSI was then used to measure teachers and administrator's ability to collaborate, meet goals, and deal with overall obstacles in a school setting and the scale normed on the importance ratings of 251 Connecticut school principals who participated in "successful school principals" study. This instrument was specifically used because it allows the researchers to learn more about how the fellows are growing as collaborators in their school setting and if they are sharing and spreading the ideas that they have

learned from the MSUrbanSTEM program. There are 69 Likert scale questions on the ELSI and there are 12 subscales.

The ELSI findings express that there were significant differences in scores across the four time points after conducting a one-way repeated measures analysis of variance. Mauchly's test indicated that the assumption of sphericity was not violated, $\chi^2(5) = 6.545$, $p = .257$, therefore Greenhouse-Geisser tests are reported ($\varepsilon = .816$). The results show that the fellows' perceptions of their own leadership abilities as a teacher was significantly affected by their participation in the MSUrbanSTEM program $F(2.45, 48.93) = 9.075$, $p < .001$. Further, 10 of the 12 subscales were found to have significantly increased. The two sub scales that increase the most were the professional development subscale and the school culture subscale. The five questions in the professional development subscale ask about the fellows taking initiative to create opportunities for self and colleagues to grow or develop. The questions on school culture cover the participants' actions concerning collaborating with colleagues in order to create a cohesive school wide education environment. Other sub scales that significantly increased were; educated person, learning process, teaching process, school goals, school standards and assessment, integration of staff evaluation, PD, and school improvement, organizing school resources and school policy, and school community relations subscales.

In addition to the four instruments, the MSUrbanSTEM team is currently conducting a qualitative thematic analysis looking at the various artifacts created by the fellows (specifically the DreamIT projects and book reviews). Qualitative analyses allow the researchers to get an in-depth look of what the fellows are doing with their students, how they are integrating technology in their pedagogy, how they are collaborating with their colleagues, and what they are passionate about while learning from this MSUrbanSTEM teaching experience. A brief preliminary analysis confirms that fellows are growing as STEM leaders, they are collaborating with other teachers, and are incorporating the main pedagogical ideas presented to them in their own classrooms. Fellows are also making interdisciplinary connections, incorporating project-based learning, and using technology in creative ways to support their student learning. Their projects reveal that they are finding innovative solutions to the challenges they face as urban educators with limited time and financial resources.

The fellows create a range of on-going reports about their DreamIT projects. These reports reveal a complex zig-zag process of iterative design and re-design as the fellows face challenges, receive feedback from their focus groups, and so on. There is a great deal of failure and challenging circumstances that emerge in these reports. What is impressive, however, is the manner in which the fellows persist in their work, taking challenges in stride, picking themselves up from momentary stumbles and moving on. It appears that they become more comfortable with the complexities of leadership and their role in the classroom and their school. Thus they seek no clear answers but rather are accepting of the wicked nature of the problems they face, the "broken images" as it were. Yet, they seek to grow and develop, even while continually seeking to experiment to develop a better and more realistic understanding of the process while holding steadfastly to broader and deeper goals.

CONCLUSION

The changes observed in the fellows (either in direct interaction with them or from seeing the data) have been fascinating and truly motivating to the designers of the fellowship. To see the fellows explore, put themselves at risk, fail, and continue to persevere in contexts that are not the most conducive to learning

has indeed been inspirational to the MSUrbanSTEM team. In fact, this emphasis on learning from failure almost took on the appeal of a badge of courage—with the statement "failure is the only option," and this almost became a motto of the program. The idea being that if you haven't failed, you really haven't pushed yourself hard enough. This, of course, is in sharp contrast to the dominant narrative in education and in social popular culture, which is fundamentally averse to failure (Kohn, 2000). Much like the philosophy of learning from John Dewey, the fellows learn by doing the science or doing the math, not just from reading (though much reading does happen), or from listening to lectures (and they have some of those as well), nor from receiving handouts and powerpoint slides (and their websites host a few of those too). All of these components exist but the central aim is to do and share the work, and learn by doing, while bringing what you learn to the educational experience.

The MSUrbanSTEM team also does not pretend to have all of the answers. They do, however, offer suggestions for brainstorming, collaborating, wondering, and thinking outside of the box in order to help the fellows reach their teaching goals. Building on the fox and hedgehog quote by Archilochus, with which the authors started this chapter, Isiah Berlin divided writers and thinkers into two categories. Hedgehogs know, argue, and predict that all knowledge is related to one central vision, while foxes entertain ideas that are complex and do not try to explain all phenomena with one theory. There is research to show that in complex domains, where cause and effect are hard to tease apart and where irregularity is normal, foxes do better than hedgehogs in forecasting. This is because foxes are eclectic in their choice of ideas, humble in their relative ignorance, not overwhelmed when the facts go against their current thinking, willing to learn from their mistakes and nimble in changing tactics when the world around them changes. In fact, there is research to show that in the area of political forecasting, the diffident foxes fare far better than overly-confident hedgehogs (Tetlock & Gardner, 2015).

The MSUrbanSTEM approach has been that of the fox and they seek to instill the same qualities in their fellows. They encourage their fellows to enter the classroom with multiple strategies, philosophies, and thoughts on how to teach and guide the students in the class. On any given school day teachers could be teaching up to 150 students while having to take into mind the various backgrounds, prior knowledge, and daily emotions of their students. Approaching the school like a hedgehog forces all of the students to fit into the teaching theory of the teacher, while the fox approach allows the teacher to effectively connect and meet the needs of their different students. As a teacher educator, one cannot predict the future behaviors and needs of each of the students that the teachers will meet. Teacher educators can however equip teachers to become comfortable with this ambiguity, to understand that, such is the nature of the field of education, and in fact it is this diversity and "confusion" that gives much of this work its infinite richness and variety. Additionally, the MSUrbanSTEM equipped teachers will not be surprised by the ambiguity or confusion of the process. The goal therefore, is to continually explore, create, and share and in that process come to a "new understanding of our confusion."

Clearly there are many gaps in the program designers' understanding of this complex process of teacher professional development. Their work in this area, over the years in the design of a Master's program in educational technology, and now culminating in the MSUrbanSTEM program, has had a strong focus on practice. Their understanding of the efficacy of their processes is therefore limited — and the data and results they have presented above, as in other venues (Koehler et al., 2011), are a good start. Clearly more needs to be understood about the process. One of the challenges faced by the project is its holistic nature, where assignments, readings, activities, work together in a multi-threaded, multi-dimensional manner, where issues related to aesthetics, beauty and wonder play as important a role as the develop-

ment of content, pedagogical and technological knowledge. Studying such complex interactions is not easy— and this should be an important goal of any future explorations and research.

To end, the authors would like to quote from Robert Pirsig's 1974 classic rumination on technology and values, *Zen and the art of motorcycle maintenance.* He writes:

Technology presumes there is just one right way to do things and there never is. And when you presume there is just one right way to do things, of course the instructions begin and end exclusively with [one predetermined product … But if you have to choose among an infinite number of ways to put it together then the relation of the machine to you, and the relation of the machine and you to the rest of the world, has to be considered, because the selection from among many choices, the art of the work is just as dependent upon your own mind and spirit as it is upon the material of the machine. Pirsig (1974, p.160)

As the authors look over a year of work with their fellows, they see that the focus of the MSUrbanSTEM program has been as much on the science and engineering aspects of STEM learning as it has been on the "art of the work" seeking to develop in their fellows a sense of autonomy and respect for their knowledge and skills, an openness to wonder as a prime motivator for learning, and a tolerance for ambiguity and ultimately a faith in the process that would lead to continual growth and development. The MSUrbanSTEM team views their work in this area as informing future projects in teacher professional development. These are complex issues, and as the authors wrote at the very beginning of the chapter, how they frame these issues is of critical importance. The authors hope that through this paper they have been able to provide a rich description of their approach, and the broad philosophical foundations of their work.

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KEY TERMS AND DEFINITIONS

Creative Pedagogies: Teaching and classroom practices that require an unorthodox and/or innovative approach to scaffolding students in their learning process.

Dewey: John Dewey is an educational reformer whose work emphasized the importance of teachers psychologizing subject matter, learning best by doing the work instead of simply reading about it, and teachers valuing the knowledge that each student brings to the classroom.

Experience: A concept endorsed by John Dewey, which encourages teaching and learning is most effective when the learner/student is able to partake in the phenomena being taught, as opposed to only reading about or hearing about the phenomena.

Fellowship: An earned reward or amount of money designated to a scholar for their educational work.

MSUrbanSTEM: A yearlong teacher leadership fellowship program that uses an innovative approach to teacher professional development in order to create multimodal classrooms.

STEM Instruction: Science, Technology, Engineering, and Math teacher pedagogies and practices.

Technology Integration: The incorporation of everyday tools into classroom practices to enhance the teaching and learning process.

Teacher Leadership: Teacher and administrator's ability to collaborate with colleagues, parents, and students in school related projects at the school or district level. Also teachers' habits in sharing their classroom results, practices, and experiences with their community in various ways.

Teacher Professional Development: Teacher instruction programs that help teachers to grow and learn as educators.

TPACK: The creative integration of technology, pedagogy, and content knowledge into everyday teaching practices.

Chapter 33
Understanding and Teaching Emergent Bilingual Students

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ABSTRACT

The aim of this chapter is to provide pre-service and in-service teaching with an understanding of who emergent bilingual students are and how they can adapt their practice in order to use students' home language as a resource rather than as a deficit. The chapter will share findings from a study conducted with emergent bilingual students in a kindergarten writing workshop. It will also focus on how teachers should adopt an additive approach to language that expands children's linguistic, social, and cultural resources while supporting learning a new language as well and literacy development.

INTRODUCTION

There are four million students who are classified as English Language Learners in the United States (National Center for Educational Statistics, 2014). Today, most of these students attend schools with restrictive language policies that do not allow them to use their native language as a resource for learning (Gándara, 2000; Garcia & Curry-Rodriguez, 2000; Linton, 2007). Emergent bilinguals (García, 2005, 2009) are placed in mainstream classrooms where they are faced with learning a new language and simultaneously learning to read and write in English. Students receive limited support through educational programs such as English to Speakers of Other Languages (ESOL) pullout or structured immersion programs, but many bilingual students who demonstrate oral proficiency are often excited from these programs under the assumption that the students have full command of the English language due to speak conversational English (Grant & Wong, 2003).

A key factor that impacts the educational achievement of bilingual students are the teachers that facilitate instruction. Teachers have a significant influence on the academic achievement of students. Darling-Hammond (2000) has identified the following general qualities of effective teachers: strong intelligence and verbal abilities, strong content knowledge, knowledge on how to develop higher order thinking, understanding of learning development, teacher experience, and adaptive expertise that allows

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the teacher to make decisions based on students needs. Darling-Hammond (2000) concludes that there is a "strong, significant relationship of teacher quality variables to student achievement" (p. 23). This analysis also concludes that student characteristics, such as poverty or the label of being an English Learner, are negatively correlated to the qualifications of teachers. In addition, it is important to note that the growing diversity of students is not reflected in the teacher demographics. Emergent bilinguals are being educated by a teaching force of predominantly White, monolingual, and female (Boser, 2011). During the 2007-2008 school year, eighty-three percent of full-time teachers were White, 7 percent were Black, 7 percent were Hispanic, and 1 percent were Asian (Aud et al., 2012). In comparison, the number of students from diverse backgrounds continues to grow in U.S. schools. This chapter seeks to provide new understandings and ways in which teachers are working with emergent bilingual students.

BACKGROUND

The labels that are imposed on students are important and impact the way that students are viewed. Many emergent bilingual students continue to be labeled with identifiers that mark them as deficient or lacking through the use of terms such as *Limited English Proficient* or *English Language Learner* (Gort & Bauer, 2012; Reyes, 2006). These terms position students as lacking, instead of recognizing their linguistic competencies as they learn to read and write. The term most commonly used, English Language Learner, "devalues other languages and puts the English in a sole position of legitimacy" (Garcia, Klefgen, & Falchi, 2008, p. 7). For this reason, I adopt the suggested term *emergent bilingual* (Garcia 2009; 2010; García et al., 2008; Gort & Bauer, 2012; Reyes, 2006). The term emergent bilingual is utilized in this study to refer to "young children who speak a native language other than English and are in the *dynamic* process of developing bilingual and biliterate competencies, with the support of their communities" (Reyes, 2006). The term also views their bilingualism as an asset rather than a deficiency and positions this group of students as having potential instead of seeing them as deficient because they speak a different language. In essence, this term validates the students' home language and thus affirms their identity as language users.

While emergent bilinguals are developing their oral language competencies in both languages, they are often also developing their written literacy in English and Spanish (Garcia et al., 2008; Reyes, 2006). Biliteracy is defined by Perez and Torres-Guzman (1996) as "the acquisition and learning of the decoding and encoding of and around print using two linguistic and cultural systems in order to convey messages in a variety of texts" (p. 54). This definition of biliteracy takes into account how reading and writing development are influenced by the linguistic system. It also recognizes how reading and writing are embedded in the cultural practices and how the cultural system plays a part in a child's literacy development.

Although bilingual students are a group of students who speak two or more languages, there are differences in this group that can help us understand their different needs. In their study of bilingual students, Olsen and Jaramillo (1999) and Yvonne and David Freeman (2002) discuss three different types of emergent bilinguals. In doing so, they also stress that this group of students is not a homogenous group, but that recognizing the different groups can help educators determine how their experiences impact their education. The three groups of students that they describe are adequate formal schooling, limited formal schooling, and long-term. Students in the adequate formal schooling group have a strong educational background and are able to apply their academic knowledge to the learning of a new lan-

guage. Freeman and Freeman (2002) describe students in the limited formal schooling group as students who have arrived to the U.S. within the last five years. This group of students has received interrupted or limited schooling in their home country and has limited literacy in their native language. Students in this group are not able to draw upon the resources of a first language in learning a new language and therefore struggle in school.

Long-term bilinguals are the largest group of emergent bilinguals. These are students who may have started school in the United States, but still lack academic language and are at risk for school failure (Olsen, 2010). Long-term bilinguals have been in U.S. schools for 7 or more years, and yet they are below grade level in reading and writing. This group of students has strong oral skills in English but have low literacy levels in both English and their native language (Freeman, Freeman, & Mercuri, 2003). In a study of secondary Long-term bilingual students in California, Olsen (2010) identified factors that have contributed to the growing number of long-term bilingual students. Among those are inexperienced teachers, students being kept in classes for newcomers, a narrowed curriculum with the lack of access to content subjects such as science and social studies for this group of students, and inappropriate placement in mainstream classrooms.

In addition to these three groups of students, Freeman and Freeman (2009) have identified a new group of bilingual students. Potential long-term bilingual students are emergent bilingual students who are in danger of becoming long-term bilinguals. These are students who are currently being denied the opportunity to be instructed through using their native language. They also begin their schooling speaking a language other than English and arrive at school in grades K-2. Factors that may impact educational success for this group include low parent education, English-only instruction, low levels of reading and writing. Freeman and Freeman (2009) make the argument that this group of students must be afforded the opportunity to use their native language to acquire the academic language required to be successful in school. This particular study population has the potential to be in this category due to the English-only policies that deny these students from using their native language.

EMERGENT BILINGUAL STUDENTS IN A WRITING WORKSHOP

The study presented in this chapter examined emergent bilingual students' writing development during writing workshop in the context of an "English only" official curriculum. The study focuses on the social, cultural, and linguistic resources that young emergent bilingual students use when writing. Questions guiding the study were:

1. How do emergent bilingual writers participate in writing events?
2. What social, cultural, and linguistic resources do emergent bilingual writers draw upon when engaged in the composing process?
3. What impact do these resources have on emergent bilingual writers' understandings of the writing process?

Data sources included teacher, student, and parent interviews; field notes and transcripts of focal students' talk and interactions during the whole class mini-lessons and share sessions, individual writing time, and teacher/student writing conferences, and student writing samples. Constant Comparative approach (Charmaz, 2006; Glaser & Strauss, 1965) was used to analyze the data.

The study was conducted in a small town in the Southeastern United States with a shifting population. The city's Latino community has grown significantly in this town over the last two decades. The shift in population is due to a large number of manufacturing jobs in the area. The Latino community makes up about 48% of the population. The shift in demographics in the town is also mirrored in the school in which the study was conducted. The school's population is 90% Latino, 5% White, 3% African-American, and 3% Multiracial or other. The school is a Title I school with over 90% of its students being eligible to receive free or reduced lunch. The class that participated in this study was a kindergarten class. There were 20 students in the class. All of the students, except one, were emergent bilingual Latino students. The teacher and the paraprofessional were both White and monolingual. It is important to note that all instruction and official curriculum in this classroom was in English. This is despite the fact that the majority of the students in the school and the classroom were emergent bilinguals.

In this study, the researcher examined a group of 5 students during the writing time. All of the focal students were emergent bilingual Latino students with varying language and academic proficiencies. Focal students sat at the same table during the writing workshop time and had conversations and interactions about their writing. The researcher's focus was on the students' use of social, cultural, and linguistic resources that these students used while composing.

For the purposes of this chapter, I will discuss three of the study findings. The first finding is that the emergent bilingual students used language in sophisticated ways. The focal students were able to take advantage of both languages, Spanish and English to talk to each other as they were composing. Despite being able to use both languages as they talked, all of the writing that students produced was in English. The following excerpt is an example of a typical conversation that occurred during the writing workshop amongst the 5 focal students. During this conversation, the students are discussing writing and drawing about an event that happened in the popular culture show Monster High.

Lina: Este es el mono de Clawd [This is the doll of Clawd]
Neyda: Y luego vamos a hacer Lagoona's 16th birthday?
Lina: uh-uh
Neyda: and then….
Maria: the principal's 16th birthday
Lina: I need pink
Pablo: I was staying with my grandpa. We ate frijoles. [beans] It was good.
Maria: I'm going to say "Oh Clawd" (laughs)
Neyda: Maria, do your work.
Pablo: hey, you have a brown? Neyda, you can give me the brown? Neyda… ahhhh
Lina: Let's draw Draculaura ahorita[now]
Maria: and then let's do Lagoona's 16th birthday.
Lina: (singing) The happy birthday girl… the happy birthday girl…
Neyda: No Maria, you need to do your work
Lina: yeah. If you don't do it, we are not going to play with you
Neyda: Vamos a jugar afuera [we are going to play outside]
Lina: We are going to make a party of Draculaura
Maria: ah (May 7 transcript)

In contrast to this conversation that occurred in both English and Spanish, the text that were produced were exclusively written in English.

Another finding revealed that students were able to draw upon a wealth of cultural resources as they wrote. Students used popular culture characters and shows as a source for their writing. Students' everyday family experiences also provided students with a repertoire of writing topics for students. One important point that teachers must consider when working with students from diverse backgrounds is that students will bring with them different experiences that must be valued in the classroom. Students in this study drew from those family experiences as they wrote during the writing workshop. The following excerpt is a short conversation about two different pieces of writing about families.

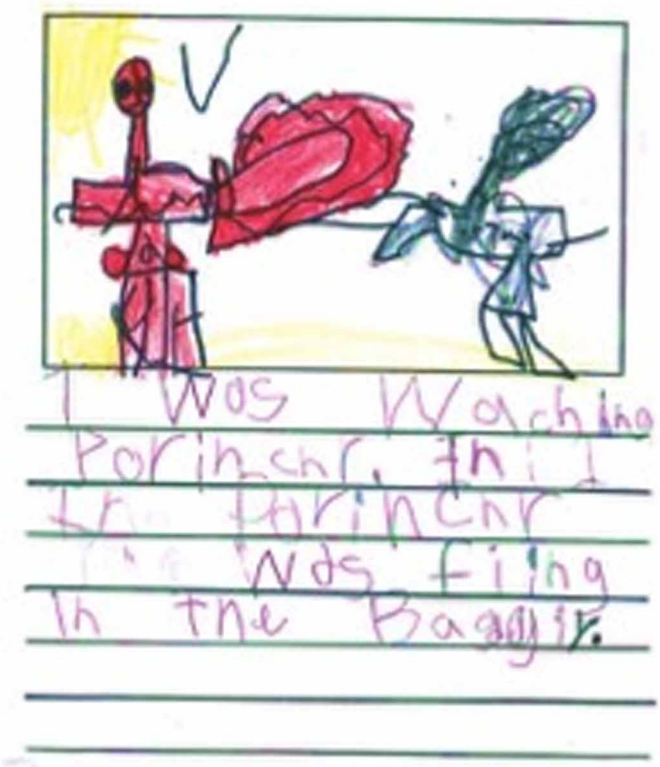
NEYDA: my brother is right here. We was saying "why are you taking me". We was waiting for mi papi [daddy]and he was still taking a bath
LINA: what?
NEYDA: he was taking a shower
LINA: Oh… y mijo el dia que mi mom graduate [the day that my mom graduate] (May 13 transcript)

Students also drew upon popular culture as they wrote. Popular topics that were often written about included *Monster High, Power Rangers,* and *Uncle Grandpa*. All of these were popular television shows that students watched outside of school. Figure 1 and 2 are examples of drawing and writing depicting these popular culture topics.

The final finding was that students were involved in complex social relationships that they used as a resource for writing during the writing workshop. Students used each other as a social resource when writing. They taught and helped each other during the independent writing time. In many cases, students appropriated the language of the teacher to help a classmate write a word or use a writing strategy previously taught by the teacher. Students were also able to demonstrate their sophisticated language

Figure 1. Lina watch Monster High

Figure 2. I was watching Power Rangers and Power Rangers was fighting and the bad guy



competencies here because they used both languages as they were helping and teaching. The following are examples of ways that the students appropriated the teacher's language to help and teach each other.

Pablo: Use your words. Neyda say it slow. (April 22, 2013)
Lina: Say it slowly and think about it more (May 7, 2013)
Juan: I said I do like yours cause you're doing your job (April 30, 2013)
Neyda: You need to write nice and neat (April 22, 2013)

Students' social relationships with each other allowed them to ask for and receive help. For these emergent bilingual students, the accessibility to other students was important as it allowed them to build a network of someone who could help them using both their home language and the official school language. Based on the findings of this study, implications for practice in working with emergent bilingual students are provided in the next section.

IMPLICATIONS FOR PRACTICE

The first implication for practice supported by findings from this study is that students' home language is a valuable resource that students can draw upon for learning. Teachers should adopt an additive ap-

proach to language that expands children's linguistic, social, and cultural resources while supporting learning a new language as well and literacy development (Moll & Dworin, 1996; Moll et al., 2001; Reyes, 2001). Teachers can respect and acknowledge students' home language and allow that language to be used even in an "English only" official curriculum (Soltero-Gonzalez & Reyes, 2012). Students' use of hybrid language practices (Gutierrez, Baquedano-Lopez, and Tejada, 1999) such as code-switching are important in supporting students as they navigate and use two languages. One way that teachers can support students is to allow students to have conversations in their native language as they are learning. In the study presented in this chapter, one of the students was able to tell an elaborate story mostly in Spanish, but wrote a simple sentence about it. If the teacher only considers the actual writing that was produced but ignores the elaborate conversation that took place before and while writing the story, then the teacher is not fully valuing all of the resources that this student is using when writing. Teachers can position vulnerable writers such as the one described as experts by valuing their oral story as much as their written story. Another suggestion is to create an interaction-rich environment where communication is valued and encouraged. Teachers could partner students who are learning a new language with peers who may be able to help. As evidenced in this study, students were able to teach and help each other as they were writing and they often used both languages to achieve this task.

In working with emergent bilingual students, teachers also should implement a curriculum that affirms students' identities as well as engaging students in collaborative critical inquiry. Cummins (2000) defines this transformative/intercultural pedagogy as "interactions between educators and students that attempt to foster collaborative relations of power in the classroom" (p. 253). Such pedagogy acknowledges students' knowledge as valuable and builds on the cultural, social, and linguist resources that students bring to the classroom. In her study of Latino students' experiences in a high school, Valenzuela (1999) argues that schools fail to acknowledge the social and cultural resources that Latino students bring with them to school. Valenzuela notes that "rather than building on students' cultural and linguistic knowledge and heritage to create bicultural and bilingually competent youth, schools subtract these identifications from them to their social and academic detriment" (p. 25). Therefore, teachers must make efforts to recognize, affirm, and extend students cultural and social resources. This can be done by also recognizing that every student and family brings different funds of knowledge into the classroom.

Educators must also be attuned to the unofficial work that takes among students during the school day. Students in this study show how social relationships are negotiated and why teachers should pay attention to the unofficial worlds of students. The complex interactions that students have with each other reveal the multi-faceted nature of learning to write. These interactions cannot be separated and directly impact the formal learning in the classroom.

The growing number of students who are emergent bilinguals should be an impetus for preparing teachers to meet the needs of these students. Lucas and Grinberg (2008) argue that teacher preparation programs need to provide teachers with specialized preparation and linguistic knowledge to provide adequate instruction to emergent bilingual students in mainstream classrooms. Pre-service and practicing teachers must be given opportunities to examine and evaluate their beliefs about working with bilingual students. Teacher preparation must also include opportunities to explore and enact culturally and linguistically relevant pedagogy (Gay, 2000; Ladson-Billings, 1994; 1995).

PEDAGOGICAL IMPLICATIONS

The findings presented in this study point to different possibilities in the instruction of young emergent bilingual students in all-English environments. The following section focuses on providing some suggestions for teachers working in these contexts.

1. Honor students' home language. Students' home language is an important form of support for instruction. Regardless of the language required for instruction, students should be allowed to draw upon their knowledge of multiple languages. Teachers can do this by allowing students to speak their home language while working with other students during the school day. Another way that teachers can support this is by allowing students to tell their stories in their native language during the writing time. This practice can help students develop their literacy as well as affirm their identity (Soltero-González & Reyes, 2012).
2. Provide learning contexts that are collaborative and interactive in nature. Collaborative group work allows students the opportunity to work and receive support from others. Using collaborative groups with emergent bilingual students can also help students with language production abilities by having students who have higher control of the English language serve as models to students who are learning English (Soltero-González & Reyes, 2012).
3. Use locally situated, culturally relevant children's literature (Fránquiz, 2012). Teachers can choose literature that reflects students' culture and language. This can include having children author books in the classroom or with their families and including those books in the classroom library. In order to affirm students' identities, it is important for students to see themselves in all aspects of the school.
4. Teachers can also take steps to learn about the role of family and community experiences on emergent bilingual students' learning development. Teachers can learn and tap into families' vast funds of knowledge (Moll et al., 1992) by conducting home visits and learning about the knowledge in the students' homes. By redefining parental involvement, teachers can seek out ways to learn from the families and engage parents by creating meaningful partnerships with them (Huerta & Brittain, 2010).

Teachers can also enact a curriculum that is transformative (Cummins, 2000) in nature. Bigelow, Christiansen, Karp, Miner & Peterson (1994) identify eight components that should be reflected in classrooms that seek to affirm students' identities while helping them develop a critical perspective. Those eight components for such a curriculum are:

1. Curriculum should be grounded in the lives of students
2. Teachers should work to help students develop a critical perspective
3. Curriculum that is multicultural, antiracist, and pro-justice
4. Curriculum that is participatory in nature
5. Classrooms that are hopeful, joyful, kind, and visionary
6. A strong focus on activism
7. An academically rigorous curriculum, and
8. Curriculum and classrooms that are culturally sensitive

FUTURE RESEARCH DIRECTIONS

This study expands our understanding about how emergent bilingual writers participate in writing events and what resources they draw upon when writing in an English only context. Much remains to be learned about ways to continue to engage emergent bilingual students in meaningful ways. The research reported here was based on documentation of students at the end of their kindergarten year. The length of the study was adequate for describing the ways in which emergent bilingual students participate in writing events and the resources that the students use. However, it was not possible to study how the young writers changed over time. New research should be more longitudinal in nature and examine how emergent bilingual students participate in writing events when they are in different contexts. In a study about writing, the context of the study, the significance of the teacher, and the role that peers must all be considered (Genishi & Dyson, 2009). Different classrooms provide different sets of expectations and opportunities in writing experiences for children who navigate two languages.

Additional research would also benefit from a home component. Students see themselves in different ways depending on the context in which they are operating. Although I was able to have contact with all of the parents of the focal students in the study, I did not observe the students in their home. Students were instrumental in helping me to understand the history of the families and language use at home, but they were very hesitant to make any recommendations for instruction for their children at school. A close examination of the literacy practices of both parents and children at home would help to establish a clearer picture of the funds of knowledge (Moll et al., 1992) that students bring to school.

CONCLUSION

In this study, I was able to see the social world that emergent bilingual students engage in and navigate as they are writing. Despite being in a restrictive language environment, students in this study used both languages in sophisticated ways and demonstrated how they drew upon a wealth of resources, including each other, as they wrote. On the basis of this study, teachers can support students as they draw upon their rich resources by encouraging talk in multiple languages in the classroom. This study also demonstrates how the politics of language education impact young students as they position themselves in the classroom based on the access to linguistic resources. The findings from this prompt study questions about English-only policies that deny students the use of their native language as they learn to read and write by challenging deficit perspectives that fail to view students' home language and culture as a resource in learning.

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Chapter 34
Evaluation of Master's Programs in English Language Teaching (ELT): A Turkish Case of Professional Development

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ABSTRACT

This chapter aims to evaluate the English Language Teaching (ELT) master program offered by the Graduate School of Educational Sciences at a foundation (non-profit, private) university in Istanbul, Turkey. Specifically, it investigates the preferences of the students about joining this particular program as well as analyzes their perceptions along with the ones shared by the course instructors and program coordinator. The sample population comprised fifty students, five instructors and one program coordinator. Data were obtained through a questionnaire and reflective essays. The findings revealed that the master program was effective regarding the content of the program as well as the role of instructors which contributed to the professional development. However, the range of elective courses and balance between course loads needed more consideration for the redesign of the existing program. Findings are discussed in relation to program design and evaluation in English language teaching master's programs.

INTRODUCTION

Learning and teaching English language has been highly appraised all around the world, placing greater emphasis on the effectiveness of language teacher education programs and their share on raising qualified language teachers (Block and Cameron, 2002; Freeman, 2002; Kirkpatrick, 2007; Harmer, 2008; Hinkel,

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2011; Cook, 2013). As foreign language skills are profoundly important in any realm like education, industry, medicine, technology, or science; quality of language education programs plays a big role in keeping up with the worldwide advancements as it is actually a prerequisite to be on the same wavelength with others in international arena. One way of reaching required quality in existing language education programs is through systematic evaluation.

The field of program evaluation has evolved over the past half century, referring to the thoughtful process of focusing on questions and topics of concern, collecting appropriate information, and then analyzing and interpreting the information for a specific use and purpose (Brown, 1995; Lynch, 1996; Posavac & Carey, 2003; Stufflebeam & Shinkfield, 2007). As in other fields, program evaluation has an important role in teacher education programs showing the necessary steps to be taken to fix and enhance current programs besides helping program designers create safe guidelines for the future programs. According to Wallace (1991), teacher education programs should have steady and established principles which are followed throughout the implementation of the curriculum and any application done within the program. While defining these principles which basically constitute the goals of the program, program features and instructional setting should be taken into account as well as students' needs, preferences, characteristics and attitudes (Mede, 2012). Rea-Dickins and Germaine (1998) support and further this statement indicating that it is a very fundamental part of the program and takes place at the center of it. Briefly, any practice within instruction should be shaped accordingly, to reach wanted competence and proficiency level.

Since evaluation has gained attention in education, a great deal of evaluation studies that differ in terms of their purposes, emphasis and methodologies have been conducted in the field of English Language Teaching (ELT). The primary emphasis of these studies was mostly on evaluating perceptions, needs, feelings and attitudes of the students and teachers engaged in undergraduate or language preparatory programs (Basturkmen & Al-Huneidi, 1996; Ekici, 2003; Sarı, 2003; Mutlu, 2004; Erozan, 2005; Ors, 2006; Ozkanal, 2009; Akyel & Ozek, 2010; Tunc, 2010; Mede, 2012). However, as graduate studies are of upper degree and basically require the most contemporary and outstanding quality education, evaluation in these types of programs should not be ignored. As stated by Richards (2005), for an English language teaching master program to be effective enough, there are some points to be queried such as whether the goals are fulfilled, stakeholders in education are contented, it is compatible with setting in which teaching occurs, and it is any better than its equivalents.

Taking all these into consideration, there is an apparent need to conduct evaluative studies concerning graduate programs in the field of English Language Teaching (ELT) since they play a crucial role in teacher education and preparing candidates to become more effective teachers or teacher educators. Therefore, the present chapter aims to evaluate an ELT master program at a foundation (non-profit private) university in İstanbul, Turkey by investigating the major preferences and the encouraging determinants of the students about joining the program, examining how far it addresses their needs in relation to program goals, content, instruction, resources and outcomes, teacher roles, major strengths and weaknesses of the program.

The findings of this research are expected to provide in-depth information regarding the effectiveness of the program suggesting sound guidelines for further improvement. Finally, another significant aspect of this study is that it will contribute to the scant body of literature on graduate program evaluation in Turkish EFL context. By these means, the results of the study may be suggestive for other universities in understanding the effectiveness of their own graduate programs.

BACKGROUND

Evaluation is generally considered to be a linchpin in a program. Within the realm of education, it means a whole of instruction, activities, tasks and materials which are combined and incorporated to reach certain predetermined goals and objectives. Therefore, an educational program should be evaluated systematically to see whether the goals and objectives are achieved along with whether the program is working as it was planned (Brown, 1989; Kelly, 1999; Nunan, 1988; Lynch, 1990; Patton, 1997).

Program Evaluation in Language Education

Evaluation in language education programs goes in a line with program evaluation studies in five ways: focus has moved away from measuring outcomes only, classroom processes has gained more attention, evaluation has become area of expertise for teaching profession, improving teachers' abilities is important, and standard and formative evaluation has come into prominence (Kiely and Rea-Dickens, 2005).

A number of studies aimed to evaluate language teaching programs in various educational contexts. Although some emphasized on evaluating preparatory or undergraduate language teaching programs (Henry & Roseberry, 1999; Tarnapolsky, 2000; Sawatpanit, Suthers & Fleming, 2003; Yıldız, 2004; Marcinkoniene, 2005; Nam, 2005), others attempted to evaluate master programs in English Language Teaching (ELT) (Fradd & Lee; 1997; Kayla, Wheeless & Howard, 1981). Since the focus of this chapter is on the evaluation of a particular master program (e.g. ELT), only the theoretical background on these studies will be discussed briefly in the following section.

To begin with, the results of the study on master program evaluation conducted by Fradd and Lee (1997) at a university in Florida showed including students' view in the evaluation considerably helped the betterment of the program. In this study, evaluation of the program was seen essential for continuing program advancement by focusing on teachers' reflections and analysis on program strengths and weaknesses. It was emphasized that teacher' opinions were quite significant for program evaluation as well, making the results and suggestions more applicable to the real life teaching environment.

In the study carried out by Kayla, Wheeless, and Howard (1981), student opinions were again in the center of the evaluation. They argued that existing program evaluation questionnaires were not enough for a comprehensive evaluation. To measure the efficiency of the program, a Graduate Student Program Evaluation (GSPE) scale was developed and administered to the participants. The scale covered all aspects of the program and let students express their ideas about what they liked best and least and which elements should be kept or changed in the program. The results suggested that graduate students' evaluation was not multidimensional and they saw all the components in their programs as a whole in their learning experience. The obtained findings were basically used for program review and curriculum analysis.

Apart from the program evaluation studies summarized above, majority of the evaluation studies were conducted in Turkish EFL context both in preparatory or undergraduate language teaching programs (Daylan, 2001; Celik, 2003; Ekici, 2003; Mutlu, 2004; Ors, 2006; Payam & Saricoban, 2006; Tavil, 2006; Yilmaz, 2009; Akyel and Ozek, 2010). However, only a few of them focused on master programs in English Language Teaching (Dollar, Tolu & Doyran, 2014; Kanatlar, 1996; Kirmizi, 2011).

Kanatlar (1996) conducted a study to evaluate an MA TEFL program at a private university in Ankara to check how far the goals were attained by collecting data from questionnaires along with interviews. Graduates of the program and administrators were the participants who answered questions on whether the program met the students' needs in terms of course content, design and materials used. The find-

ings showed that education in the program contributed students' professional teaching life and the goals were generally reached. As a result, both alumni and administrators asserted that the program should be maintained.

Kirmizi (2011) implemented a study to evaluate MA ELT programs offered in Turkey, which presented a good model for this study as well. The study made a comparison between equivalent programs in terms of program description, content, instruction, departmental support, atmosphere in the department and resources. Data gathered from 90 participants (students and graduates of the programs) through questionnaires and interviews revealed that further academic study and personal enrichment were the most important functions of the program. Besides, most of the programs under evaluation met the participants' expectations with a positive atmosphere and helpful professors.

A parallel study attempted to evaluate the strengths and weaknesses of the very same master program, with a focus of meeting the needs of prospective teacher trainers (Dollar, Tolu & Doyran, 2014). The results of the study indicated that the exiting program had more strengths than weaknesses in terms of qualified instructors, theory and practice balance, and assignments.

Based on these overviews, it is obvious that the role if systematic evaluation cannot be estimated in any educational program. Considering the context of this study, there is still need for evaluation studies on master level programs particularly in Turkish EFL context. To fill in this gap, the present study is crucial for representing an example for evaluation of an MA ELT program. Specifically, it aims to find out what is adequate or which aspects are missing in the program, whether the program meets students' expectations and needs, what the strongest and weakest points are, and to draw implications for improvement and betterment of the program itself. The findings will serve as a thorough examination of the nature of the program as well as its side effects.

MAIN FOCUS OF THIS CHAPTER

Issues, Controversies, Problems

Methodology

Given the great importance of program evaluation argued above, the present study aims to find out effectiveness of the MA ELT program and draw some implications for further improvement through inclusive data collected from all stakeholders namely, students, instructors and program coordinator. The study principally investigates the ELT students' major preferences for joining the master program and examines their perceptions towards the nature of the program based on course content, instruction, resources and expected outcomes. Finally, the present study attempts to identify the side effects (strengths and weaknesses) of the MA program and provide further suggestions for the redesign of the existing program. The following research questions were addressed:

1. What are the students' preferences and the encouraging determinants about joining the MA ELT program?
2. What is the nature of MA ELT program as perceived by students, instructors and program coordinator in terms of the following components:
   a. Content

b. Instruction
c. Resource
d. Expected Outcomes

3. What are the side effects (strengths and weaknesses) of the MA ELT program

Research Design

This research study employed mixed method as a research design. Specifically, the study was in concurrence with one of the mixed method research strategies, convergent design which focuses on collection and analysis of quantitative and qualitative data all at once, but individually without prioritizing either (Creswell & Clark, 2011; Teddlie & Tashakkori, 2009). The quantitative data was gathered from questionnaires while qualitative data was obtained by reflective essays from students, instructors and program coordinator. The two strands of data collection and analysis were conducted independently with equivalent precedence.

Participants

In an attempt to evaluate the MA EFL program, data was collected through purposive sampling from 50 participants who are currently enrolled in the existing program. 40 female and 10 male students who had their undergraduate degree in English Language Teaching (30), English Language and Literature (10), American Culture and Literature (2), Translation and Interpretation Studies (2), and other departments (6) participated in the study. Their age range was 23-29 with at least 3 years of teaching experience.

Furthermore, 5 instructors and 1 program coordinator teaching and/or supervising in the program also took part in the study and provided supplementary data. They were all females with the age range of 34-40 years old. They all had their PhD in the field of English Language Education and had at least 9 years of teaching experience.

Setting

This study which attempted to evaluate an MA ELT program was conducted at the Graduate School of Educational Sciences, at a private university in Istanbul, Turkey. The overall aim of the program is to enhance the quality of English Language Teaching in our country to the world standards by supporting professional development of novice and experienced teachers in the field. The program concentrates on developing knowledge and critical understanding of recent theories and research in language acquisition and learning, and relates these to the practice of English language pedagogy. In this program, the students discuss and apply instructional models and linguistic theories which relate classroom experiences of EFL students to real-life contexts. They also improve their skills in understanding and conducting research in foreign language education. It is a 2-year thesis master program offering must courses on Research Skills, Second Language Acquisition, Teaching Language Skills, and elective courses on ICT in Education, Curriculum Development for ESP, Personal Development and Effective Communication Skills for Teachers, Teaching English to Young Learners, Sociolinguistics, and Cross-Cultural Communication & Language Education. By the end of the program, the students will get acquainted in becoming a reflective TEFL practitioner, a competent educational researcher and an active member of the international academic and professional TEFL community.

Data Collection Instruments

Questionnaire

As stated in the previous part of this research, one of the data collection instruments was a questionnaire which constituted the quantitative part of the study. ***The*** questionnaire was partially adapted from Kırmızı's (2011) dissertation which aimed to conduct a comparative evaluation study of 9 master programs in English Language Teaching in Turkey, related to the concepts of program description, content, instruction, resources, outcomes and courses in the program curriculum. The questionnaire comprised of 3 sections in total. The first part of the questionnaire consisted of questions regarding participants' personal information namely, gender, department of graduation and years of teaching experience. As for the second section, it was allocated to identify the MA students' perceptions about joining the program. Specifically, it attempted to gain information concerning their future career plans, the reasons why they preferred to have a master degree and why they chose this particular program. Finally, the third section was about the participating students' perceptions with respect to the nature of the program namely, program content, instruction, resources and expected outcomes which was based on a 5 point Likert type scale ranging from 'strongly agree' to 'strongly disagree.'

Reflective Essays

As for the qualitative aspect of the study, data was gathered through reflective essays. Of the 50 participating MA students in the study, 23 were asked to reflect critically on program content, instruction, resources, expected outcomes, objectives, as well as the side effects of the program. Similarly, all course instructors (n = 5) and the program coordinator were also asked to write reflective essays emphasizing on their overall perceptions regarding the nature of the program as well as its strengths and weaknesses.

Data Analysis

In this study, the quantitative data was collected by the means of a questionnaire. The percentages were estimated using SPSS (Statistical Package for the Social Sciences), which provided well founded and clear picture of the data. For the qualitative part, the reflective essays were audio-recorded, transcribed verbatim and were subjected to rigorous content analysis (Creswell, 2009; Miles and Huberman, 1994). Data analysis was an ongoing and iterative process. The process involved exploring the properties of codes and themes, identifying relationships between codes and themes, uncovering patterns, and testing inferences related to reflection. The coding of the reflective essays showed evidence that the participants made a connection between the conceptual knowledge and their own experiences under the aspects of the nature of the MA ELT program followed by its side effects.

To identify the degree of inter-rater reliability, two experts in the field of English Language Teaching (ELT) identified themes from the codes. It emerged that the raters achieved 85% of agreement on the general themes apart from the different verbalizations of similar concepts.

FINDINGS

In the first research question of this study, the participating students were asked questions regarding their future career plans after graduation, the reason why they chose to pursue a master's degree and why they preferred this particular program. Based on the obtained percentages, almost half of the participants (42%) chose this program for being a researcher in an academic setting as their future career plan while 34% of them stated they wanted to be English teachers in a private school.

As for their reason to have a master's degree, 56% of participants marked an academic career as a primary career choice and intellectual enrichment (46%) as the second most marked options. Career change (%10) or increase in income (%22) was not among the primary reasons for the participants.

Finally, when the participating students were asked why they preferred to join this particular program, job opportunities (%60), scholarship opportunities (%38), academicians in the program (%40) and program's reputation (%32) were among the main reasons that they marked as very important as shown in the table below:

Table 1. Future career plans after graduation

	Frequency	Valid Percent
Researcher in an Academic Setting	21	42.0
Management or Administration	3	6.0
Other Non-academic Position	2	4.0
English Teacher in a State School	7	14.0
English Teacher in a Private School	17	34.0
Total	50	100.0

Table 2. Reasons to start a master's degree study

		Frequency	Valid Percent
Primary Career Choice	No	22	44.0
	Yes	28	56.0
Required Upper Degree	No	29	58.0
	Yes	21	42.0
Personal Intellectual Enrichment	No	27	54.0
	Yes	23	46.0

Table 3. Reasons to choose the ELT master program

		Frequency	Valid Percent
Graduate Program's Reputation	Very Important	16	32.0
	Moderately Important	23	46.0
	Slightly Important	6	12.0
	Not Important	5	10.0
Job Opportunities for Graduates of This Program	Very Important	30	60.0
	Moderately Important	8	16.0
	Slightly Important	6	12.0
	Not Important	6	12.0
Academicians in the Program	Very Important	20	40.0
	Moderately Important	11	22.0
	Slightly Important	11	22.0
	Not Important	8	16.0

THE PERCEPTIONS ABOUT THE NATURE OF THE PROGRAM

In an attempt to answer the second research question and its sub-questions, data were gathered through questionnaires and reflective essays. The following part reports the results related to the nature of the program referring to the content, instruction, resources, and outcomes.

To begin with, to evaluate the content of the program, the findings of the questionnaire reported in Table 4 below revealed that the majority of the students (86%) agreed the courses offered within the program follow a logical sequencing. Nearly all of them (90%) stated that the program is up to date. Besides, most of the participants thought that the program allocates sufficient time for each course (%70), gives adequate training in recent trends about teaching English and for the needs of the local context (%78) and provides a variety of master's level course and program offerings (%70).

One of the most remarkable points for content evaluation part was that all of the MA students (100%) shared the same viewpoint that the program teaches how to conduct a small scale action research and adding that the program provides them with adequate guidance to improve research skills (86%).

Furthermore, almost all of the participants (90%) affirmed that the program gives adequate training in teaching language skills and it encourages reflecting on past experiences as a language learner (%92). Majority of them also agreed that the program is relevant to their needs (%82), teaches how to teach English (%72) and avoids overlapping information between different courses (%82).

On the contrary the only two points that almost half of the participants disagreeing with were about the program not providing adequate guidance to improve classroom management (42%) and testing skills (44%). A possible reason behind these two findings might be that the program does not have any specific courses related to classroom management or testing which should be taken into consideration.

Parallel to the questionnaire results, the qualitative analysis of the reflective essays given to the students, instructors and program coordinator showed that the content was one of the strongest aspects of the program. Specifically, they highlighted the importance of doing small scale research (action research) and the improvement of students' research skills as shown in the following excerpts:

… As most of the courses had a final research project, I learned about related topics and improved my research skills and got ready to write my thesis (Student, Reflective essay data, 5th Oct. 2014).

… I like the way our program handles both on theory and practice by helping students learn different topics as well as improve their research skills by engaging them in small scale research (Instructor, Reflective essay data, 5th Oct. 2014).

… The students should be able to conduct a small scale research (action research), combine theory with practices and become good researchers (Program Coordinator, Reflective essay data, 5th Oct. 2014).

Another important issue raised about the content of the program was that the number of the elective courses such as, testing, and classroom management to provide students with more variety. The following comments support this issue:

… I think program content is quite satisfactory. However, courses based more on practice such as "Classroom Management" could have been added to the program as electives (Student, Reflective essay data, 5th Oct. 2014).

Table 4. Content

		Frequency	Valid Percent
a. The courses offered within the program follow a logical sequencing.	Strongly Agree	14	28.0
	Agree	29	58.0
	Disagree	6	12.0
	Strongly Disagree	1	2.0
b. The program is up-to-date.	Strongly Agree	16	32.0
	Agree	29	58.0
	Disagree	4	8.0
	Strongly Disagree	1	2.0
c. The program gives me adequate training in teaching language skills (reading, listening, writing, speaking).	Strongly Agree	18	36.0
	Agree	27	54.0
	Disagree	5	10.0
d. The program is relevant to my needs.	Strongly Agree	13	26.0
	Agree	28	56.0
	Disagree	9	18.0
e. The program encourages me to reflect on my past experiences as a language learner.	Strongly Agree	22	44.0
	Agree	24	48.0
	Disagree	4	8.0
f. The program teaches me how to conduct a small scale research.	Strongly Agree	25	50.0
	Agree	25	50.0
g. The program provides adequate guidance to improve classroom management skills.	Strongly Agree	11	22.0
	Agree	15	30.0
	Disagree	21	42.0
	Strongly Disagree	3	6.0
h. The program provides adequate guidance to improve research skills.	Strongly Agree	19	38.0
	Agree	24	48.0
	Disagree	7	14.0
i. The program provides adequate guidance to improve testing skills.	Strongly Agree	6	12.0
	Agree	14	28.0
	Disagree	22	44.0
	Strongly Disagree	8	16.0

… I believe that compulsory courses have been identified very well, to the point. There may be variety in terms of elective courses such as testing and classroom management. (Instructor, Reflective essay data, 5th Oct. 2014).

… I think that more elective courses as testing are needed to be added to the program. Shortly, the students should be provided with more variety (Program Coordinator, Reflective essay data, 5th Oct. 2014).

Furthermore, for the instruction component of the program, there were five outstanding points that the participating students (90%) agreed on namely, the program promotes flexibility in using different teaching practices for different situations, the program equips with the necessary instructional technologies and other resources, the program encourages reflective teaching, it promotes intellectual development and the students receive valuable feedback from instructors (see Table 5: Instruction).

Furthermore, the other two essences became evident in data analysis and the MA students mostly (82%) agreed on that quality of instruction was satisfactory and the program had a good balance between

Table 5. Instruction

		Frequency	Valid Percent
a. Quality of instruction in my courses is satisfactory.	Strongly Agree	12	24.0
	Agree	29	58.0
	Disagree	9	18.0
b. The program has good linkage between theory and practice.	Strongly Agree	12	24.0
	Agree	29	58.0
	Disagree	8	16.0
	Strongly Disagree	1	2.0
c. Teaching methods used in graduate courses (e.g., lectures, seminars, audiovisual aids) are well-tailored for our needs.	Strongly Agree	13	26.0
	Agree	22	44.0
	Disagree	14	28.0
	Strongly Disagree	1	2.0
d. The program balances teacher-centered and student-centered learning.	Strongly Agree	15	30.0
	Agree	26	52.0
	Disagree	8	16.0
	Strongly Disagree	1	2.0
e. The program equips with the necessary instructional technologies and other resources.	Strongly Agree	14	28.0
	Agree	30	60.0
	Disagree	5	10.0
	Strongly Disagree	1	2.0
f. The program encourages reflective teaching.	Strongly Agree	15	30.0
	Agree	30	60.0
	Disagree	4	8.0
	Strongly Disagree	1	2.0
g. The program promotes intellectual development.	Strongly Agree	21	42.0
	Agree	24	48.0
	Disagree	5	10.0
h. I receive valuable feedback from my professors.	Strongly Agree	22	44.0
	Agree	23	46.0
	Disagree	4	8.0
	Strongly Disagree	1	2.0

theory and practice which helped students with their professional development. Likewise, in the reflective papers, similar findings were gathered as shown in the comments below:

… The program, comprised of solid theoretical framework supplemented with practical guidelines, has reflected fruitfully on my professional development along with compulsory and elective courses (Student, Reflective essay data, 5th Oct. 2014).

… In the program, I try to make a balance between theory and practice. I realize that the acquisition of knowledge depends on practice. I, therefore, want my students to be able to analyze, compare, contrast and discuss various materials (Instructor, Reflective essay data, 5th Oct. 2014).

… The instruction focuses both on theory and practice. The balance between the two is highly emphasized to aid with the professional development of the students (Program Coordinator, Reflective essay data, 5th Oct. 2014).

Moreover, as for the adequacy of the resources in the program, most of the students (80%) agreed that the program had sufficient resources in terms of computer and internet support, university library holdings and any other equipment necessary for teaching.

Similar findings were found from the reflective papers written by the students, instructors and program coordinator as displayed in the excerpts below:

… The library resources are sufficient and easy to reach. The possibility to connect to the library database at any place is a good chance (Student, Reflective essay data, 5th Oct. 2014).

… It is easy to access technology on campus, which is quite important to reach recent resources. Also, the course books were helpful and good resources to support knowledge (Instructor, Reflective essay data, 5th Oct. 2014).

Table 6. Resources

		Frequency	Valid Percent
a. The institution offers sufficient computer and Internet support.	Strongly Agree	12	24.0
	Agree	26	52.0
	Disagree	11	22.0
	Strongly Disagree	1	2.0
b. University library holdings are relevant to the field.	Strongly Agree	9	18.0
	Agree	31	62.0
	Disagree	10	20.0
c. Specialized facilities, such as laboratories or studios, and equipment needed for teaching are satisfactory.	Strongly Agree	9	18.0
	Agree	31	62.0
	Disagree	9	18.0
	Strongly Disagree	1	2.0

… The resources in the program are up to date and easily accessible. They provide sufficient guidance for the students to follow their courses and do small-scale research as well (Program Coordinator, Reflective essay data, 5th Oct. 2014).

Finally, according to the questionnaire results, the program had up-and-coming outcomes. Specifically, 94% of the participants agreed that what they had learned in the program would be valuable for their future, that the program increases power of self-evaluation (%92), and by the end of the program they felt that they would be able to carry out research on their own and/or continue to do PhD studies at any ELT-related program both in Turkey and abroad (%92).

Likewise, % 84 of the participants also acknowledged that they felt competent enough to teach effectively, they had developed the knowledge and necessary skills required for their chosen career (%88), and they were satisfied with the quality of their learning experiences in this institution (%82) as shown in the following table.

In a similar fashion, the analysis of the reflective essays matched up with the quantitative data. In other words, the students, course instructors and program coordinator stated that the program outcomes were satisfactory in terms of the professional development of the students who gained a repertoire of teaching strategies, became autonomous and more critical and reflective practitioners and researchers as seen in their comments below:

… I developed a repertoire of teaching strategies and became a more critical and reflective researcher thanks to the assigned practical application projects and exercises (Student, Reflective essay data, 5th Oct. 2014).

Table 7. Expected Outcomes

		Frequency	Valid Percent
a. What I have learned in this program will be valuable for my future.	Strongly Agree	25	50.0
	Agree	22	44.0
	Disagree	3	6.0
b. The program increases my power of self-evaluation.	Strongly Agree	28	56.0
	Agree	18	36.0
	Disagree	3	6.0
	Strongly Disagree	1	2.0
c. By the end of this program, I feel competent enough to teach effectively.	Strongly Agree	22	44.0
	Agree	20	40.0
	Disagree	7	14.0
	Strongly Disagree	1	2.0
d. By the end of this program, I feel that I will be able to carry out research in my field on my own, and/or continue to do my PhD studies at any ELT-related program both in Turkey and abroad.	Strongly Agree	27	54.0
	Agree	19	38.0
	Disagree	3	6.0
	Strongly Disagree	1	2.0

… Program outcomes are very satisfactory in terms of professional development and gaining a scientific perspective. The students learned how to become more autonomous, critical and reflective practitioners and researchers (Instructor, Reflective essay data, 5th Oct. 2014).

… Outcomes of the program are closely linked to aims and objectives. The program has definitely some real life consequences such as professional development or academic career. A student who completes all their responsibilities and has autonomy can be a very good researcher in the field (Program Coordinator, Reflective essay data, 5th Oct. 2014).

The Side Effects of the Program

Apart from the nature of the MA program, the participating groups were asked about their opinions about the side effects (strengths and weaknesses) of the program. After the content analysis of the reflective essays, the findings showed that the program had outstanding strengths related to the quality of instructors, content, and professional development. However, few aspects such as lack of variety in elective courses and more balance of course load should be improved. The excerpts from reflective papers support these issues:

… The program content and experienced instructors enabled me to develop professionally by understanding learners better, and it also guided me to evaluate myself as a teacher and my students effectively (Student, Reflective essay data, 5th Oct. 2014).

… Aligned with the program's outcomes, preparing needs analysis questionnaires, interacting with the other teachers and devising solutions to problems enhanced my skill of problem solving, critical thinking, as well as time management and researching (Student, Reflective essay data, 5th Oct. 2014).

… I think that there should be more balance between the course loads to ensure fairness among the courses. We also need more elective courses in the program so that we can be given a variety to choose from based on our interest (Student, Reflective essay data, 5th Oct. 2014).

Besides, the instructors' and program coordinator's comments corresponded to the students' opinions regarding the strengths and weaknesses of the program. The following examples from reflective papers prove it:

… One of the strengths of our program is its content being flexible in terms of courses, and means of instruction. On the contrary, a program weaknesses is not being able to offer different elective courses (Instructor, Reflective essay data, 5th Oct. 2014).

… I think I can list the strengths as program/courses, academic staff, and tendency to maintain a certain level of quality. To me, maybe one weakness is related to course load which requires clear balance. (Instructor, Reflective essay data, 5th Oct. 2014).

… The biggest strength of the program is the well qualified and supportive instructors. However, the weakness that should be addressed is the number of elective courses and balance between course load (Program Coordinator, Reflective essay data, 5th Oct. 2014).

SOLUTIONS AND RECCOMENDATIONS

The aim of this chapter was to evaluate ELT MA program offered in a foundation (non-profit private) university in Istanbul, Turkey to find out side effects, show how far the program reaches its aims and objectives, and draw implications for betterment of it.

To begin with, the findings obtained from the questionnaire revealed that most of the candidates wanted to carry out a master's degree to further their studies in academic settings as a researcher. The percentage of those who wanted to be an English teacher in a private school was also remarkably high, showing that they wanted to improve their knowledge and skills in language teaching in practice.

Other important finding was about participants' reason to have a master degree in the first place. The most important factor was to pursue an academic career as a primary career choice. The second most important determinant was intellectual enrichment the participants expected to get after graduation which showed that even if not in academic settings, they were open to new ideas and innovations as well as tried to keep pace with ever-growing knowledge in the field. These findings were quite parallel to the findings of a previous study by Kırmızı (2011) which argues that the students want to improve themselves intellectually besides continuing a further academic study, while deciding to start a master program.

Finally, the most important factor which led students to prefer this particular program was found to be the anticipated job opportunities after having graduated followed by the academicians in the program, scholarship opportunities and program's reputation.

In brief, it is possible to conclude that students see the MA program both as a primary step for further academic studies and a requirement for better job opportunities while considering it a way of personal enrichment and improvement. When it comes to determinants for them to choose this program, job opportunities and what is offered in the program like quality of academicians and scholarships are upmost importance.

Furthermore, apart from the students, program instructors and coordinator were asked to share their perceptions about the nature of the program specifically in terms of content, instruction, resources and outcomes.

The results obtained from questionnaires and reflective essays demonstrated that the content of the program was perceived to be quite efficient as it highlighted the importance of conducting small scale research, providing training in teaching language, encouraging reflection and supplying field specific knowledge. On the other hand, the range of the elective courses such as classroom management and testing has to be expended to meet the needs of the students in these two aspects.

Furthermore, for program instruction the highest points were merited to three items: the program encourages reflective teaching, instructors give valuable feedback, and the program promotes intellectual development. The findings showed that the program met the students' expectations and needs in terms of intellectual development. The participants also highly valued regular feedback they received from instructors on their assignments and expressed their positive perceptions towards a good rapport and supportive atmosphere in the program.

As for the program resources, it was inquired whether the computer and internet support, library holdings and other equipment were satisfactory for the students' needs. Both students and instructors were quite satisfied with resources provided, especially the internet access all over the campus and the library holdings which were up to date and the fact that they could reach them online whenever and wherever they need.

On the other hand, the findings on the expected outcomes revealed that the students, course instructors and program coordinator were quite satisfied and hopeful about the future educational attainments. Majority of the participants agreed that what they had learned in the program would be valuable for their future, that the program increases power of self-evaluation, and by the end of the program they felt that they would be able to carry out research on their own and/or continue to do PhD studies. As their needs are met in general, the participants were pleasant about their learning experiences and felt competent to apply what they learner in their classrooms. Besides, the course instructors agreed that the program brings in scientific perspective with a focus on research and contributes to personal development of the students resulting in real life consequences. These findings are consistent with Mede (2012)'s argument which asserts that program characteristics and instructional setting as well as students' needs and preferences should be taken into account in a program evaluation study. They also support Kirmizi's (2011) study which comparatively evaluates ELT MA programs in Turkish EFL context and claims that the participants think content is relevant to their needs and there is a good balance between theory and practice.

Finally, the last research question of the study addressed the side effects of the program to identify the strongest and weakest aspects of it. The findings based on the analysis of reflective essays indicated that the most important strength of the program was the quality of instructors. Majority of the student participants repeatedly stated that the instructors in the program were very supportive and understanding as well as being very competent and experienced in the field. This shows that the course instructors play a crucial role because they determine the quality of education in essence. And being the ones supplying the fundamental input for students and guiding their learning process, basically they shape the nature of the program. Therefore, having determined and diligent instructors, the program seems to have a strong basis. This finding quite overlaps with the results of a previous study (Dollar et.al, 2014), which indicates the instructors in the program are highly qualified and accessible.

Other outstanding strengths of the program were content and focus on students'' professional development. As for the content, research and teaching skills included in the curriculum met students' needs as they had chance to apply what they learned to the real life teaching practices. The program provides both theoretically and practically satisfactory input for students to teach effectively. Professional development as a strong aspect in this program is very important; because as discussed with the previous findings, intellectual enrichment is one of the most significant determinants for students and being enrolled in this program meets expectations.

As for the weak aspects of the program, number of elective courses and inequality among course loads came first. In this master's program, it is without doubt that there are practitioners who work with different level students and their needs differ accordingly. Their interests and the subjects they want to study also change. Therefore, they want to choose different elective courses to improve themselves in the aspects they want to or need to. For instance, some of them want to have Classroom Management course, while others strongly state that they would like to have a course about testing. For this reason, the courses offered in the program should be diversified and if there is any need more faculty members should be employed. Inequality between course loads is a weakness that can be improved with more collaboration between instructors. It is for sure that every instructor has different teaching philosophies

and uses different methods, prefers different types of assignments; however, for the fairness on the side of students, the course loads should be balanced. These findings confirm the argument of Wallace (1991) and Brown (1995) with which both claim program evaluation is necessary to find out the essential and required steps to be taken for improvement of the program and for creating a guideline for future programs.

In brief, as argued by most researchers, all programs should go through a systematic evaluation to keep up with the changes and innovations, besides reaching its main goals such as meeting students' expectations and providing adequate quality education. It is important to know what the strong and weak points of the program are, for its betterment and improvement. That's why, the findings of this study are significant and crucial for effectiveness of the program itself and it also aims to serve as a model study for other master programs' evaluation.

FUTURE RESEARCH DIRECTIONS

This study has several recommendations for further research. First of all, systematic evaluation is important in all programs. The present study was able to detect the side effects of the program confirming the need and urgency of systematic evaluation studies in local contexts, too. Therefore, this study should not remain as a one-shot evaluation study, but should be followed by similar evaluation steps after the suggested changes done to see whether or not it works properly. Moreover, this process should have proactive measures to determine probable shortcomings and improve strong sides.

Second, participants of the study were the MA students, course instructors, the program coordinator and the researcher, herself who were all actively involved in the existing program. This shows that the program was mainly evaluated from the insider perspective. Future research should also include an external evaluator(s) which would increase the credibility of the study.

As the existing MA program has been running for four years, future research should be conducted in the very same program with more participants, as the number of students and graduates would increase as well as their needs and expectations may vary and reach a wider range.

Furthermore, this study was conducted in Turkey as the local context to be able to evaluate an ELT master program to provide suggestions for its improvement. However, the results may also be relevant to similar programs in Turkey and abroad as it follows fundamental evaluation processes with sound theoretical grounds.

Finally, as this study was conducted in a local and specific context, future research can be conducted to compare and contrast different programs within or out of Turkey which may help to draw implications for the improvement of graduate programs.

CONCLUSION

The results of this chapter aimed to highlight that systematic evaluation has very beneficial gains to see how effective the program is by exploring the strengths and weakness. This research focused on a very specific and local program to find out its effectiveness in terms of content, instruction, resources, expected outcomes and the side effects of the program from the perspectives of students, course instructors as well as program coordinator. With the obtained findings, this study identifies certain aspects of the program that are satisfactory or should be improved and provides sound basis for designing an effective program evaluation in language teaching master programs.

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KEY TERMS AND DEFINITIONS

Curriculum: "The learning experiences and intended outcomes formulated through systematic reconstruction of knowledge and experience, under the auspices of the school, for the learners' continuous willful growth in personal-social competence" (Tanner & Taner, 1980, p. 102).

Evaluation: "Systematic assessment of an object's merit, worth, probity, feasibility, safety, significance, and/or equity" (Stufflebeam & Shinkfield, 2007, p. 13).

Master's Degree (MA): "A degree that is given to a student by a college or university usually after one or two years of additional study following a bachelor's degree" (Merriam-Webster Dictionary).

MA ELT Program: Master's degree program which provides students with a solid foundation in the English language, methodology, educational sciences, research and linguistics in order to make them fully qualified teachers of English, taking into consideration the latest developments in the field.

Program Evaluation: Collection of methods, skills, and sensitivities necessary to determine whether a human service is needed and likely to be used, whether it is sufficiently intense to meet the need identified, whether the service is offered as planned, and whether the human service actually does help people in need without undesired side effects (Posavac & Carey, 1989, p. 3).

Chapter 35
Professional Development to Develop Elementary School Teachers' Assessment Practices in Mathematics

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ABSTRACT

The climate of high-stakes tests has greatly influenced the way mathematics is taught in schools in the United States. In this study the author shares the findings of a professional development project focused on cognitively-demanding mathematical tasks and performance tasks that can be used for both instruction and assessment. Through an inductive analysis of open-ended surveys, the professional development increased teachers' awareness and use of cognitively-demanding mathematical tasks that align to their standards. However, many teachers reported their beliefs that assessments should be multiple choice and reflect the format of their high-stakes state-wide end-of-year assessment. Implications for professional development related to assessment in mathematics education are also shared.

DEVELOPING TEACHERS' KNOWLEDGE AND SKILLS RELATED TO ASSESSMENT

A Call for More Effective Assessment

"[The] Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning." (NCTM 2014, p. 53)

In the Common Core State Standards for Mathematics (CCSS-M; Common Core State Standards Initiative 2011) and other rigorous mathematics state standards both in the United States and internationally, students are expected to demonstrate a balance of procedural and conceptual understanding while solving rigorous mathematical tasks. The opening quote from the NCTM *Principles to Action* (NCTM

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2014) and the requirement of rigorous mathematics standards requires teachers to be effective at various aspects of assessment, including posing cognitively-demanding tasks, in-the-moment assessments of students' understanding, examining student work, and selecting or creating differentiated follow-up tasks. These teacher practices are challenging to carry out consistently on a daily basis.

As a result, there is a need to carefully think about how to best support teachers to use some of these aspects of assessment. This chapter provides an overview of teachers' knowledge and skills related to assessment in mathematics and shares data from a study about Grade 5 and 6 teachers' use of assessment through a professional development project.

Research on Mathematics Assessment

A large-scale meta-analysis of thousands of research studies on student achievement found that teachers' use of formative assessment was one of the most impactful teacher practices associated with gains in achievement (Hattie, 2009). Specifically, in mathematics, the process of looking at formative data collected during instruction and using that information to differentiate and modify instruction has been associated with gains in students' understanding (Wiliam, 2007). Further, processes associated with formative assessment were linked to gains in students' mathematics achievement for students who were performing below grade level (Black & Wiliam, 2010; Polly, 2014). By formative assessment, I mean ongoing assessment that occurs naturally during the school day to check students' understanding and progress.

Teachers often view assessment though, as a barrier to teaching, and do not see assessment as part of the teaching and learning processes, therefore seeing it as an add-on or additional duty in their day. Research studies have found this to be especially true with large-stakes end-of-year tests that are typically implemented at the state level in the United States. In one study Plank and Condliffe (2013) noted that in the period immediately before large-scale assessments teachers who had been using student-centered pedagogies all year long modified their instruction and used teacher-centered pedagogies and direct instruction as the tests approached. Further, Polly (2014) found that the types of mathematical tasks posed by the teacher decreased in cognitive demand and became more focused on basic skills as tests approached. Prior studies have also noticed that teachers decrease the rigor of mathematical tasks and focus primarily on basic mathematical skills when students are struggling or in high stakes environment where pressure to perform on tests is high (McGee, Polly, & Wang, 2013). In most cases teachers claim that they feel pressure from their school administrators to focus on having their students perform well on these tests (McGee et al., 2013).

There is a need for research examining how to best prepare mathematics teachers to effectively assess their students while also maintaining a culture of rigorous tasks focused on conceptual understanding and mathematical reasoning. This chapter examined the broad question, "How did the professional development support teachers' development and application of skills related to mathematics assessment?" Based on the literature, this study focused on the use of cognitively-demanding mathematical tasks, in-the-moment assessment of student understanding, examining students' written work, and selecting or creating follow-up, differentiated tasks. Specifically, this study examined, "What was the influence of professional development focused on mathematical tasks and assessment in mathematics?"

METHODS

Context

This study includes 24 teacher-participants who worked at one of two intermediate schools (Grades 4-6) in the district. The district had end-of-year test scores that were about the state average. All teachers teach in classrooms that have 1-to-1 technology, where each student has access to a laptop computer, and teachers are encouraged to use the technology throughout the entire school day. Prior to the professional development, students were using a variety of internet-based technologies independently in class for practice and assessments. This series of workshops occurred over 12 hours, 6 hours in the summer followed by 3 2-hour meetings during an entire school year. District leaders and administrators had asked for the focus of the workshops to be general and focus on effective teaching strategies for the Common Core State Standards. However, based on teachers' questions and requests, a majority of the workshops focused on posing and creating mathematical tasks and the role of assessment in their mathematics classrooms.

Data Sources and Data Analysis

Primary data sources were the open-ended surveys completed by the teacher-participants. Secondary data sources included professional development materials as well as the author's notes recorded immediately after each of the professional development sessions.

The data was thematically coded using inductive qualitative analysis techniques (Coffey & Atkinson, 1996). Data segments were organized into their own row of a spreadsheet and were then labeled by a code that represented that data segment. Examples of codes included, "mathematical tasks" and "examining student work." Data segments that shared codes were then examined together to look for similarities and differences within codes. Codes with similarities were analyzed in order to generate themes. These themes were verified by revisiting the raw data source.

DESCRIPTION OF PROFESSIONAL DEVELOPMENT ACTIVITIES AND FINDINGS

Selecting and Designing Mathematical Tasks

The NCTM Principles to Action (NCTM 2014) emphasize the importance of teachers posing cognitively-demanding mathematical tasks in order to allow students opportunities to develop understanding of concepts and engage in mathematical practices that include both conceptual and procedural understanding. The seminal framework of mathematical tasks from Stein and Silver (1988) is cited extensively in Principles to Action and is fundamental to the work that I describe in this chapter (Table 1). After all, teachers' assessment of students' mathematical understanding is most effective when it comes from high-level mathematical tasks that allow students to determine their solution path and make mathematical connections between concepts and procedures.

Table 1. Levels of mathematical tasks

Level of Demand	Type of Task	Description	Grade One Example	Grade Four Example
Low Cognitive Demand	Memorization	Tasks focused on the recall of previously learned facts, rules, or formulas with no connection to concepts or underlying meaning.	What is 4 plus 5?	What is 7 times 6?
	Procedures without Mathematical Connections	Algorithmic tasks focused on using a specific procedure in order to find the correct answer. There is no connection to underlying meaning.	Find the difference between 37 and 18.	Find the product of 37 and 26.
High Cognitive Demand	Procedures with Mathematical Connections	Tasks that use procedures to develop deeper levels of understanding of mathematical concepts. Tasks are usually represented in multiple ways with connections made between representations.	There are 37 children on the playground. Then 18 leave and line up. How many are left on the playground? Solve the problem using two different strategies.	There are 37 boxes of pencils on the table. If each box has 26 pencils how many pencils are there? Solve the problem using two different strategies. Explain how your strategies are similar and how they are different.
	Doing Mathematics	Tasks requiring complex thinking to apply the understanding of mathematical concepts in choosing a strategy, exploring the task, and making sense of their answer.	There are 37 children on the playground. Some are boys and some are girls. If there are between 19 and 29 boys how many girls could there be? Find at least 4 possible answers. Write number sentences for each of your answers.	There are 26 pencils in each box. There are between 35 and 40 boxes in the cabinet. What are the possible numbers of pencils there could be? If the school needs at least 975 pencils how many boxes of pencils will they need? Write a sentence to explain how you know that you are correct.

(Smith & Stein, 1998)

Tasks during Professional Development

During the workshops teachers participated as learners and explored a variety of tasks that aligned with Doing Mathematics or Procedures with Mathematical Connections task categories. Some tasks were multi-part performance tasks written by the Smarter Balance Assessment Consortium. Appendix A shows Part C of the five part Storage Unit task. In Parts one and two, learners draw an aerial view of a storage unit divided into rectangular units and complete a table that relates the price of a storage unit to the volume of the unit. In Part 3 learners have to adjust the price based on the conditions given in Appendix A. Part 4 involves calculating costs and profit and Part 5 requires learners to write multiple paragraphs about the mathematical concepts and choices made during the design of the storage unit.

By solving tasks as learners, teachers deepened their understanding of mathematics concepts and had conversations about assessment based on the following prompts:

1. As your students were working on this task what would you be looking for?
2. What are some aspects of this task in which you might bring the class together to check students' understanding through discussion?
3. What would it look like for students to demonstrate their understanding of the math concepts in this task?

Teachers worked on these tasks and had conversations with their colleagues in groups during workshops.

Findings Related to Tasks

Teachers reported on the surveys that they felt overwhelmed by some of the tasks and the idea that these were expected to be done successfully by the students that they taught. Many expressed frustrations that many of their students lacked the fundamental skills of operations with whole numbers to even begin to work on some of these tasks that aligned to their grade level. One teacher reported, "I feel like these tasks may be possible at the end of the unit after students have mastered the basic skills needed to be successful. Before that, it would be a waste of instructional time."

In line with the NCTM Principles to Action (2014), time in workshops was spent thinking about ways to scaffold the tasks and help students explore them without decreasing the level of rigor in the task themselves and without waiting for students to master basic skills. Some teachers reported their belief that these performance tasks could be used for both instruction and assessment purposes during a unit. One teacher wrote:

I see a benefit in giving these types of tasks in the middle of a unit to allow students to explore the mathematics concepts that we are focusing on. These will let me see what students understand and what they don't without waiting for a unit test later.

Another teacher wrote:

These tasks are interesting and engaging. Students have liked the ones I have taken from these workshops and gave them. They are very hard, but I have students work in groups and ask a lot of questions to help them work through the tasks.

The mathematical tasks created an overwhelming feeling to some teachers, while others reported a benefit in spending time on the tasks.

Ongoing Assessment of Students' Understanding

Ongoing Assessment during Workshops

During the workshops teachers spent time sharing what they do as their students are working. Answers ranged widely from working with a small group of students while the rest worked independently, circulated around the class to help students, or sat at a table where students came to get their work checked. Through the question of, "How can you better know whether or not students are making sense of mathematics when they are working?" teachers determined the need to have a more structured or systematic way of assessing students' understanding while they teach. Some teachers created checklists that they took back to their classroom to use during their teaching (Table 2), while others reported that they would be more cognizant of in-the-moment assessment in their classroom.

Table 2. Example of a checklist teachers used during observations. For each instance observed put a + for acceptable, or a – for developing.

Student's Name	On Task	Working with Peers	Showing Work	Logical Strategy	Correct Answer	Explains Thinking	Comments
Juan	+	+	+	+	+	-	Needs more practice with oral explanations
Tavion	+	-	+	+	-	-	Struggled getting along with group, worked hard alone
Marcus	+	+	+	+	+	+	Excellent work

Findings Related to Ongoing Assessment

On the surveys teachers reported that they returned to their schools and discussed with their colleagues systems and processes to collect ongoing assessment data about their students. However, only three teachers reported using ongoing assessment practices in their classroom on a consistent basis. One of the struggles that teachers reported that they had to work through was finding time to attend to students' thinking during discussions and observe students work when they need to help and assist students. A teacher wrote, "My students need so much help during math class that I don't really have time to collect data on how they are doing."

Other teachers reported that their focus this year was on using tasks to assess students and that ongoing assessment might be something to focus on next year. A teacher wrote, "It is hard to focus on everything. I am posing better tasks than before so I am going to focus on ongoing assessment next year maybe."

While ongoing assessment was a focus of the workshops teachers did not report using these practices when they returned to their own classroom. The need to help struggling students and the focus on other aspects of mathematics teaching were given as reasons why these practices were not implemented.

Examining Students' Written Work

Examining Written Work during Workshops

The examination of students' written work was a focus that teachers had the strongest philosophical approaches about, and perhaps was the area that saw the largest shift in terms of opinions over the course of the workshop. The heavy focus on grading work and the end of year high-stakes state assessment had led many teachers to a grading system where an answer was either correct or incorrect which meant that assessment was viewed plainly as the number of questions correct compared to the number of total questions, and broad strategies to reteach the concepts to increase the number of questions that students can answer correctly. This idea was supported by the internet-based programs that students used on a daily basis, where during independent time students would spend 15 to 30 minutes of class on these programs answering questions in a program that monitored and reported their progress throughout the year. Teachers used these programs as a way to collect grades and check students' performance on concepts that they had not mastered from previous grade levels as well as concepts they had worked with earlier in the year.

Through exploring tasks as learners and discussing those tasks in light of their students, teachers discussed the question, "What would it look like for students to demonstrate their understanding of the math concepts in this task?" time was spent during the workshops thinking about the aspects of mathematics understanding in general that teachers desire to see their students show. This list included:

1. Choosing and carrying out an appropriate strategy to solving a task,
2. Doing all (or most) computations accurately using an appropriate process,
3. Finding the correct answer,
4. Clearly and accurately explaining how they solved the problem, and
5. Making connections and generalizations between mathematical concepts.

As a result of this conversation, teachers then were asked to consider what it would look like to grade these various aspects rather than only grading the correct answer. Teachers initially pushed back citing that the end of year tests only award correct answers and the process, and that they were concerned about overinflating grades by awarding partial credit. During the workshops, teachers worked in groups to create a rubric for a task they were going to pose to their students. Table 3 shows an example of a rubric that was created.

Findings Related to Examining Written Work

Teachers reported that creating rubrics was time consuming, but that they believed using this approach to assess students' written work on tasks would make evaluating students' understanding more consistent.

Table 3. Example of task and rubric developed by grade 6 teachers Task: You have 5 and 1/3 cups of sugar. If you need 2/3 of a cup of sugar to make a dozen cookies how many cookies can you make? Write an equation that matches the situation. Solve the task two different ways. Write an explanation about how you know that you found the correct answer.

	Does not Meet Benchmark	Partially Meets Benchmark	Meets Benchmark	Points
Logical strategies	Student doesn't solve the task in 1 logical way (1 pt.).	Student solves the task in 1 different way that is logical (2 pts.).	Student solves the task in 2 different ways that are logical (3 pts.).	
Correct computation	More than 2 computations are incorrect (0 pts.).	All but 1 or 2 computations are correct (1 pt.).	All computations are correct (2 pts.).	
Correct answer	The final answer to the task is incorrect (1 pt.).		The final answer to the task is correct (3 pts.).	
Shows work	Work is either not shown or is unclear for 2 more steps of the task (0 pts.).	Work that is shown is clear for all but 1 step of the task (1 pt.).	Work that is shown is clear for each step of the task (2 pts.).	
Clear and accurate explanation	The written explanation includes little clarity or accuracy for an explanation about how the student arrived at the correct answer (0 pts.).	The written explanation somewhat clearly and accurately explains how the student arrived at the correct answer (1 pt.).	The written explanation clearly and accurately explains how the student arrived at the correct answer (2 pts.).	

One teacher wrote, "It was beneficially to see and create an example of a rubric to evaluate students' written work on tasks and multi-step problems. It just isn't realistic to do this in my classroom with everything else going on."

One teacher reported:

I did use a rubric on a project that I had my students do at the end of our ratio and proportion unit. I gave it to students before they started working on the project and I had them check it to make sure they had all of the parts that they needed.

Several teachers (18 of 24, 75%) reported comments that were consistent with statements in workshops about how they struggled with the idea that partial credit and rubrics should be used since it is in conflict with the end-of-grade test format. One teacher wrote, "We do not give partial credit on the end of year test so it does not make sense to give it during the year on big assessments."

Another teacher said, "I get worried that partial credit could lead to inflated grades that are higher than students' actual performance. That is why I don't give partial credit to my students."

The examination of written work and use of rubrics was an area where teachers did not demonstrate much change during the series of workshops. Teachers' sentiments focused on the format of the end of year test.

Selecting or Creating Differentiated, Follow-up Tasks

Differentiated Tasks during Workshops

The last aspect of assessment that was included in the workshops was the process of selecting or creating differentiated, follow-up tasks for students based on the data that teachers had collected either formally on written or internet-based work or informally during discussions or observing their students. For the teachers in this workshop the internet-based programs provided one aspect of differentiated instruction since the tasks and concepts were influenced by students' performance on previous activities. Teachers, however, were not planning or using differentiated activities during other aspects of their mathematics class.

During workshops teachers solved tasks as learners and used multiple strategies, which provided a shared experience for teachers to discuss ways to solve tasks using concrete objects such as pattern blocks, representations such as pictures or number lines, or more abstract equations. As tasks were discussed, teachers shared which approaches their students were most likely to have success with (pictorial representations) and the notion that students in their grades tend to dislike using concrete manipulatives since they think that manipulatives are for younger students.

In addition to discussing tools or strategies to use to differentiate tasks, teachers spent a lot of time during the workshop considering how the size of numbers influences the difficulty of tasks. For example, in the Common Core State Standards, which are taught in the teachers' state, Grade 5 students are expected to divide a non-zero whole number by a unit fraction, which are fractions less than 1 with a 1 in the numerator (5.NF.B.7). Students in Grade 5 also are expected to or divide a unit fraction by a non-zero whole number. In Grade 6, students are responsible for dividing all fractions including mixed numbers without restrictions on the size of numbers (6.NS.A.1). During workshops this example of dividing fractions was used to collaboratively work through the process of discussing how the size of

Table 4. Example of differentiating instruction for dividing fractions in Grade 6

Progression	Size of Numbers in Tasks	Example
1	Dividing a non-zero whole number by a unit fraction (from Grade 5).	5 ÷ 1/3
2	Dividing a unit fraction by a non-zero whole number (from Grade 5).	1/3 ÷ 5
3	Dividing a fraction less than one by a unit fraction with the same denominator	5/6 ÷ 1/6
4	Dividing a unit fraction by a fraction with the sane denominator	1/6 ÷ 5/6
5	Dividing a fraction less than one by another fraction less than one with the same denominator	3/4 ÷ 2/4
6	Dividing mixed numbers and fractions less than one with the same denominator	2 ¾ ÷ 3/4
7	Dividing a fraction less than one by another fraction less than one with different denominators	3/4 ÷ 2/3
8	Dividing mixed numbers and fractions less than one with the same denominator	3 2/3 ÷ 5/6

numbers in tasks might be differentiated for Grade 6 students. During the workshop teachers brainstormed all of the different possible size of numbers that could be used while exploring and then ordered them in terms of difficulty.

Table 4 shows the progression that teachers agreed upon.

Findings Related to Differentiated Tasks

All teachers reported that they had posed differentiated follow-up tasks at some point during the school year. Twenty-two of the 24 (91.67) teachers reported that they had to make easier, more simple tasks in order to meet the needs of their students when posing follow-up tasks. One teacher reported:

I posed a challenging task on one of the first days of our unit on long division. However, over half of my class needed a lot of help so instead of dividing a four-digit number by a two-digit number I posed a follow-up task where they divided a three-digit number by a two-digit number. Some students who had struggled before did much better with smaller numbers.

In some cases, teachers reported needing to create a variety of follow-up tasks. A teacher wrote:

After the first task in a lesson about multiplying fractions I had to pose a few harder tasks to 5 of my students, easier tasks to 10 of my students, and a task of similar difficulty to my other 7 students. It felt good to know I was doing my best to pose tasks that were appropriate for them and helped to deepen their mathematical understanding.

There were a large number of teachers who reported posing differentiated, follow-up tasks to their students. In each of the examples provided teachers used their observations of students' struggles or successes to determine whether to pose similar, easier, or more difficult mathematical tasks.

DISCUSSION

For teacher-leaders or mathematics leaders, the findings from this study suggest that teachers' knowledge and skills related to assessment can be developed through professional development focused on cognitively-demanding tasks, in-the-moment analysis of students' understanding, analyzing students' work, and designing differentiated follow-up tasks. This is especially promising in light of the culture that these teachers worked in due to high-stakes end-of-grade tests. Further, it extends the work of research studies that document teachers' challenges of posing cognitively-demanding tasks in testing grades (Plank & Condliffe, 2013; McGee et al., 2013).

Teachers reported an overwhelming feeling when they explored and solved multi-step performance tasks, but also said they appreciated learning more about the rigor expected in the Common Core Mathematics Standards. Teachers reported using rigorous tasks in their classrooms after workshops. Teachers' implementation of cognitively-demanding tasks and follow-up differentiated tasks could be in part due to their experience during workshops when they explored tasks as learners. Perhaps, consistent with prior studies (Polly & Hannafin, 2011) and research-based recommendations for professional development (Garet, Porter, Desimone, Briman, & Yoon, 2001; Loucks-Horsley et al., 2003), these experiences set the stage and provided the necessary shared experience for teachers to have conversations about both formative assessment used to make future instructional decisions as well as summative assessment. Further, teachers reported despite meeting with each other on a regular basis during the year in their buildings, this workshop time was needed to focus solely on the activities described in this article.

Implications

In terms of implications, follow up research studies are needed that include data from teachers such as surveys, interviews, and focus groups, as well as other sources. Data collected from classroom observations could help provide more clear pictures of assessment in classrooms in future research endeavors. Specifically, there is a need to document how a teacher in a classroom informally and formally assesses students in an ongoing manner.

For teachers, this article provides some specific ideas about how to further deepen your assessment skills. Collaborating with other teachers on this work, if possible, will only strengthen the experience of developing tools and becoming more apt to assess students' mathematical thinking. Lastly, the focus on cognitively-demanding mathematical tasks cannot be stressed enough, for if students only solve tasks with low cognitive demand they will not have the opportunities to demonstrate their understanding of mathematics concepts.

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APPENDIX

Example of Performance Task

The completed table from Part B is shown below.

The building owner determined that some of the monthly rents in Part B are not reasonable. He wants the cost for each cubic foot of volume to decrease as the volume of the storage unit increases.
In the table below, the owner decided to charge $0.12 for each cubic foot of volume in only the smallest storage unit.

- Complete the table by determining a cost for each cubic foot of volume and a corresponding monthly rent for each individual storage unit.
- Make sure the cost for each cubic foot decreases as the volume of the storage unit increases.
- Make sure the monthly rent increases as the volume of the storage unit increases.

Table 5.

Dimensions of Floor (in Feet)	Height of Storage Unit (in Feet)	Volume of Storage Unit (in Cubic Feet)	Monthly Rent
5 by 5	10	250	$30
5 by 10	10	500	$60
5 by 15	10	750	$90
10 by 10	10	1,000	$120
10 by 15	10	1,500	$180
10 by 20	10	2,000	$240
10 by 25	10	2,500	$300

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