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Student Reactions to Learning with Technologies

Perceptions and Outcomes

Kathryn Moyle & Guus Wijngaards

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Foreword

The term “student or learner centered” is fashionable in conversations and publications about schools and universities. The abundant use made of the term might lead one to believe that many, if not most, schools are student centered. While at a superficial level, it could be argued that schools are, by definition, student centered since the fundamental formal mission of any school is to educate students, it is abundantly clear that many schools that claim to be “student centered” do not actually put the student, as a person, at the center of the decision process regarding the content and process of learning. For those who believe that “student centered” should be more than a slogan, it is necessary to understand the student’s perspective on what is – or is not - done to, for, and with him or her in the school setting.

It is easy to understand why teachers and administrators give less serious consideration of the student’s perspective than we should. After all, we all were once students and we occupy space in close proximity with them. That along with the belief of some educators that the perspective of students is irrelevant since they know what is best for students’ leads to the conclusion that careful inquiry of students’ beliefs and opinions is not needed.

This book provides strong testimony on critical value of understanding students’ perspectives pertaining to their learning and this has become particularly important with regard to learning with digital media. In recent years, untested assertions and assumptions have been made about young people and their uses of technologies. The aptitudes, attitudes, expectations, and the learning styles of students who have grown up with technologies reflect the learning

environments in which they were raised. These environments are strikingly different than they were when current teachers and administrators were growing up. Computers, mobile phones, the Internet, social networking, games and other forms of digital media are a familiar part of the lives of students. Many are dependent on technologies not just to keep in touch, but as a way of developing their identities, socializing and learning what matters to them.

There are few published empirical studies that enable us to hear students’ voices on the role that digital media plays in their lives as well as their sense of how it could have more impact on their learning. This book makes a major contribution by bringing together recent research on the views and expectations of students about the use of digital media for their schoolwork. The chapters draw on data collected directly from students located in different countries, different education levels, with various software applications and devices. The diversity of topics all focused on understanding students’ points of view, make this book extremely valuable for students, teachers, and policy-makers.

We cannot make best use of the learning opportunities of digital media for our students until we can see how they see digital media in their lives. The chapters of this book make a major contribution in giving us such insight.

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Preface

STUDENT REACTIONS TO LEARNING WITH TECHNOLOGIES

Ours are the times of technology. Technologies have grown tremendously and have permeated all areas of our lives. The educational sector however, is somewhat lagging behind other sectors, and seems to limit technology use. Yet many researchers are convinced of the vital role that technologies can play in learning and teaching. The purposes, theories and ways in which learning with technologies can be conceptualized and operationalized is generating an increasing body of literature, but there is still a lot to be examined. With the arrival of Web 2.0 and the Semantic Web for instance, not enough is known about the ways in which these online technologies interact, and may interact, with students' formal and informal learning. Anytime, anywhere delivery of content and the opportunities for pedagogical interaction seem to be powerful options with mobile devices. But there are gaps in our knowledge. Furthermore there is little published research about listening to students' views about learning with technologies. This book contributes to rectifying this omission by bringing together some recent research findings about the views and expectations of students when including technologies in their studies. Throughout this book the phrase "student voice" is used to refer to research studies in which the views of students, irrespective of their age, form the primary data for the research being reported.

LISTENING TO STUDENTS' VOICES

The reader of this book will find different types of contributions: some of them more reflective, bringing together a range of student voice research initiatives, while others are more focused on reporting the collection and analysis of primary research data. We see these different approaches as a strength of the book as it captures different "voices" about the educational uses of technologies by students from around the world.

To establish a foundation upon which to contextualize the various chapters, the book commences with a review of peer-refereed research, published since 2005, that specifically sought students' voices as primary sources of data. The chapters that follow are global and varied. Chapters include studies from the USA, Canada, Europe, Australia and China. The participants in the studies are predominantly located in schools and universities. The studies set out to investigate different issues concerning teaching and learning with technologies from the students' points of view. The authors have used a range of research methods to collect and analyze their data. The findings in several chapters show some consistencies of themes, with the students recognizing the benefits of learning with technologies, yet feeling that the full potential of technology-use in classrooms is not consistently being realized. Given these characteristics, the forthcoming discussion is structured using the following headings:

- Global and varied;
- Themes and methodologies; and
- Students' views and feelings.

Global and Varied

All the chapters in this book pay attention to diverse learning and teaching situations in various parts of our globe with students voices reported from varying ages and stages of development. In Alberta, Canada, Gray, Andrews and Schroeder outline how the K-12 school community is engaged in a variety of multifaceted research projects and stakeholder consultations that are giving voice to school students' views about learning with technologies. The Australian chapter by Brown also reports the views of school students, from a study involving interviews with students at two co-educational senior school colleges in Canberra: one in a Catholic school and the other in a Government College. The chapter from Johnson, Dyer and Lockyer presents findings from research projects conducted with young people aged between 14 and 21 at risk of leaving school early, in the United Kingdom Austria, Ireland, Sweden and the USA.

In the Netherlands the chapter by Bottema & Swager reports a national survey with students in primary and secondary schools, vocational education and training institutions, teacher training students and early career teachers. In another Dutch chapter by Fransen & van Goozen five case studies are described: one in a Flanders (Dutch Belgium) primary school, and the other four in the Netherlands: one in a vocational school, two in universities and one in a "learning company", outside of formal university education.

Campbell outlines her research with a group of Chinese post-graduate students in education, located in a typical medium-size provincial city in North-Eastern China, and their research with undergraduate students located in 12 Chinese universities in this rural province. In the United States, Spires, Zheng and Prudent take us into a graduate education course as part of a New Literacies & Global Learning master's degree program at North Carolina State University. This US study investigated students' ability to integrate content, pedagogies and technologies flexibly during their teaching and learning, referred to as students' Technological Pedagogical Content Knowledge (TPACK) development. Students in the course were teachers acquiring a master's degree while simultaneously teaching in a K-12 classroom. In Ireland, students of two higher education institutions, both in Dublin, informed the research study by O'Donnell and Sharp. An Australian chapter by Gregory involved a group of higher education students who were enrolled at a regional university and were located either on or off-campus. In this chapter, Gregory reports how these students used the virtual world Second Life to overcome barriers of distance in their learning. Another Australian contribution by Beckmann involved students in city-based master courses in development and museum studies, where about a third of the students were located outside the city, and were taking the courses through distance education. Two Flemish (Belgium) chapters by Bruneel, Elen, Wit & Verhoeven and Decuypere & Bruneel respectively, focused their research on Flemish students at a Catholic University.

Themes and Methodologies

Research methods described in the chapters in this book are multi-various and include surveys, interviews, electronic focus groups, pilot studies and the development of case studies to enable both quantitative and qualitative analyzes to be undertaken. As part of the graduate course on new literacies and media, participants at that university were required to design and implement lessons that incorporated a range of technologies, produce written reflections about their experiences, and engage in online interactions with participants in the class. Qualitative results from the participants' written reflections revealed four themes relative to TPACK. The four interpretive themes that emerged from the online reflection data were newly acquired knowledge, newly acquired confidence, navigating technology problems and being motivated and excited by student responses to technologies.

The studies informing two chapters, one from the Canadian province of Alberta and the other from The Netherlands, set out to gain an improved understanding of the expectations and experiences of school students, about how technologies may be utilized to improve learning outcomes, and to develop a better understanding of students' requirements regarding technologies in education and training. In Alberta the early findings of two current research projects and two recent stakeholder consultations were examined. Surveys, interviews with the researchers, and jurisdictional case studies were used to capture students' views about learning with technologies. A mixed method case study approach was used to answer questions concerning the effective use of a variety of technologies for learning in the "Technology and High School Success Project" (2007-2010). Online surveys probed a range of students' views about their education in the "Speak Out: Alberta Student Engagement Initiative (2008-2010)". The Canadian "Speak Out National Research Project (2009)" also provides a snapshot of students' views about how technology is currently being used in schools and classrooms.

In the Netherlands data were gathered from over 2000 students using online questionnaires, adapted to the various target groups, and by means of qualitative research through focus groups, using the electronic tool Zing systems (Moyle & Fitzgerald, 2008). The other Dutch chapter comprises five case studies about innovative learning and teaching practices in which Web 2.0 tools were used. This study examined which factors contributed to their success as learning environments. A cross-case analysis was carried out to gain an insight from students' perspectives into the similarities and differences of learning in these modes, and the transferability of these practices between formal and informal learning contexts.

University teachers studying in a post-graduate degree in education in China surveyed their own undergraduate students to identify the ways in which their students used technologies for learning in formal contexts (related to their university studies) and in non-formal contexts (related to their personal interests). This approach provided data from 1,740 undergraduate students from 12 universities and colleges throughout the province. These data were supplemented by an analysis of student responses to learning with technologies in a classroom context using visual ethnography. The views of students' identified as marginalized from school were also collected using ethnographic research methods.

At an Australian university, three pilot studies were conducted with university students enrolled in Information Technology Communication (ICT) in Education subjects. The students participated in virtual world sessions during their studies. The researcher set out to investigate whether a virtual world is engaging for the students; whether real life workshops can be replicated and improved using a virtual world; and comparing interactive tools for enhancing quality assessment responses. In each of the pilots, students were requested to complete end of semester surveys and the online conversations were recorded.

The other chapter outlining research conducted with students in an Australian university describes the responses of students to compulsory online discussions. Discussion-based learning is often a crucial element in postgraduate professional development. Educational technologies provide unparalleled opportunities to encourage such discussions in courses with distance or blended delivery. But how do students regard online forums? Do students regard online discussions as equivalent to face-to-face experiences? Moreover, do educational technologies have a role to play in facilitating discussions even when students are meeting face to face? These questions are discussed in this chapter.

The third Australian contribution broadens discussion about the nature of digital technologies policies within Australian schools by listening to students' voices regarding ethical concerns and policy regulations issues. Ethical issues associated with the use of digital technologies have been of increasing concern in the Australian media and wider public. Issues discussed in this chapter include cyber-bullying; accessing content of a violent or sexual nature on the Internet; and the use of mobile phones to film and photo incidents and then the transmission of them to a wider audience. This study uses interpretative and critical theories to inform the research and the data were collected using in-depth, semi-structured interviews.

The first of the two chapters from Belgium raises the question: "How do "living technologies" relate to "learning technologies" concerning frequency, time and educational use from the students' perspective?" In this study "living technologies" refer to technologies currently and actively used for living purposes such as Facebook and mobile phones. "Learning technologies" refer to technologies designed specifically for educational purposes such as learning management systems. To collect data about the daily use of technologies by students, and their perceptions and opinions, data were gathered in two ways. Firstly, 15 randomly selected students from different programs at the Catholic University in Belgium were interviewed several times in depth during the academic year 2009-2010. The second part of the data collection consisted of the students completing two online surveys.

The second Belgium chapter deals with the questions: "Are there any educational possibilities of using Facebook for educational purposes from students' perspectives and if so, which?" "Are students themselves inclined to recognize and utilize any educational possibilities of Facebook, or do they use Facebook only in leisure time? And finally, "Are students willing to add faculty members as Facebook friends? Why (not)?" In this chapter these research questions were examined and answered through a systematic reporting of interviews conducted with 15 participants.

The chapter outlining a study conducted in two higher education institutions in Ireland provides the findings of a survey about students' perspectives on the academic use of technologies, particularly the two universities' learning management systems. The survey responses received from three hundred and twenty students are analysed and discussed.

Together this suite of chapters, takes "student voice research" beyond simple quantitative questions of "how much", to more complex and sophisticated questions concerning students views about why they do or do not learn with the use of technologies. The research questions have moved from questions that can be answered using survey tools, to questions that require not only quantitative, but also qualitative, interpretative and critical analyzes.

Students' Views and Feelings

So, what do the chapters in this book tell us? What are students saying about learning with technologies? Overall, the findings from the respective studies discussed here suggest that students want more reliable and less restricted access to a wider variety of technologies including personally-owned devices.

Students also want to use technologies in more interesting, motivating and challenging ways to enhance their learning. They are frustrated with restrictive technology policies, inadequate access to technologies in classrooms, ineffective integration of technologies by teachers, and confusing online learning environments.

Important conditions for justified use of technologies in learning and teaching are largely dependent on the learning preferences and prior knowledge of individual students; on the teachers' effectiveness in integrating technologies into meaningful teaching and learning activities; on the teachers' understanding and application of pedagogical practices that foster 21st century learning; on the available levels of access to technologies; and on the reliability of technologies, online resources, and technical supports available to students.

But when reading the chapters of this book, many other interesting opinions and ideas manifest themselves about issues and themes that are in the spotlights of the present-day playgrounds of education and research. These themes include how formal and informal learning could complement each other; the role that Web 2.0 applications can play in learning and teaching; the input that students should have into decision-making about education policies; about co-ownership of students in their own learning and teaching practices; and about the redesigning of electronic learning environments at school and universities. Many questions often generate similar answers, but sometimes as a result of different opinions, depending on the circumstances and contextual differences, like cultural disparities and different educational views.

The graduate student teachers at North Carolina State University became aware of the power of technology tools when they were used appropriately. This study shows that these student-teachers understood that as a teacher they have to be sure that students are engaged in learning and not just having fun with a new technology. These students indicated that they realize integrating technologies into the curriculum is not a choice anymore; it is a requirement. These students realized too, that time constraints, too few resources and restrictions and limitations on the use of technologies for teaching and learning purposes can be frustrating. Nevertheless these students also indicated that they realize those problems are part of the work, and they have to overcome such obstacles.

Alberta school students when asked how they might use mobile devices to help with their schoolwork, offered suggestions that often mirrored their current uses of technologies in the classroom. For example, students indicated they would use these devices to access online textbooks and social networking sites; communicate with peers and teachers; create and share documents, videos or podcasts; organize their work; coordinate their calendars; look up information on the Internet, receive alerts and reminders about homework and tests; take notes or record lectures; upload or download information; and work on projects with classmates.

The Australian university students who participated in the virtual world pilots stated on a regular basis that a virtual world is engaging. They indicated they believe that communication is a very important component of learning and teaching in a virtual world, and that anonymity enabled quieter students to speak out in ways that they would not do normally. A majority of the Australian school students interviewed in Canberra felt that the rules and guidelines set out in their respective schools' policy documents, and the filtering and blocking software used, were not in themselves adequate to maintain compliance and foster ethically responsible behavior. The students in this study recognized that education could play a viable role in preparing children in schools to practice responsible social behaviors when using the Internet combined with some type of reasonable framework of restrictions. However, several students pointed out that the education had to be meaningful and cohesive and start from a young age, rather than wait until students were in their teenage years.

The students enrolled in the distance provisions offered by an Australian University reported that they acquired valuable experiences through participating in online discussions. Furthermore, the findings from this study suggest that such an approach to student learning can help lecturers to shape their use of technologies to support students to use reflective, experiential and peer-responsive learning that fosters professional engagement with current debates. These Australian students frequently reported that the ideas expressed online enhanced their learning, and encouraged deeper critical reflection on the materials presented in lectures or for reading. But the students reported also that “an assessable online discussion generally involves more work than most other forms of assessment”. This finding was something neither the researcher nor the students expected. Nonetheless, students’ initial concerns about both the medium and their ability to do the task appeared to be effectively countered by their experiences.

In China, students are rapidly becoming as familiar with technologies as are their peers in Western countries. The students in the study outlined in this chapter, like their Western counterparts, use a wide range of technologies, although mobile phones are by far the most ubiquitous, with a 100% saturation level. This degree of use of mobile technologies has resulted in a situation where many university and college students in China are far more familiar with the use of these technologies, than are their lecturers. Similar situations are not unfamiliar in Western countries, but this situation is exacerbated in China where there are many older academics who believe in the efficacy of the Confucian teacher-centered approach to education. Another factor limiting the widespread use of the Internet for educational purposes in China is the strict Government control over the media and the Internet. This condition means that Chinese educators have only limited access to the wide range of online resources relevant to teaching and learning; a situation not uncommon to teachers, students and parents in Western countries such as the UK, USA and Australia. The high levels of mobile phone saturation among university students and teachers however, and the increasing range of applications suggests that this mode of delivery has the potential of changing the ways in which students learn and provides increased access for lifelong learning.

The Irish students felt that the use of technologies in higher education could beneficially transform learning and make a positive difference to studying; however, the students also insisted that technologies would never replace their lecturers. The students indicated that technologies have to be properly integrated with an approach to teaching, not just be used for the sake of technology.

At the Catholic University in Belgium, students made a clear distinction with respect to the frequency and reason of using “living technologies” and “learning technologies”, finding that students barely used “living technologies” like Facebook and mobile phones for educational purposes. The students reported they want to avoid an overlap in terms of the use of particular applications for particular reasons. For example, the students indicated they visit Facebook just for fun such as to check friends’ photographs, or to post messages on their wall, not for educational purposes.

In the case studies examined from the Netherlands, the students highlighted the importance of different learning practices for fostering their enthusiasm for learning. All the teaching and learning practices studied showed that a certain degree of co-ownership of the content and direction of the learning processes meant that the learning approaches fitted the interests and learning preferences of all students to some degree. The students had a say about their learning, and felt they were taken seriously; conditions that resulted in the development of co-responsibility between the students and their teachers, for the learning practices used. Similar views were expressed by the students marginalized from schools, in each of the countries in which the research was undertaken.

The case studies undertaken in The Netherlands also identified success factors for teaching and learning with Web 2.0 technologies. The findings indicated that the students seemed motivated using the technologies; a core concept in all learning practices, and as such it was considered a success factor. Another success factor was whether, in the students' opinions, they had enthusiastic teachers. They identified such teachers as being capable of inspiring people, and knowing how to challenge students to be active learners. These kinds of teachers offered learners room to co-own the content and learning processes. The students also indicated that such teachers have innovating attitudes, dare to experiment, and know how to find the right balance between directing, and facilitating in relation to the learners' demand for structure and supervision. Another success factor identified in all the studied learning practices that emerged from the case studies conducted in the Netherlands was the place for rich and attractive learning environments. Such environments are rich and attractive because of the interactions possible between the physical environment, the technologies available within them, and the links between the learning practices and the local surroundings which often involved collaborations with real individuals, companies and organizations.

In conclusion then, the chapters in this book suggest that the use of technologies in teaching not only make learning more interesting because of the availability of various types of media, but by listening to students' voices about the use of technologies also offers possibilities for variations in the learning processes, and for their adaptation to personal learning preferences. While this book does not offer irrevocable opinions and definitive views or insights, we hope that you will find it a useful lens through which to view the world of students, and to provide insights into the possibilities for accessing and conducting similar research.

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KEY TERMS AND DEFINITIONS

Blended Learning: Learning that is facilitated by the effective combination of different models of teaching, styles of learning and modes of delivery including with technologies.

Distance Learning: The process of transferring knowledge to students who are separated from the instructor by time and physical distance, and who are making use of technology components, such as the Internet.

Formal Learning: Learning that takes place within a teacher-student relationship, such as in a school or educational institute, and which implies the design and delivery of learning programs.

Informal Learning: Learning that occurs through the experience of day-to-day situations, and is often unintentional learning.

Learning Company: Enterprise aiming to develop professional expertise with a focus on the integration of practical knowledge and professional skills while carrying out realistic professional tasks.

Personalization: Individual learning and demand-driven education, in which a student chooses and plans learning activities according to his or her personal needs and ambitions.

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Section 1
Literature Review

Chapter 1
Students' Views about Learning with Technologies: A Literature Review

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ABSTRACT

There is a paucity of recent, formal education research that listens directly to students' views of learning with technologies. Much of the research that has been conducted has tended to focus on evaluating students' current experiences within a specific course, or concerned with tangible issues such as frequency of computer use, access to computers and the Internet, and evaluations of technical skill levels. Available research has tended to use quantitative or mixed method approaches, with data collected through surveys using convenience samples, Likert scales and free response questions. These methods are sometimes supplemented with interviews and observations. To establish an understanding of existing research, and to provide a foundation for the chapters that follow, this chapter reviews a selection of studies published since 2005 that collected data directly from students. It is apparent from this chapter that there is room for more formal research that listens to students' views of learning with technologies.

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INTRODUCTION

Including technologies in teaching and learning requires changes to be brought about at multiple levels: at the level of pedagogy, curriculum, policy, infrastructure, organization and governance, at the local institution as well as at system levels. This literature review is concerned with peer-refereed research studies published since 2005 about learning with technologies that uses as primary data, the perspectives of school and university students. In this chapter, the shorthand nomenclature of the "student voice" is adopted to describe the literature that has been reviewed from the point of view of students' perspectives about learning with technologies. The purpose of this review is to examine published literature since 2005 to:

- Identify recent research already undertaken in the field;
- Identify the research methods used to underpin existing published research;
- Identify any gaps in existing knowledge; and
- Reflect on the implications for future research that could be undertaken.

There is a small but growing body of literature about the importance of listening to the "student voice" in teaching and learning (cf Farrell, Danby, Leiminer, & Powell 2004; Flutter, 2006; Holdsworth, 2005; Jackson 2004; Oerlemans, K., Vidovish, & O'Neill, 2006; Whitehead & Clough, 2004), but comparatively less research has focused upon hearing students' perspectives to learning with technologies. This lack of specific "student voices research" about learning with technologies (cf Oblinger & Oblinger, 2005) applies to primary, middle and secondary school students, students undertaking training, and to university students and their learning with technologies. A diverse range of technologies is now part of many students' daily lives. Yet while policies and reports advocate the economic, social and cultural benefits that technologies may play in students' lives, it seems fewer efforts have been made to directly engage learners in dialogue about how they would like to see their classrooms and institutions change to enable meaningful learning with technologies. The focus of this literature review then, is on student voices in research published since 2005, about their views of learning with technologies.

BACKGROUND

Many students currently attending schools in developed countries have lives imbued with technologies such as computers, the Internet, automatic teller machines, mobile phones, interactive video and online games. As these young people have been growing up, the importance of including technologies in learning has consistently been acknowledged in government and non-government reports around the world (cf Organisation for Economic Co-operation and Development (OECD) 2010; United Nations Information and Communication Technologies Taskforce 2003). Some large scale national approaches to fostering teaching and learning with technologies are being implemented. For example, in 2008, the Australian Government introduced the "Digital Education Revolution" policy which committed almost \$2 billion over four years to provide computer technologies through the "National Secondary School Computer Fund" to secondary school students in the school years 9 to 12. The aim of this initiative is to achieve a one to one computer to student ratio by 31 December 2011 (Australian Government, Department of Education, Employment and Workplace Relations (DEEWR) 2008). The "Digital Education Revolution" initiative coincided with the "global financial crisis". The implementation of the "Digital Education Revolution" was consistent with OECD advice during that time such as the following: "Many countries face challenges regarding school buildings. Renovating the school infrastructure (e.g. integrating ICT [information and communication technologies] and building more ecologically-friendly schools) can foster more innovative and effective learning environments." (OECD, 2009, p. 15)

In 2008-09, for the third consecutive year, Denmark and Sweden were assessed by the World Economic Forum as the world's most networked economies (Mia, Dutta & Gieger 2009). In 2010, the "The Global Information Technology Report 2009-2010" placed Singapore between Sweden and Denmark respectively, as the top three "networked ready" countries in the world. These rankings were determined through the use of the "networked readiness framework", used since 2002 to generate reports for the World Economic Forum about countries' use and preparedness to use technologies (Dutta & Mia, 2010). International and national agencies use indicators such as household access to computers and the population's access to telephones and the Internet to measure economic productivity (cf OECD, 2010b; 2007a; 2005b; 2003). Capabilities now commonly seen as essential to everyday life include word processing, digital scanning, emailing, using Global Positioning Systems (GPS), accessing the Internet and undertaking numerical analyses with technologies, as well as higher order capabilities such as problem-solving, creativity and knowledge creation (cf OECD 2005a).

There are however, a lot of myths about how young people use technologies. In the UK, the report "Their Space. Education for a Digital Generation" (Green & Hannon, 2007) outlines a study undertaken by Demos in conjunction with the UK National College for School Leadership (NCSL). This report describes attitudes played out in the media about the ways in which young people to the use of technologies, as ranging from "moral panic" through to "digital faith". Green & Hannon (2007) describe "moral panic" as being characterized by media narratives focused on the potential dangers of new technologies. These narratives are based upon violence, videogames and the portrayal of young people as an apathetic generation. They describe "digital faith" as being characterized by technological determinism where all new technologies are positive and potentially transformational. The authors argue however, that educators must get beyond these dichotomies. Listening to students reflect on their own behaviors using technologies, is one way to do that.

Consistent with Green and Hannon's study (2007), students across several countries report there are disconnects between the ways in which they use technologies within the educational institutions they attend, and the ways in which they use them in their personal lives, including for educational purposes (cf Green & Hannon, 2007; Moyle & Owen, 2009; Project Tomorrow, 2010; 2009; 2006a). These disconnections could be symptomatic of larger issues, where the ways in which students learn and want to learn, is different to the visions of learning being implemented in their educational institutions (Project Tomorrow, 2009). Several studies for example, report that students find the quality of their learning that includes technologies to be often poor and uninspiring (Farris-Berg, 2005; Prensky, 2006; Project Tomorrow, 2009; Valdez, 2005). Indeed, students at all levels of education repeatedly indicate that where their learning is to include technologies, they would like more complex and engaging activities to do, that are relevant to their lives (see, for example, Project Tomorrow, 2010; Green & Hannon, 2007). Furthermore, many students in these studies indicate that more complex uses of technologies would improve their attitudes toward their learning.

METHODOLOGY

A summary of "student voice research" about their expectations of learning with technologies, published since 2005 was prepared. Peer-refereed research published in online and hard copy journals and books was reviewed to inform this literature review. The primary requirements for reviewing the research was that the data were collected from students in schools or universities, and the findings from the study were published since 2005. Categories were identified in the literature reflecting the themes that emerged from the review. These categories have been used to structure the literature reviewed, and to enable an identification of the gaps in current research.

The following categories were identified:

- Implications of access and use of technologies;
- Proficiency with technologies;
- Approaches to student learning;
- Motivation and engagement; and
- Communication.

The categories that emerged from the literature are used below to structure the findings from the review.

FINDINGS FROM THE LITERATURE

The category of "access and use" is used to describe research studies that collected and analyzed data about overall computer and Internet use and access by students for learning. The category of "proficiency with technologies" describes research about students' specific technical skills, including their views about their own skill levels using technologies. In this category, research examined students' views of their own self-confidence in performing various tasks using technologies, the supports and hindrances students identified for using technologies, and their views of teaching and learning practices for building technology skills. Research categorized as focusing upon "approaches to student learning", are those studies reviewed that addressed issues concerning deep learning through engagement, and student-centered approaches which involved students developing meaning and understanding in their learning. Research included here also addressed issues relating to students' development of higher order skills of analysis, synthesis and creativity. Studies identified as investigating "motivation and engagement" of students using technologies, encompassed published research in which the students articulated views that indicated they find learning with technologies engaging, enjoyable and motivating. Motivation and engagement of students to learn involves moving students beyond surface learning towards deeper approaches to learning through fostering interest and developing understanding of meanings through the integration of knowledge. Research reporting students' views about using technologies for communication purposes such as through social networking sites and mobile devices was included in the "Communication" category.

Implications of Access and Use of Technologies

Information about access to and use of technologies by school students is available internationally through the survey data collected by the OECD from 15 year old students in over 50 countries as part of the Programme for International Student Assessment (PISA) (Thomson & De Bortoli, 2008). A survey completed by these students is used to collect the data. The survey questions relate to the students' usage of computers and the Internet, and years of experience using these technologies; frequency of computer and Internet use at school, at home and in other places; frequency of use of the computer and Internet to undertake various technology tasks, and self-efficacy in particular technology tasks. The Trends in International Mathematics and Science Study (TIMSS) surveys developed by the International Association for the Evaluation of Educational Achievement (IEA) to measure trends in Year 4 and Year 8 students' mathematics and science achievement, also collect some data about school students' computer access and usage (Thomson & Fleming, 2004).

In the United States, data collected since 2003 through Project Tomorrow's "Netdays" and "Speak Up Events" provide insights into hundreds of thousands of US students' views of access to and use of technologies. "Speak Up Events" are conducted annually, and involve the administration of online surveys that are designed to collect students views and to provide them with a voice into national and local policies that impact upon education. The "Speak Up" surveys are developed with input from a national Student Advisory Council representing students from across the United States, education non-profit partners as well as teacher and administrator advisors. The "Speak Up Events" surveys include grade-appropriate online student surveys for students in the years K-3, 3-6, 6-12, respectively. Each survey comprises 20-40 multiple choice questions and 2 open-ended questions (Project Tomorrow, 2006a).

The research methodology each year involves teachers gathering individual student and whole class responses via the age-appropriate online survey that asks the students to:

- self rate their personal skills;
- rate the value of their technology skills;
- indicate their technology use at home and school;
- identify specific technologies they use;
- identify the frequency of use;
- specify the subjects in which technologies are used; and
- indicate the activities in which they participate that use technologies (e.g., research, presentations, communications, assessment, checking of test results) (Project Tomorrow, 2006a).

Over time, students' responses to these annual "Speak Up" surveys show that there is increasing student use of digital cameras, MP3 players and laptop computers across grades 3-12. Students in grades K-2 have increased their weekly use of desktop computers, and K-12 students are using video games weekly, with the use by males and females being similar until high school. Almost all respondents in grades 6 to 12 report that computers help them with their schoolwork (Project Tomorrow, 2010; 2009; 2006b).

Major results emerging from the "Speak Up" surveys show that:

- students are strong believers in technologies capacity to enrich their learning;
- young people adopt new technologies to suit their lifestyle and they choose devices for specific functions and purposes;
- communication is a key motivator for students to use technologies;
- the senior levels of primary school and in particular the sixth grade being the "tipping point" for US students to report they use technologies for communication purposes;
- younger students adopt sophisticated technologies where they can learn from their older siblings;
- students want access to up-to-date technologies at school and for these technologies to be easily available;
- the main frustration for students arises from restrictions to technology use for learning tasks such as occurs through filtering; and
- students see their futures including the use of technologies for learning and to prepare themselves for a competitive job market (Project Tomorrow, 2010; 2009; 2006b).

Other smaller surveys periodically ask students about their access to and use of technologies. For example, in the United Kingdom, Livingstone and Bober's (2005) research involved 1,511 young people aged 9 to19, and it set out to examine how these young people used the Internet. The aims of the research were to:

- Collect detailed, systematic survey data that documents the extent and nature of the understandings, practices and contexts of

Internet use among 9-19 year olds in the UK;
- Collect in-depth qualitative data about children and young people's perspectives about the place of the Internet in their lives;
- Identify original empirical research in key policy-relevant areas; and
- Integrate academic theory and research to produce new findings and analysis.

The purpose of the research was to make an assessment of the online risks and opportunities open to young people when online, in order to contribute to the academic debates and development of policy frameworks concerning children and young people's use of the Internet. The research combined interviews and observations with a national in-home survey of children, young people and their parents. Data was collected from the children using a national survey instrument with the questions asked face to face, together with another survey administered to 906 of their parents. A series of focus group interviews and observations interested in children's use of the Internet were also conducted. This research included an examination of issues of access, frequency of computer use and supports and hindrances to that access and use.

The research showed 75% of students had Internet access at home, although the access was higher in middle class homes (88%) compared to working class homes (61%). About half of the children and young people indicated that when they are on the Internet, they are online for between 30-60 minutes at a time. Around a third of the respondents indicated they have more than one computer at home, with 25% using broadband. The majority of the young people in this research also reported access to the Internet at school (92%), but 30% of the children and young people also indicated they have no classroom lessons involving the Internet. About 40% of the young people indicated they accessed the Internet daily and 40% reported accessing the Internet weekly. Over 90% of the daily and weekly users indicated they go online to do school work. Of the daily and weekly users of the Internet, 25% reported they go online for advice, while 33% of daily and weekly users indicated they have been taught to judge the reliability of the information they access.

A study in The Netherlands involving 400 teenage students between the ages of 13 and 15, also asked about their access to computers and the Internet at home and at school, and how much time they spent on the Internet. Only 4% of the students indicated they spend more than one hour a day on the Internet at school whereas over 30% of respondents indicated they spend between one and three hours a day on the Internet at home (Wijngaards, Fransen & Swager, 2006).

Although data about access and use of technologies by students shows students have access to computers either at home or at school or both, Australian ethnographic research by Neal (2005) about students' use of technologies in seven schools, saw these students comment on the lack of access to computers in their secondary schools. This study involved observations of young people in Years 5 to 9 and included 32 semi-structured interviews with year 6 and 7 students. The interviews were conducted twice, with the second interview conducted after the students made their transition from primary to secondary school. The students indicated that in secondary schools the computers were frequently located in computer laboratories, which were mainly used for Information Technology (IT) classes, thereby limiting the more general access to the computers by the students. These students also highlighted school security policies as a hindrance to their learning, and the slowness of the Internet as a point of frustration. Many students reported that as a result of the locked down nature of the Internet at school, they preferred to use their home computers for learning purposes.

Proficiency with Technologies

The OECD PISA 2006 "ICT Familiarity" student questionnaire data (OECD, 2007b) provides insights into the views of the 15 year old respondents from across 50 countries, about their self-assessed skills and confidence in relation to undertaking various tasks such as chatting online, creating multimedia, copying data to CD ROMs, creating databases and editing digital images. Predictably, those countries with the highest rates of access and use of technologies by young people, also have students who report the highest levels of confidence in their own technological abilities. Findings from the PISA 2006, "ICT Familiarity" student questionnaire data has also found that a new form of "digital divide" has emerged between those who have the competencies to benefit from using digital technologies, and those who do not. Furthermore, this report observes competencies that allow young people to benefit from learning with technologies are closely linked to the economic, cultural and social capital of the student (OECD, 2010a).

Students in the research conducted by Livingstone and Bober (2005) in the UK, identified their confidence with technologies being positively influenced by the regular use as well as the amount of time spent online. Fifty percent of those young people who self-identified as being occasional or non-users of technologies cited hindrances to their use based on lack of access, but some also noted lack of interest, time or skills. Thirty percent of students in this research indicated they had received no classroom lessons that included using the Internet, while 38% indicated that they trust online content and only 33% of the daily and weekly users indicated that they had been taught how to judge reliability of information. The students also noted however that they learnt about technologies away from school and parents; mainly from friends and through personal exploration.

In Australia, Neal's (2005) research shows that the main uses of technologies in the classroom reported by the students were for technical tasks such as typing, cutting and pasting, for teacher-initiated specific web searches, and to answer particular set questions. While these types of tasks were the predominant classroom experience of the students, they also commented that they valued the collegial learning opportunities and more inquiry-based tasks required of them.

Other research concerned with students' views about learning with technologies has particularly focused on the students' beliefs about the value of technologies to support their learning. Li 's (2007) research involved 450 Canadian secondary school students in years 7 to 12. This research indicates that the Canadian students involved, reported improvements in their confidence for learning that involved technologies. Data was collected through surveys of the students which included two open-ended questions. The first question asked about the students' views of the usefulness and effectiveness of technologies in learning; and the second about their preferred ways of using technologies in learning. Interviews and focus groups were also used in this study, with students questioned about their perceptions regarding the integration of technologies into teaching and learning.

The students reported frequent use of technologies in classrooms (25%). Seventy-three percent of the students indicated they liked the efficiency afforded by using technologies and highlighted some of the advantages of technologies, including easier access to cutting-edge research. Over 33% of the students indicated they liked the more diverse pedagogical approaches available from using technologies in their learning. The students also reported the necessity for update-to-date equipment (24%) as some of their future requirements for learning with technologies at school (Li, 2007).

Research by Levin & Wadmany (2006) in Israel examined students' beliefs and their relationships to classroom practices when exposed to a technology-based learning environment. This three year longitudinal study involved 164 students in grades 4 to 6 in one school. Data was collected using a student survey and classroom observations. Student questions (after 3 years in a technology-rich environment) included thirteen open-ended questions about their attitudes towards learning in a technology-based environment; their experiences in their traditional learning environments; and their satisfaction levels with their new learning environment. The students indicated they liked learning with technologies, in part because the learning was exploratory, involved learning new skills and was connected to their lived experiences outside of school.

The interaction between confidence in their basic computer skills and gender was addressed by Markauskaite's (2006), in a quantitative study which involved a survey of Master of Teaching students. The research involved the administration of questionnaire and a numerical analysis of student-teacher contributions to compulsory online learning activities. The survey participants consisted of 217 students enrolled in a Master of Teaching program at an Australian university. One hundred and twenty-two students or 56.2% of the total cohort volunteered to participate in the survey including 96 females (78.7%) and 26 males (21.3%). The participants all had a bachelor's degree, with their average age being 29.6 years, and with 22.1% of the participants having a previous degree in science or English. The study found that while there were similar capability levels for males and females in terms of problem-solving and communication using technologies, the confidence of the female students in self learning and independent coping strategies for some of the more complex technology functions, were statistically different to their male counterparts. The largest gender differences related to maintaining a computer, managing spreadsheets, editing and designing graphics and creating websites, with the female students showing lower levels of ability.

Maninger and Anderson (2007) also conducted research with student-teachers in the US. Their study focused on evaluating the impact of technologies on the learning by student-teachers. In the first part of the research, 27 student-teachers were involved: 17 in an experimental group and 10 in a control group. This part of the research involved the student-teachers undertaking a technology class, where some students were provided a more scaffolded approach to learning with technologies than others. In the second part of the research, 76 student-teachers undertaking an educational technology course completed two surveys: the first survey was administered prior to the course and the second survey was administered at the end of the course. The surveys addressed issues concerning the student-teachers skills, confidence and beliefs in the value of technologies for learning, and their intentions to use educational technologies in future work in schools, or not.

The findings of the research showed that all students reported good self-efficacy for computer skills, although their overall intentions to transfer technology skills to their work in classrooms was less evident. The results from the two groups involved in scaffolded and un-scaffolded learning activities showed that the student-teachers in the scaffolded learning group had more confidence to integrate spreadsheet and database software into their practices, and indicated an increased intention to use technologies. Students in the experimental group were more confident to integrate spreadsheets and database software and indicated an improved intention to use technologies, although they did not indicate that this increased use of technologies would occur in the classrooms during their practicum. This research highlights the importance of the context for learning technology skills and the necessity to practice the use of technologies within a university course, prior to going on practicum in order that the student-teachers are able to build skills and confidence, and to learn how to overcome obstacles such as lack of access.

Approaches to Student Learning

Some of the research reviewed focused on how students develop higher order thinking through the use of technologies in their learning. Most of this research indicated however, that approaches to higher order learning were largely aspirational on behalf of the students, rather than being the style of learning they were actually experiencing. While a small number of studies in the school sector were identified that presented the student voice about higher order thinking, generally students indicated that their educational institutions focus on surface learning and the technical aspects of technologies, rather than promoting complex learning with technologies. The focus in this section though, is on those studies that do highlight opportunities for going beyond surface learning with technologies.

Neal's (2005) research highlights primary and secondary school students' perspectives in relation to technologies. The students in this study indicated their preference for active learning and that the inclusion of technologies in their learning provides them with opportunities to have more control over their learning, to collaborate with other students, and to use the teacher as a facilitator rather than transmitter of knowledge. Students in this research particularly valued the opportunities for peer collaboration through the use of technologies, the sharing of ideas with classmates, and assisting each other when using technologies. The students indicated that the computers provided opportunities for hands-on learning through controlling the mouse; using different software applications; exploring the Internet through prompts and comprehending what was on the screen; and thereby engaging them in the development of their cognitive skills. For example, the students in this study talked about how they used digital cameras and robotics to undertake a problem-solving task (Neal, 2005).

> *What we (a group of students) had to do is, you get a little brick (car) .... We made it first, then you have to program it and you have to experiment because you've got to make it go for a certain amount of seconds and one wheel stops and the other will keep on going so it will turn around through the maze. You've got to experiment a lot of times and test it out. (Neal, 2005, p. 16)*

Neal's study also discusses the importance of planning and reflection in students' learning and linking activities to students' lives (Neal, 2005). The students articulated the benefits of the different learning activities they had undertaken with technologies, and the strengths and weaknesses of the different pedagogical approaches they had experienced. Neal (2005) also reported that the students had a strong belief about the potential benefits of learning with technologies. These students indicated however, that there was generally more focus in their classrooms on the regurgitation of information, than on "really using" technologies to explore, think and learn. The students in the study by Levin and Wadmany (2006), also reported they liked learning with, and through technologies. In this research the students indicated they value learning that is directly related to their lives, reporting enjoyment and satisfaction when learning about matters of personal interest and developing their knowledge of new tools.

The ability to customize and personalize their learning with technologies was identified as important by college students in a US study (Roberts, 2005), where technologies were seen as things that can be adapted to individual and groups requirements. Based upon interviews, polls, focus groups, and conversations with students, this study investigated the expectations to learning with technologies of college and university students across the USA. In his study the students' definition of "technology" was not limited to computers or the Internet. To these students, "technology" was "any electronically based application or piece of equipment that meets a need for access to information or communication" (Roberts 2005: p. 3.2).

Roberts (2005) found that the students' expectations about learning started with their teacher: their expectation was that their academic leaders would demonstrate enormous knowledge and passion for their field of expertise. But closely following this expectation was the expectation the academic staff were able to use technologies both inside and outside the classroom to effectively communicate that expertise to students, and to be able to customize the learning experiences of the students in his or her class. Indeed to the students in this study, the inclusion of technologies in their classes was seen as a fundamental requirement of their learning, and that technologies should be used to aid communication and presentations about the subject at hand.

As universities are starting to establish virtual campuses in "Second Life", some literature is emerging that reports students' views of learning on the semantic web. One such paper is by Sanchez (2007) who, in the first world, is located in the US. His paper reports the findings of students undertaking an undergraduate literature class in *Second Life.* The students reported having a "very high" learning curve using this medium for their study.

Motivation and Engagement

Learning with computers is reported as enjoyable by students around the world. Authors such as Prensky (2006) posit that complex and deep learning, where tasks involve inquiry and problem-solving, motivate students and that if tasks are low level, students become passive and bored. Prensky draws on young people's experiences and uses their words to provide evidence for his arguments. Prensky argues that technologies, and in particular complex games, provide an ideal platform for students to learn "21st century skills" such as problem-solving, communication and collaboration skills, and the ability to be strategic and to multi-task. He further argues that games provide students with opportunities to learn using exploratory and thoughtful processes that involve complex activities and require the students to take multiple viewpoints, and to organize and use information to inform actions. The title of Prensky's book, "Don't bother me Mom – I'm learning!" is taken from an interview with a teenager who explained that he enjoyed playing video games because of their complexity and found it annoying to be interrupted. Indeed, one of the aspects of complex gaming playing that Prensky highlights is the deep concentration required to play such games. This book challenges the argument that video and online games are harmful to children. Instead Prensky aims to show how playing video and online games can enable young people to undertake advanced problem solving, learn language and cognitive skills, and to develop strategic thinking and multitasking skills. Prensky argues that too much school work is not engaging and does not involve deep thinking and that young people choose to play complex games so that they can engage in some deep, sustained cognitive activities. The book looks at topics such as the use of strategy games by the armed forces, and provides examples of professional workers such laparoscopic surgeons who play games as a 'warm-up' before surgery.

Research in The Netherlands by Wijngaards, Fransen and Swager (2006) asked teenagers why they liked playing online and video games. A case study was developed about teenagers and gaming which addressed the question: "Why do teenagers engage in games and what do they and the designers think the students can learn from them?" This case study was developed with input from 189 young people in upper secondary schools in The Netherlands. The teenagers involved were asked to complete a survey that asked questions about their gaming behavior, their preferred games; and their views of the educational value of games. The questions asked in the survey were informed by the "Seven habits of highly effective people" by Stephen Covey (1990) and were used by Marc Prensky to indicate what young people learn from playing complex games. The Dutch survey also sought information about the teenagers gaming habits. Findings suggest that the main reason these students play online and video games is to have fun. Asked what skills they believed they developed from playing these games, the students indicated they developed:

- Reaction times;
- Eye-hand coordination;
- Strategic thought;
- Rapid decision-making skills; and
- Problem-solving skills.

In Australia, Neal's (2005) research also showed that students find using computers engaging and enjoyable as the following quote from one of the students involved in his study, indicates.

A computer...it's just more fun. In a book...just the way they pronounce it it's really boring, but on a computer it's like really colorful and stuff. Some of the web pages and everything, you can click on things and they pop out on the page, instead in a book it's just a page with writing (Neal 2005, p. 12).

Similarly, UK students reported they found learning with computers enjoyable. The following statement from one of the children participating in the "UK children Go Online" project illustrates this stating: "I don't find it hard to use a computer because I got into it quickly. You learn quick because it's a very fun thing to do". (Livingstone & Bober, 2005, p. 14) Similarly, Li's (2007) research indicated that Canadian students have a positive attitude towards learning with technologies, with 87% of students indicating they were "very positive" about it, and 18% of the students highlighting "fun", "flexibility" and "increased confidence" occurring as result of using technologies in their learning.

Levin and Wadmany's (2006) research in Israel provides students' views about how technologies motivated them in their learning. The responses of the students through the surveys administer in this study emphasized the role of technologies in motivating them through involvement in a social processes, which increased their knowledge of classmates, gave them an appreciation of the diversity among the class members, enabled them to develop friendships, and to use collaboration learning processes. Respondents to the US "SpeakUp" events (Project Tomorrow 2010; 2009; 2006a; 2006b) also consistently report that they get fun and engagement from learning with technologies. Students in the groupings K-3 and in grades 3-6 indicate they use technologies because "it's more fun", they "learn more", and they "can work more quickly". Indeed, nearly 60% of the students in grades 3-6 consistently indicate they like using technologies for school because "it's more fun". Of the students in grades 3 to 6, over 40% also consistently indicate they believe they "get the best information online" (Project Tomorrow, 2010; 2009; 2006a; 2006b). One grade 7 student, when asked whether he thought US schools should include online classes, responded this way:

I think it would be very cool and interesting to create online classes at our school. Kids would really want to give it a shot and try it out. I really think it would help our future because it would make learning fun and different (Project Tomorrow 2006a, p. 25).

Indeed online classes were rated as having considerable appeal, with students especially favoring more mathematics classes being available online (Project Tomorrow, 2006b).

Students in school education are not the only students to consistently comment upon the motivation to learning, technologies provides them. Research by Hammond and Wiriyapinit (2005) of students views of studying a Masters of Business Administration (MBA) course online, also reported they found the environment comfortable, motivating and enjoyable in which to study.

Communication

Throughout much of the literature reviewed, students at all levels of education comment on the value of technologies for communication. Many studies note that considerable email, chatroom and messaging are used by students after school hours. Recently researchers have begun observing students using technologies such as wikis and blogs, "Facebook", "YouTube", and Web 3.0 applications such as "Second Life", specifically for communication purposes. The potential place of these technologies in education is now actively being considered by researchers and educators. The studies reported in this review of the literature highlight some of the key points made by students in the studies researching their views of communication technologies in teaching and learning.

Research in the UK by Green and Hannon (2007) over a 9 month period investigated how children and young people use new technologies. The purpose of the study was to inform strategies that could enable school leaders to understand and interpret how and what young people are learning outside of school, with a view to developing an understanding of how school leaders may be able to build on those experiences. The research tells positive stories about how young people use online spaces to build relationships and create original content. The authors argue however, that there is a lack of alignment between the realities of young people's lives and the institutions and society within which they operate.

This research was conducted in several stages and included interviews, group discussion and informal conversations with over 60 young people around the UK who also completed diaries about their purposes, type and frequency of technology usage. The findings from the study indicated that young people use technologies as tools to make their lives easier. The researchers identified various types of young technology users including:

- "digital pioneers" who focus on creating and using blogs for communication purposes;
- "creative producers" who develop websites and upload movies;
- "everyday communicators" who communicate with Short Messaging Service (SMS) and online texting services; and
- "information gatherers" who focus on using search engines such as Google and using wikis.

Green & Hannon (2007) argue that the skills evident in the children involved in this study, developed through the online and other digital activities they undertake, build capabilities such as creativity, communication and collaboration. Furthermore, the researchers argue that these capabilities are those that will enable them to succeed in a globally networked, knowledge-driven economy. In Australia, the students in Neal's research (2005) specifically commented on the benefits of being able to communicate via email and through online discussion lists. Simply being in contact with friends, particularly in other schools, was identified by the students as being beneficial to them. The students also indicated that they valued the collegiality within the classroom that was afforded through online environments.

Dutch research by Wijngaards, Fransen and Swager (2006) involving over 400 students aged between 10 and 14 years of age investigated how and why students use one specific messaging system called MSN. This study showed that 65.8% of the students indicated they do so simply to remain in touch with friends and that 16.5% of these students have MSN working for up to 2 hours per day. When asked what they discuss, 76.1% of the students indicated they use MSN for homework. When asked who the students include on their buddy lists:

- 75.8% stated they include schoolmates;
- 28% indicated they include a teacher; and

- 16.8% of all students indicated they would like their teacher to be involved when discussing homework.

Other research also highlights the benefits students see from communicating using technologies such as cell phones. Students consistently identify cell phones as one of their most preferred technologies for communicating with each other, especially text messaging rather than email or Instant messaging (Livingstone & Bober, 2005). The majority of Australian children over the age of 12 are now more likely than not to own a cell phone (Australian Communications and Media Authority (ACMA), 2009). In the US, the Project Tomorrow data that indicates that the favorite communications device for students in K-12 is the cell phone with 73% of students in grades 9 to 12 reporting they use a cell phone daily (Project Tomorrow 2006b). Students also report that their communications include discussions about education, with 97% of US students indicating they think that cell phones should be allowed at school for emergencies and for connecting with parents (Project Tomorrow 2006b).

Social networking sites are also increasingly being used by students according to a study commissioned in 2007 by the National School Boards Association (NSBA), a not-for-profit federation of state associations of US public school boards. Funding for the data collection was made available from Microsoft, News Corporation and Verizon. The students in this study were aged between 9 and 17. They reported spending almost as much time using social networking sites as they did watching television. This time commitment represents about 9 hours a week spent on social networking sites, compared to about 10 hours a week watching television. This study also found that 96% of the students with online access reported that they used technologies such as chatting, text messaging, blogging and visiting online communities, such as "Facebook", "MySpace" as well as services designed specifically for younger children, such as "Webkins" and the chat sections of "Nick.com". Furthermore 81% reported they had visited a social networking site within the past three months of being surveyed, and 71% indicated that they use social networking tools at least weekly. The students in this study reported that one of the most common topics of conversation on the social networking sites was education. Almost 60% of students who use social networking indicated they talk about education topics, and more than 50% indicated they talk specifically about schoolwork and homework that requires the Internet to complete the activity. Thirty percent reported having their own blog and 41% indicated that they regularly post messages. Common activities undertaken by the young people surveyed include sharing music, photos and videos (NSBA, 2007).

Research by Wijngaards, Fransen and Swager (2006) investigating Dutch students' purposes for using networking sites also confirms that students like to communicate with each other using technologies, and that a major topic of that communication is about their school work. Two of the main reasons students identified for using social networking technologies included to help them to do their homework, to find information, and to learn from the views, opinions and ideas of others. This study also found that more Dutch girls than boys used networking applications, and also found that in general girls networked with more people than did boys, although the boys had more classmates in their network than the girls.

Research in The Netherlands involving students who were either in their last two years of secondary school or at university also found that these students enjoyed communicating with friends and classmates through social networking sites (Wijngaards, 2007). One of the purposes of the study was to determine whether there is a role for social networking sites in schools and higher education. Two data collection tools were used: a questionnaire with 33 questions; and interviews with 13 students ranging in age from 15 to 22 years. The purpose of the interviews was to gain personal insights into the habits, opinions, feelings and motives behind certain behaviors that emerged through the questionnaires. A total of 573 people, comprising 241 students from university and 332 students from secondary schools returned the questionnaire. This study shows that these students, like their peers around the world, value communicating with each other to discuss matters of interest including their studies using a range of technologies including mobile devices and social networking sites.

FUTURE RESEARCH

The purposes for undertaking this literature review included to identify gaps in existing knowledge and to reflect on the implications for future research that could be undertaken.

This review of the literature shows that the use of a range of technologies including mobile devices, web 2.0 technologies such as social networking sites, virtual worlds and learning platforms within schools and universities, according to the students, is opening up new and exciting opportunities for their learning. Research including data collected directly from students suggests that not only can technologies engage students and enable certain materials to be taught more efficiently, they also allow teachers and students to personalize learning content and processes for particular students. As such, technologies have the potential to extend and transform teaching and learning. The ways in which such transformations can occur however, remains one topic requiring further research.

Children and young people today use technologies on a daily basis and have embraced the Internet as a source of information and as an educational tool. Many young people have a high degree of digital literacy and are confident users of technologies. Incorporating technologies into teaching and learning then, is an important step to engaging students and helping them learn through the various media they use on a daily basis. Although there are various ways that technologies can be used within classrooms, more research is required about what strategies support the various preferred ways of learning students have at different levels of maturity. For example, web 2.0 technologies such as blogs and wikis, support collaborative learning and the sharing of resources (e.g. bookmarks, photographs), problem-based and inquiry-based learning, reflective learning, and peer-to-peer learning (Minocha, 2009). Technologies such as these, as well as presentation slides, social networking sites, search engines, online social bookmarking tools, and other technologies offer an extended range of activities for students, but research about the crucial factors that ensure the use of these tools, and which ones unlock educational benefits for students is still required.

Integrating technologies into education and training can change the ways in which classes are taught. Students can learn in ways that allow more individual and self directed learning. A benefit of using technologies in teaching and learning is being able to tailor lessons and course materials to the demands of individual students. Personalizing learning for example, involves creating the means to understand and support the individual learning of every student and to monitor his or her progress (British Education and Communications Technology Agency (BECTA), 2008a). Using technologies, can also allow teachers to customize classroom activities and ensure that children who require extra help can get it (US Department of Education, 2008). With the use of technologies, education no longer has to simply take a "one size fits all" approach. With the proliferation of technologies, educators now have a way to meet the differing demands of students and enhance their learning opportunities. The flexible and customizable nature of technologies and how those characteristics can be meaningfully incorporated into teaching and learning strategies that exploit this flexibility are still required. Furthermore, research about the ways in which personalized learning can be applied with and across classes of students is also still required.

Challenges for the future include how teachers and students together can come up with effective ways to blend technologies into the goals and practical outcomes of the studies students undertake. Students' recommendations for the future have included relaxation the rules education institutions impose regarding email, instant messaging, and the use of mobile phones. Other improvements proposed by students relate to increased availability of laptops for education and home use. Embracing technologies and recognizing their educational potential will increasingly allow educators more flexibility in the way they deliver the curriculum. As such, more research is required.

"Student voice" research indicates that educators ought to listen to their students, encourage decision making among students, involve students in design instruction, and get input from students about how they would like to taught. Student voice research also suggests that students want to be involved in all aspects of classroom life including discussions about curriculum development, teaching methods, organization, policies, discipline, and assignments. Research is required in schools, training institutions and universities about how technologies can assist students to be more highly involved in all aspect of their educational lives.

CONCLUSION

This literature review set out to establish a context against which the remaining chapters in this book can sit, and to

- Identify recent research already undertaken in the field;
- Identify the research methods used to underpin existing published research;
- Identify any gaps in existing knowledge; and
- Reflect on the implications for future research that could be undertaken.

The review of the literature focused on peer-refereed research published since 2005, whose primary data included that collected directly from students in either schools, training institutions and/or universities.

The review of the literature showed that there is a growing body of literature in the broad field of "education and technologies". Within that field there is a comparatively thin body of literature that specifically focuses on the views of students and has collected data directly from students. Most of the research reviewed used quantitative data collection methods focusing on questions of "how much". Surveys and questionnaires were the predominant tools used for data collection, with statistical analyses focusing on the identification of mean scores and standard deviations. There has been comparatively little research that has investigated the reasons why certain matters are the way they are from the points of views of students. Where qualitative data collection has been collected, it has often accompanied quantitative data collections. Furthermore, there has been little research about how students' learning with technologies is fostering deep rather than surface learning with technologies. Research frequently focused on students' experiences of the technical aspects of using technologies for basic tasks and for presentation purposes. Students rarely talked with researchers about changing the ways they taught so that the technologies were used to foster higher order thinking involving analysis, synthesis and creativity to enhance students' learning.

The findings from this review of the literature then suggests there are gaps in our knowledge about what students think and how they view learning with technologies. These gaps straddle all aspects of using technologies in education. Students want to contribute their views of the administration, organization, policy development and practices of teaching and learning with technologies. Continuing to listen to students' views will continue to provide a rich field for ongoing research. Educators then, can only benefit from more "student voice" research.

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KEY TERMS AND DEFINITIONS

21st Century Skills: A phrased often used to imply the use by students of problem-solving, communication and collaboration skills in learning, and the ability to be strategic and to multi-task.

Deep Learning: Learning that involves the sourcing and application of information for inquiry and problem-solving activities, rather than the rote learning of information as an end in itself.

Digital Literacy: Has many definitions but includes the ability to locate, sift and sort information, understand and/or participate in online communications and/or create content using digital media.

Ethnographic Research: A research method that aims to learn from others about how their way of living is conducted. It is intended enable the researcher to learn about another way of life from the insiders' points of view and to understand their experiences, goals and aspirations. Data collection usually occurs over an extended period of time and usually involves observations, interviews and document analysis.

Likert Scale: A type of scale that provides the reader with multiple choice options as answers to the questions used in questionnaires and surveys.

Personalized Learning: Involves understanding and supporting the individual learning of each student, to create opportunities for each student to determine his or her own ways of achieving the required outcomes from their learning, and to monitor his or her progress achieving their own goals.

Qualitative Research: Refers to research that investigate issues concerning "why" and "how" certain things are the way they are. Qualitative data collection often involves interviews, observations and analysis of text.

Quantitative Research: Refers to research that investigates questions of "how much" or "how many". It also sometimes refers to experimental research, where a hypothesis is being tested.

Wiki: An online site that allows the creation and editing of interlinked web pages via a browser using a simplified text editor. Blogs are typically managed individually while wikis are typically maintained by a group of people, and can be either open to anyone or closed to those outside the group.

Section 2
USA and Canada

Chapter 2
New Technologies, New Horizons:
Graduate Student Views on Creating Their Technological Pedagogical Content Knowledge (TPACK)

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ABSTRACT

The purpose of this chapter is to present graduate students' views of their Technological Pedagogical Content Knowledge (TPACK) development. These graduate students are also teachers. Data was collected using a mixed method approach founded on the TPACK Framework and social network analysis. Koehler and Mishra (2006) claim that effective teaching with technology requires TPACK, or an ability to integrate content, pedagogy and technology flexibly during the act of teaching. As part of a graduate course on new literacies and media, participants were required to design and implement lessons that incorporated a range of technologies, produce written reflections about their experiences, and engage in online interactions with participants in the class. Qualitative results from participants' written reflections revealed four themes relative to TPACK. Additionally, a social network analysis demonstrated a positive relationship between participants' views on their TPACK development and their interaction patterns within the online learning environment. This study shows that the TPACK framework can be a useful tool, giving educators a productive way to think about technology integration as they navigate the rapid changes prompted by emerging technologies.

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INTRODUCTION

The Internet is undoubtedly the most important technology of this generation. In an era where it is possible to "Facebook" and "Skype" friends as well as "Google" just about any topic imaginable, the Internet offers both challenges and profound promise for education. There is an increasing trend in Internet usage, particularly among children and adolescents. In fact, in the United States the National Center for Educational Statistics (2009) reports that instructional classrooms with access to the Internet and web-based learning tools has increased from 51% in 1998 to 94% in 2005. On average 8-18 year olds spend a total of 10 hours and 45 minutes in a typical day using various media forms (e.g., movies, video games, music, audio) (Kaiser Family Foundation, 2010). In most cases out-of-school technology use is outpacing in-school technology use (National School Boards Association, 2007). These statistics suggest that students are becoming increasingly dependent on the Web as a primary resource for information gathering in and out of school settings (Lawless & Schrader, 2008).

In a recent survey conducted in the US with 4000 middle grade students who were in a North Carolina statewide after-school program (Spires, Lee, Turner & Johnson, 2008), students reported high frequency usage of video and online games, music services as well as email, instant messaging, and cell phone services out of school. The main distinctions that emerged between in and out of school technology use related to the intent of the technology use and the actual devices being used. Outside of school, students were using technologies for communication and entertainment purposes. They also were more likely to use smaller handheld and gaming devices outside of school. Inside school students were using desktop computers for web-based research, word-processing and other productivity purposes. The surveys suggested that students' technology use inside school is often less creative and meaningful than their technology use outside of school. Interestingly, research suggests that while they are frequent users of technology tools, students typically lack information literacy skills and their critical thinking skills are often weak (Oblinger & Oblinger, 2005). Contemporary students may be "digital natives" (Prensky 2007), but they do not necessarily understand how their use of technologies affects their ways of learning.

As technological change transpires at a phenomenal rate, American teachers are under increasing pressure to integrate new technologies into their instruction (National Educational Technology Plan, 2010). It is important for teachers in the United States of America (USA) to use the technologies not only because students expect it, but also because educational systems have to stay abreast of the changes in online research, communication, and social media in order for students to be prepared for 21st century work and citizenship (Trilling, & Fadel, 2009). New teachers entering the field often are more adept at using technologies since they have grown up with them; although new teachers still have the challenge of using technologies in meaningful ways that enhance learning; teachers who have been in the field for some time confront the dual challenge of acquiring a disposition that accommodates ongoing change as well as "re-learning" how to teach using contemporary technologies (Darling-Hammond, 2010).

This chapter presents student voices on learning to use technologies during a graduate education course as part of a "New Literacies & Global Learning" master's degree program at North Carolina State University (2009) in the USA. Students in the course were teachers who were acquiring a master's degree while simultaneously teaching in a K-12 classroom. To frame the learning experiences for the students, the course focused on new literacies (e.g., online search and comprehension skills, use of Web 2.0 tools and participatory media) and the development of technological pedagogical content knowledge

(TPACK). Specifically, the objectives of this chapter are twofold: (1) To review the current theoretical and research findings on TPACK and social network analysis; and (2) To present an analysis of how graduate students created their TPACK as they traversed the requirements of a graduate class, which included integrating new technologies in their classrooms, reflecting on their TPACK development, and interacting with their classmates in an online environment. The learning management system, "Moodle," was used to support the online interactions among the students.

THEORETICAL BACKGROUND AND RESEARCH QUESTIONS

Many educators, business leaders and policy makers, are thinking hard about the new knowledge and skills that are required for workplace productivity. Even though it is impossible to predict the future, based on current expectations from the business community, trends are emerging in terms of new employment skills that are required by school leaders. The Partnership for 21st Century Skills (P21) (2005) is one in a series of business-education groups that have targeted core content, skills, and processes that are deemed critical to twenty-first century workplaces. P21's perspective is consistent with that of many economists and nonprofit organizations that address workforce-capacity issues (Levy & Murnane, 2004; Dede, Korte, Nelson, Valdez, & Ward, 2005). P21 (2005) has identified six key elements for 21st century education (i.e., media, communication, critical thinking, creative problem solving, interpersonal, collaboration). P21 argues that these elements enable young people to develop a wide range of skills while using information and communication technologies (ICT) in real world contexts.

P21 (2005) suggests that technologies play an important role in educational change and much of the proposed change is tied to the tools and resources students use in their everyday lives. As reported earlier, students are becoming increasingly dependent on technologies to communicate, gather information, extend social experiences, and be entertained (Spires, Lee, Turner & Johnson, 2008). As students move into the workplace their interest in technologies transfers with them; however, employers often expect workers to possess even more sophisticated technological skills and know-how and an accompanying disposition receptive to change. In a recent US report, "Rising Above the Gathering Storm" (2007), members of the National Academies of Science projected that scientific and engineering occupations are expected to continue to grow more rapidly than occupations in general with a projected 70% greater increase by 2012. Many argue that if the U.S. is to maintain its economic leadership and compete in the new global economy, today's K–12 students must be better prepared and encouraged to enter Science, Technology, Engineering & Mathematics (STEM) careers.

The concern that the scientific and technological emphasis critical to America's economic leadership is eroding at a time when many other nations are gathering strength is widely held. In keeping with this perspective, Levy and Murnane (2004) conclude that the nation's challenge is to prepare youth for the high-wage/high-skilled jobs that are rapidly growing in number—jobs that involve the 21^{st} skills of expert problem solving skills and complex communication. Twenty-first century skills are different than 20th century skills primarily because of the advance of information and communications technologies. Levy and Murnane (2004) have documented an important aspect of what constitutes 21st century understandings and performances:

Declining portions of the labor force are engaged in jobs that consist primarily of routine cognitive work and routine manual labor—the types of tasks that are easiest to program computers to do. Growing proportions of the nation's labor *force are engaged in jobs that emphasize expert thinking or complex communication—tasks that computers cannot do. (pp. 53–54)*

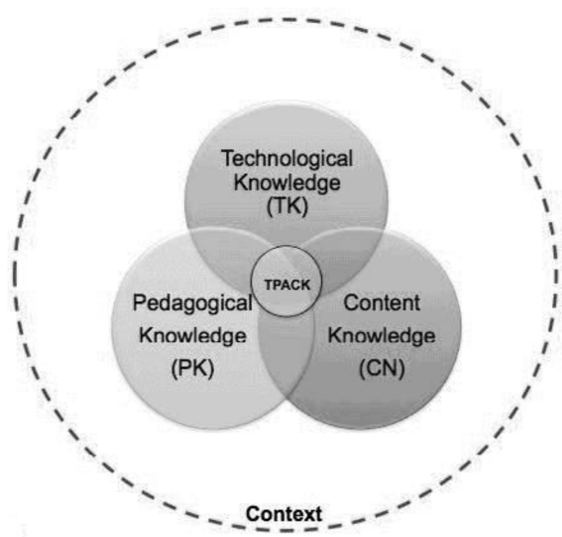
Dede (2007) astutely argues that the proposed skills and knowledge are not robust enough to encompass what is required for the future; but rather understandings and performances will better serve U.S. students' transition into 21st century work and life. Levy and Murnane (2004) suggest that expert thinking and complex communication are essential for contemporary work, since these are the two areas in the workplace that computers cannot replace human beings. Expert problem solving involves effective pattern matching based on detailed knowledge, metacognition, and the set of skills used by the perplexed expert to determine when to end one strategy and try the next. Complex communication involves managing multiple information streams as well as the capability to interpret subtleties and construct convincing rationales. In an economy flooded with new concepts and invented language, communicating complex information effectively is an increasingly valued skill. Complex problem solving, quick and intuitive decision-making ability, and collaboration skills, are the keys to success in the workplace.

The rapid pace of change and the demand for continuous learning makes the "capacity to learn" a highly valued competency as well. One could argue that the bottom line for 21st century life and work is that learners must be able to (1) forge understandings in ambiguous and complex problem solving landscapes, and (2) collaborate effectively within multiple information and communication streams. If students are to acquire these skills to be successful, then it is imperative that teachers know how to support and develop these skills with their students. The constant access to technology and information creates a "new learning ecology" where teachers' professional knowledge must make a "pedagogical shift to accommodate learning that is continuous, changing, and above all exponential" (Spires, Wiebe, Young, Hollebrands, & Lee, 2009, p. 10). Two important areas for teacher development is the capacity to deftly integrate technology with academic content and to use social network interactions to support ongoing learning. Following is a discussion of the theoretical background information related to these two areas: "Technological Pedagogical Content Knowledge and Social Network Analysis for online interactions". These two areas provide a theoretical context for our study.

Technological Pedagogical Content Knowledge (TPACK)

Mishra and Koehler (2006) assert that the successful teacher is one who can draw from content, pedagogy and technology, forming a technological pedagogical content knowledge (TPACK) framework. (See Figure 1). They have extended Shul-

Figure 1. TPACK Model. (Adapted from "Technological pedagogical content knowledge: A framework for teacher knowledge," by P. Mishra and M. J. Koehler, 2006, Teachers College Record, 108(6), p. 1017-1054. Copyright by the Teachers College, Columbia University. Retrieved June 2008 from http://punya.educ.msu.edu/research/tpck/)



man's (1986) time-honored model that highlighted pedagogical content knowledge, which is the knowledge required to teach specifically within different academic content areas. Shulman's contribution dramatically advanced the understanding of teacher knowledge and how it develops. By building on Shulman's model, Koehler and Mishra have created a framework that can be useful as teachers and teacher educators navigate the vast changes in teaching and learning that are occurring as a result of the Internet. In essence, Koehler and Mishra claim that effective teaching with technology requires TPACK, or an ability to integrate content, pedagogy and technology flexibly during the act of teaching. They argue that teaching with technology is a "wicked problem" (Rittel & Webber, 1973), with solutions being difficult to realize because of "complex interdependencies among a large number of contextually bound variables" (Mishra & Koehler, 2006, p. 9). Central to understanding Mishra & Koehler's TPACK framework is the capacity to separate the three components (i.e., content, pedagogy, and technology) while at the same time understanding that they co-exist in a dynamic transactional relationship. For example, when a new technology is introduced it forces teachers to "reconstruct the dynamic equilibrium among all three elements" (Mishra & Koehler, 2006, p. 18). Teachers have to develop capacities for continually evolving pedagogical skills that must be adapted with each new technological innovation.

Central to closing the gap between in-school and out-of-school student technology use is teachers' dispositions and usage of technologies to support student engagement with new literacies. Learning how to use technologies is considerably different to knowing how to integrate them seamlessly during instruction, as Mishra and Koehler (2008) assert with their TPACK model. Simply having technologies and content knowledge is inadequate for applying technologies effectively and helping students learn new literacies. In-service teachers want and require their expertise and past experience to be recognized and connected to challenges of the current learning experience so that it will relate to real life issues and problems they face when integrating technologies and new literacies into their classrooms (Hughes & Scharber, 2008). According to Harris (2008), in-service teachers have to know why they are learning new skills and strategies and how they will benefit them.

Based on the TPACK framework, this study examined how graduate students' online interactions on Moodle contributed to their TPACK development by using social network analysis (SNA).

Social Network Analysis of Online Interactions

Interaction is one of the most defining characteristics in online learning environments (Sing & Khine, 2006; Lamon, M., Reever, & Scardmalia, 2001; Shen, Nuankhieo, Huang, Amelung, & Laffey., 2008). Social constructivism learning theory suggests that learning is a social and cognitive process mediated by frequent social interaction and discourse (Boudourides, 2003; Foko & Amory, 2008; Hendriks and Maor, 2004; Swan, 2003). In a social constructivist learning environment, effective learning happens through interactive processes of discussion, negotiation, and sharing (Vygotsky, 1978).

The purpose of social network analysis is to provide a description of the interactions among network members as fully as possible and trace how information flows within the network (Knoke & Kuklinski, 1982). One of the most important benefits of social network analysis is that it enables educators to quantify and visualize the interaction patterns of learners, and also to figure out how the social interactions of participants contribute to the new learning of students. The social network measures used in this study include *density* of the whole network and *centrality* degrees of individual students. "Density" refers to the extent to which all the nodes (i.e., individual graduate students in the course) in the network are connected with each other. The density of a binary network is defined as the actual total number of connections among nodes, expressed as a proportion of the maximum possible connections. The value of this measure ranges between 0 and 1.00. A higher value indicates a better established community (Scott, 1991). The most common measures of "centrality" include *Freeman's degree* and *between-ness* (Freeman, 2006). Degree is defined as the number of other nodes (i.e. other people in the class) to which a node (i.e. another person) is connected (Scott, 1991). "Between-ness" measures the extent to which a particular node lies between the various other nodes.

In light of the new literacies that are being prompted by the use of emerging technologies, (Leu, Kinzer, Coiro, & Cammack, 2004; Coiro, Knobel, Lankshear & Leu, 2008) and the growing trends among students demonstrating their increased passion for and reliance on technologies for entertainment and communication (Lenhart & Madden, 2007), the pressure on teachers to successfully integrate technologies into classrooms is palpable. The TPACK framework offers insights into how the complexities inherent in teaching and learning with technologies can be approached to facilitate teacher growth (Spires, Hervey, & Watson, in press). Social network analysis provides a process to analyze patterns of communication and interaction in online environments. These two theoretical areas were used to frame the research study.

RESEARCH METHOD

Through a mixed-method approach (Cresswell & Piano-Clarke, 2006), this research investigated three questions:

1. How do graduate students (who are also teachers) perceive their TPACK development?
2. What are graduate students' online interaction patterns within a Moodle environment? and
3. How do graduate students' online interactions contribute to their TPACK development?

Participants

Participants included 29 students who were enrolled in the graduate course, *New Literacies and Media*, which used an inquiry project-based learning approach to integrating technologies. The participants in this study were graduate students and also classroom teachers. There were 3 males and 26 females; one African American and 28 Caucasian. Additionally, 58% of the graduate students reported having 5 years or less teaching experience; 37% of the graduate students had between six and fifteen years of teaching experience; and 5% of the graduate students had over 15 years of teaching experience. They taught in a combination of elementary, middle and high schools; content areas included English/Language Arts, Reading, Math, Social Studies, Science, and Technology.

Graduate Course Requirements

The graduate students in this study were required to create an inquiry learning project (ILP) in which they integrated technology into a content lesson and implemented the lesson in their classroom. Additionally, they reflected on their understandings of the TPACK framework, and the successes and challenges they faced as they implemented technologies into their classroom activities; and they interacted with their classmates within a Moodle online learning environment.

Data Sources and Analysis Procedures

Using a mixed method research design (Creswell & Plano-Clark, 2006), data for the study was collected from two sources: (1) Graduate students' written reflections from the Moodle forums; and (2) Graduate students' online interaction patterns determined by a social network analysis. The mixed method allowed for causal inferences to be made through quantitative data as well as providing complementary qualitative data (Creswell & Plano-Clark, 2006), that provided rich descriptions of the participants' reflections on their TPACK development.

Graduate Students' Written Reflections from the Moodle Forums

Data analysis focused on graduate students' responses to open-ended questions posed in weekly online forums throughout the semester. Two researchers independently read the forum responses and targeted initial topics based on the frequency with which participants mentioned certain topics. The initial topics were collapsed by similarities and the data were reread and recoded. During the second reading, a small number of new topics emerged and were coded in a third data reading session. The researchers then clustered the coded data into themes and made decisions about which themes to include in the study, based on relevance to the research question and number of responses aligned with a particular theme. The initial 7 codes evolved into 4 interpretive themes.

Graduate Students' Online Interaction Patterns Determined Through Social Network Analysis

The graduate students' online interactions were analyzed drawing on the online course log files and activity reports, and by using social network analysis (Scott, 1991). Analysis of the course log files and activity reports focused on the pattern and frequency of interaction in terms of sending and receiving comments and responses. The frequencies of interactions were counted and the results were recorded in a case-by-case matrix (i.e., the frequencies of interactions were represented for each student). For the purpose of this study, the matrix was dichotomized. Dichotomization in this context refers to the presence or absence of interactions, which is represented by 1 or 0 in the appropriate cells. Based on the new dichotomized data, the density of the whole network was measured using social network analysis software Ucinet 6.0. A directed matrix was used to specify who sent out and who received comments. To give a comprehensive understanding of the interaction patterns and frequency, the results were also visualized using NetDraw 2.0.

RESEARCH RESULTS

Qualitative results from the graduate students' written reflections and quantitative results from the social network analysis are reported separately by research question within the results section. Additionally, we demonstrated a relationship between graduate students' written reflections of their TPACK development and their interaction patterns within the online Moodle environment.

Results from Graduate Students' Written Reflections

Graduate students' online reflections were analyzed to address the research question: How do graduate students perceive their learning with technologies, and specifically their TPACK development? As mentioned earlier, 7 codes and 4 interpretive themes emerged from the online reflection data. The 4 interpretive themes were:

1. Newly Acquired Knowledge;
2. Newly Acquired Confidence;

3. Navigating Technology Problems; and
4. Motivated and Excited by Student Responses to Technologies.

Newly Acquired Knowledge: "It's Not the Technology that Matters; it's How it is used."

Since technology tools are evolving at such a rapid pace, teachers are searching for ways to think productively about how to integrate technologies in meaningful ways. Graduate students in this study were no exception. Throughout the course as they reflected in the Moodle forum, the graduate students were encouraged about their new found knowledge regarding the TPACK framework; specifically they were relieved to have a way to think about technologies in reference to their content and pedagogy—two areas with which they already felt comfortable. See Table 1 for a sample description of how the graduate students applied TPACK by making choices about technologies, pedagogies, and content as they created their lessons.

Several graduate students expressed their new understandings by contrasting the educational value of the technologies versus the "fun factor." One graduate student expressed it this way:

The TPACK model is a great tool for teachers when integrating technology. It's not enough to decide to use technology in the classroom. I fear I have too often used a tool just to use it, rather than examine whether or not the tool will engage my students in their learning or get in the way of their learning. I have to be sure that students are engaged in learning and not just having fun with a new technology.

Another graduate student expressed that before she understood the TPACK framework application, she often used technologies in a superficial way:

In the past, I fear some of the projects I've given students were designed to be more of a fun or creative project with a brief nod towards the Standard Course of Study. Also, I have often chosen the technology tool because it was new, innovative and/or fun; unfortunately, the tool wasn't always appropriate to the content or skill I was teaching and I tried too hard to make it fit.

Still other graduate students were aware of the power of the technology tools when used appropriately to help school students be innovative with their thinking: "If the knowledge that [school] students acquire by creating a Glogster project or a ToonDoo artifact can help them express their ideas more thoroughly and more innovatively, then integrating the technology was truly worthwhile." One graduate student claimed, "I think the concept of TPACK is revolutionary. It provides a concrete guideline for educators to obtain accountability for their teaching practices and methods to promote student learning." Another graduate student succinctly illustrated how her TPACK knowledge evolved over the course of the class:

In the beginning of the class as I was introduced to the complexities of social networking, gaming, and cool tools (e.g.,Tux paint, Animoto, Trailfire, and Toondoo) I felt excited, overwhelmed, and perplexed. Initially I wondered how these tools could be purposeful in the classroom; as a result of applying the TPACK framework and actually using the tools with my content, I get it now.

Most TPACK theorists agree that using the TPACK framework to frame the development of graduate students' knowledge does not require a rigid adherence to one approach to technology integration (Harris, Mishra, & Koehler, 2009). Rather the development as well as the demonstration of graduate students' TPACK knowledge requires flexibility and fluency. During the course, graduate students began to develop some flexibility and fluency as they applied the TPACK framework to their instructional lessons.

Table 1. Sample description of how graduate students applied TPACK by making choices about technology, pedagogy, and content as they designed lessons

Technology Tool	Content	Pedagogy	Graduate Student Reflections
iMovie	Story Retelling--*The Three Little Pigs* by Jeanette Sanderson	The teacher had students create three pictures depicting the story sequence. Students then shared their three pictures and provided an oral retelling, which was recorded using iMovie. The movies served as inspiration to write their own version of *The Three Little Pigs*, which served as the script for a puppet show.	"As graduate students, we saw first-hand the increased level of engagement from students when technology is incorporated into a lesson because of every student's desire to record their retelling. Students are eager to create another story."
Wordle	Writing--Word Choice & Frequency	The teacher demonstrated how to copy and paste a story into Wordle; students then pasted their written story in Wordle. Students reviewed all the words highlighted which represented their descriptive word choice frequency of word usage.	"We were actually surprised at how excited the students got about picking out their describing words in the Wordle. They were visually excited about the Wordle, but were also excited because it was individualized and something they had never worked with.
VoiceThread	Unit on Central Africa	The teacher had students create a culminating project using VoiceThread. The project incorporated all they learned about the people of Central Africa. The VoiceTread allowed for the students to thoughtfully organize and represent the content learned.	"I saw firsthand how the middle school students came more alive and involved with their classmates and with the content itself. They were able to carry on a lengthy discussion of different issues that involve the lives of Central Africans, such as war, plague, famine, and drought."
Glogster	Reading--*The Gift of the Magi* by O. Henry	The teacher instructed students to create a Glog for O. Henry's *The Gift of the Magi* that represented their literary analysis of the story. The Glog contained five quotes from the story, five images, three literary terms found in the story (i.e., irony, imagery, metaphor), and a sentence suggesting the theme of the story. Students' final product was uploaded to the class webpage.	"Even the hesitant students who were initially frustrated eventually completed the assignment. The activity was much more engaging than using markers and paper; it likewise allowed the students a chance to practice their online literacy skills."
Toondoo	Reading-- Fictional Text	The teacher used Toondoo to enhance students' ability to understand character analysis. The students focused on the following aspects of the characters in the story: appearance, actions, personality, and interaction with other characters.	"Students gained deeper understanding of the characters in the story than if they had only read the book."
Technology Tool Reference iMovie: http://www.apple.com/ilife/imovie/ Wordle: http://www.wordle.net/ Voice Tread: http://voicethread.com/ Glogster: http://www.glogster.com/ Toondoo: http://www.toondoo.com/			

Newly Acquired Instructional Confidence: "My fear level has diminished greatly!"

Coding results of graduate students' reflections showed that as a result of participating in the course, they had a new attitude towards the "technology" element in the TPACK framework. They no longer had a skeptical attitude towards the values and importance of technology integration. One graduate student revealed her change in attitude by sharing, "I am hesitant to use technology because I am nervous it will not be meaningful. But I am now willing to take the risk until I get it right." Another graduate student added,

I was very skeptical about technology's place in the classroom. Now I can see how it can be used *effectively in the classroom. Technology tools are great because they are fun for students and they get students engaged in learning. They also provide students with experience and practice in new literacy skills.*

This change in graduate students' perceived value of instructional technologies in turn led to the shift in how they now recognized that technologies should not be extra, which was evident in several graduate students' forum posts. One graduate student stated, "Integrating technology into curriculum is not a choice any more. It is requirement." Another graduate student highlighted her change of attitude when she explained,

Initially, I viewed the use of technology as a separate entity within the confines of the classroom. After reading Daniel Pink's 'A Whole New Mind,' I understand that the integration and exposure to different mediums of technology is the key to participating in the conceptual age. The necessity of integrating technology in the classroom is overwhelmingly vital for teaching students how to be global learners.

Obviously, graduate students have come to understand that they cannot "use technology for the sake of using it". Instead, they realized that technologies in the classroom must be integrated in such a way that the students are the ones that are taking the lead, as stated in one of the teacher's final paper.

In addition to the graduate students' shift in their perceived values of technologies and the urgent demand for them to integrate technology as an integral part of teaching, most of the graduate students in this study also acknowledged that their confidence level in applying new technologies to further student learning had greatly increased due to their TPACK development throughout the semester. One graduate student stated,

At the beginning of this class, I was overwhelmed. However, I feel I have grown so much in my confidence. I now feel confident in discussing these new media literacies with my students and learning from their experiences to drive future instruction.

Another graduate student used an analogy to express her TPACK:

Like a puzzle, I need to figure out the perfect placement of each piece of TPACK to make it work together. On numerous occasions I have tried but have not found the correct placement. Now I feel my puzzle is starting to come together. I feel much more confident combining the various components of the TPACK analogy and using them in unison.

Another graduate student voiced an increased confidence level in technologies integration. In her initial TPACK reflection she stated that she "felt a little 'in the dark' and overwhelmed." At the end of the course, she stated, "I don't feel as overwhelmed because I now have more experience and know that I can integrate technology successfully!"

Developing constructive attitudes and fostering a sense of responsibility is vital for graduate students to successfully use technologies in their classrooms and to face the challenges in the new educational era. It was evident from the data analysis that the different course activities and the scaffolding they received fostered a new attitude about TPACK.

Navigating Technology Problems: "Technology can be Very Frustrating but That Doesn't Mean We Shouldn't Use It!"

Many educators are aware of the problems facing the integration of technologies in the classroom. Several of the graduate students in this study voiced the challenges and difficulties that have prevented or hindered their use of technologies in the classroom. As one graduate student stated, “Time constraints, too few resources, and limitations and restrictions made integrating technology frustrating.” The coding results represented that indeed time, too few resources, and restrictions are the three problems faced most often when integrating technologies in the classroom.

Time restraints were identified the most frequently within the coding. As one graduate student revealed, “Time seems to be my major limiting factor; time to explore the tools, time to create meaningful activities and the time to teach my students.” Another teacher added,

I often feel that I simply do not have enough time to really dig into technology integration to do it justice. Technology changes and morphs so quickly, I hardly feel that I can keep up with learning the content, let alone integration of new concepts using technologies in meaningful ways.

There are only so many hours within a school day and time spent incorporating technologies is often the first to be set aside. Since using technologies does initially take time to integrate within the classroom, many graduate students (prior to their TPACK development) voiced that it was easier to just give up. However, throughout their TPACK development they discovered the importance of incorporating technologies into classroom activities. One graduate student stated, “I saw how incorporating technology with content and pedagogy really does make the material more accessible and gives students an added educational benefit/advantage.” This is an example of how time sowed in the beginning produces time in the long run.

The lack of resources was the second problem identified by graduate students throughout the coding. The U.S. economy and school budgets are often unable to financially provide classrooms with the latest technologies. One graduate student revealed, “I know when I have taught before technology was not always available. We had a computer lab once a week.” The technological lag in many ways is the main contributor to the educational-technological gap. This gap was a source for frustration for many of the graduate students and was often another cause for the graduate students to abandon technologies integration into teaching and learning. One graduate student stated, “There are numerous issues that may hinder one from being at the center of the TPACK model. Stressful assessments, low budgets, and limited technological resources can account for the many educators who lag behind the TPACK journey.” Once technologies became a content commitment rather than a classroom commodity, graduate students’ perceptions changed even in the face of little resources. One graduate student voiced her new attitude towards technologies integration after her TPACK development:

I love the idea about technology being a ‘wicked problem’ and that there aren’t quick easy answers that will work for everyone; that teachers will need to look at their specific circumstances and creatively work towards a solution that will probably not ever be completely resolved. I love the idea that it’s a constant work in progress, much like a piece of art.

The third problem graduate students addressed was the restrictions often placed on technologies within the classroom. Bans and blocked sites as well as government restrictions present a ongoing problem for technologies use in the classroom. One graduate student stated, “I have always been intimidated by trying to get all my students to use technology before because there is typically some type of complication that arises in the midst of it.” Restrictions often times are created to protect students from inappropriate content and technological predators. In keeping a school safe however, a large technological gap is the price teachers often pay. One graduate student voiced her TPACK discoveries with regard to restrictions and limitations as follows:

TPACK forced me out of my comfort zone. Working with technology can be tricky and frustrating! I learned that I like to take risks with technology and that it feels good to know I'm providing my students with cool tools they can use in other curricula as well.

Another graduate student added,

My attitude has changed in that I am less weary of trying new things with my students. I am less intimidated by the idea of classroom instruction on the Internet. When used appropriately, student engagement, increased comprehension and mastery of new literacies can occur. Most importantly, I've learned that if I expect my students to be open and malleable, I too must be willing to take chances.

These chances are not taken at the expense of student safety but as a way to teach school students how to become critical consumers of multimedia text.

Motivated and Excited by School Students Responses to Technologies: "I was thrilled to see my students so engaged."

Motivation and excitement are two components that are necessary for technologies integration into classroom activities, to overcome the many challenges and become a fixed facet of instructional curriculum. The motivation to bridge the technological gap in classrooms must begin internally with the teacher. We cannot wait for technologies to become a curriculum requirement in order for teachers to incorporate them. The integration must start with the teacher. The graduate students throughout their TPACK development became increasingly more motivated to include technologies in their teaching and learning activities, in spite of the constant challenges. It was clear that many graduate students' perspectives were changed and they become motivated to incorporate technologies in their own classes. As one student stated,

I want to incorporate technology today that will help my students prepare for their futures tomorrow, whether that is through demonstrating lifelong learning as I attempt to use new technology tools, through teaching them how to read critically online, or through using technology in ways that match how they will need to use it in the workplace.

Integrating technologies during the course provided a chance for the graduate students to have many questions answered, experience camaraderie, and to see the big picture of technologies integration. These combined with a pedagogical foundation and content knowledge helped to dispel fears and produce motivation. One graduate student expressed her new perspective by saying, "My students will be facing a world which does not exist at the moment and it is up to me and other teachers to prepare them for that world." These graduate students' motivation was not influenced by the "cool factor" of technologies, but rather by their responsibility to students.

The graduate students' motivation was also fueled by student responses to technologies integration. Many graduate students claimed to see an increase in their students' productivity, interest in the content, and ownership of their work. However, the graduate students began to see how bridging school students' out-of-school literacies with the curriculum, enhanced rather than decreased learning productivity. Many graduate students echoed this graduate student's statement that "Students realize the importance of technology and their world is beginning to revolve around it more and more." As the graduate students began to incorporate technologies into their own classroom, their students began to respond in very similar ways as revealed in the following graduate student's statement:

I observed how beneficial it was toward my students'learning. The inclusion of VoiceThread was important for developing higher level thinking skills in my students. This Web 2.0 tool seemed to engage my students better than the textbook has in the past, and they really enjoyed listening to the story being read to them, as well as being able to comment on different questions.

Another graduate student stated, "I learned that my students have NO FEAR when it comes to technology. They greet each new resource with cheers and excitement. The newer the technology is, the higher the excitement. I need to be this way!" Many graduate students also agreed that they must welcome their new educational challenges with excitement; they had seen how responsive their own students had become from their incorporation of technologies. As one graduate student stated, "The wheels are turning and I am dreaming of a myriad of ways that I can put into practice all that I have learned this semester."

The graduate students' commitment to integrate technologies into their teaching and learning did not stop in their classrooms. Many of the graduate students revealed their desire to pass this learning onto fellow graduate students and other schools. One graduate student stated, "My goal is to influence other teachers to combine their technological, pedagogical and content knowledge into lessons. I plan to share my lesson ideas, which are formed with the TPACK framework in mind, with my fellow educators". Throughout the study of these graduate students' TPACK development, the coding revealed that TPACK was the catalyst for their new motivation and excitement for technologies in school classrooms. Their own students' responses were the final nudge forward into the exploration of digital technologies and the sharing of knowledge with their learning and teaching communities. The goal stated by this graduate student sums up the desired result of a TPACK development:

I am not going to be just the cool technology teacher who lets the students do fun things. I am going to be the cool technology teacher that knows her stuff, meets the content needs of the classroom teachers, engages her students in fun, yet meaningful ways, and prepares each student who leaves her classroom to meet the ever demanding global needs of the 21st century.

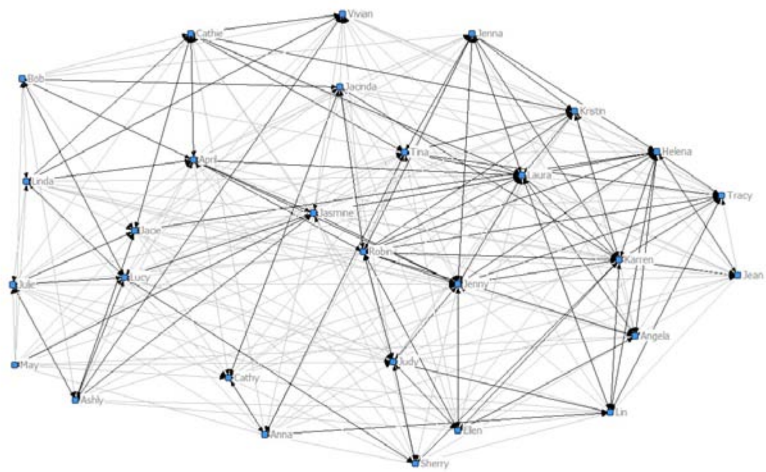
Results of Social Network Analysis of Students' Online Interaction Patterns

The graduate students' online interactions were analyzed to address the research question: How does online interaction contribute to graduate students' TPACK development? In order to answer this question, a social network analysis on the graduate students' interactions within Moodle was conducted. Data for the analysis was acquired from computer log files and activity reports that are part of the Moodle course management system.

According to the requirement of the course, each graduate student was required to respond to at least one other graduate student's original post in each forum. The frequency of the interactions was recorded in a matrix. It is important to note that, for the density measure in this study, the matrix was dichotomized (cutoff value=0) using the social network software Ucinet 6.0. The results of the social network analysis indicated that the online learning community had a density level of 0.3842, which, based on previous research, is considered high (Lipponen, Rahikainen, Lallimo, & Hakkarainen, 2003).

In order to give a clearer picture of the entire network, the interaction pattern was visualized using social network software Netdraw 2.0 (see Figure 2). The dark lines indicate reciprocal interactions, which mean that the targeted pair of graduate students commented on each other's posts. The light gray lines indicate unidirectional interactions among all of the graduate students,

Figure 2. Visualization of students' interactions



with the arrows indicating the direction of interaction. From Figure 2, we observed that "Robin", "Jasmine", and "Jenny" were in a more central position of the network. This position of centrality indicates that these 3 graduate students were the most active participants in the social network; specifically, they had a greater number of reciprocal as well as unidirectional interactions within the online community.

Relationship between TPACK Development and Online Interaction Patterns

It is evident from the social network analysis data that the graduate students were able to form a cohesive online learning community through interactions with each other within the Moodle environment. This online network and connection in turn contributed to the students' TPACK development. These findings were also supported by our coding results of graduate students' online reflections. One graduate student stated in her final paper, "I have been able to network and seek help from fellow graduate students. I benefited extensively from the collaborative, idea-sharing atmosphere." Another graduate student added, "This course really became more of a congenial community where we shared our knowledge and helped each other learn." Yet another graduate student went further by saying,

At the beginning of this class, I felt a bit intimidated by incorporating technology into my lessons; I knew I would need support and guidance through the process. However, I feel I have grown so much in my confidence. I have also been given much to consider through the readings and the online discussion forums.

It became evident that the graduate students benefited from the scaffolding they received from their classmates in the online community.

One of the reasons some graduate students were more active in the online community than others, may have been due to their level of comfort with technologies in general. For example, the graduate students who reported higher levels of technologies experience at the beginning of the course were also the graduate students who were more active in the online discussions. "Robin", for instance, was in the most central position of the network, was a graduate student in the instructional technologies program as well as a teacher, who had much experience with technologies. He also stated in one of his written reflections in reference to his TPACK, that he was "the calm in the midst of the storm" when it came to technologies integration. In an online learning community, like in a face-to-face learning environment, more experienced participants tend to help less experienced participants make new meaning, create new knowledge, and develop professional skills during frequent online discourse. This type of distributed expertise among class members is essential in order for everyone to receive the necessary scaffolding for skill development.

Several other graduate students held a more central position in the network based on their prior experience with technologies. Based on the research data, however, all graduate students regardless of their initial level of technologies experience participated actively in the online environments. Their participation went well beyond the course requirement of at least one response to a classmate for each forum. It can be concluded then, that graduate students with different initial technologies integration levels were able to fully participate in online interaction and discussion by actively sharing ideas, information and experience, and negotiating their views of learning with technologies, and specifically, the TPACK framework. Based on Vygotsky's (1978) view that learning is a social phenomenon, such frequent social interactions can also serve as scaffolding of students' new TPACK knowledge construction.

FUTURE RESEARCH DIRECTIONS

There are several directions that future research could address. Firstly, this study was based on a single semester-long online graduate course. Further research that has a longer study timeframe and larger sample size would be helpful for a deeper understanding of how graduate students use the TPACK framework to evolve their practices with technologies integration. Secondly, it is important to note that the social networking analysis addressed online interaction patterns of the participants but it did not address the quality of those interactions. Future research could focus on providing a content analysis of graduate student responses to assess levels of quality, including construction of new knowledge. Thirdly, research could also be undertaken to assess students' performance and learning outcomes in an online environment, compared with students' in a face-to-face or hybrid learning environments. Fourthly, studies focusing on the impact of the online facilitator as well as other contextual and student factors could also significantly contribute to the body of knowledge in the field of online teaching and learning. Clearly, there is much research to be conducted in this area so that we can have a clearer picture of communication patterns as the learning that takes place online.

CONCLUSION

The theoretical and practical implications of this study contribute to our understanding of the value of TPACK and the value of student voices to help shape the future educational landscape. It is important for graduate students to articulate the types of learning and "meaning making" that they experience with technologies. Ultimately, teachers will always face challenges in engaging students with content through technologies. Using TPACK as a framework to help guide thinking and instructional choices appears to be a powerful tool for teachers and students. Throughout their TPACK development the graduate students within the class began to see that many of the challenges as opportunities to grow as an educator and as an individual. As one graduate student stated, "Only by blending time-honored practices and strategically and reflectively incorporating technology can my students reach new horizons and learn what they need for future success." The goal is for teachers to be lifelong learners and to adapt to changes so they can support their students to be engaged, 21st century learners who will grow up to be globally engaged citizens and workers.

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KEY TERMS AND DEFINITIONS

Density: In social network analysis, the density of a network is defined as the actual total number of ties among nodes, expressed as a proportion of the maximum possible ties.

Dichotomized Matrix: In social network analysis it refers to the. presence or absence of interactions, which is represented by 1 or 0 in the appropriate cells of the network.

Inquiry Learning Project (ILP): A graduate level assignment in which students posed an inquiry question related to integrating technology into their content area.

Mixed Methods: Use of both qualitative and quantitative methods to study educational phenomena. The two methods may be used simultaneously or at different stages of the same study.

New Literacies: New literacies emerge from the theoretical and practical intersection of literacy, evolving technologies, and media. The New Literacies Collaborative (NLC) is a multidisciplinary team of scholars and educators who promote teaching, learning, research, professional development, and global connections around new literacies (see newlit.org).

Pedagogical Content Knowledge (PCK): Shulman (1986) highlighted pedagogical content knowledge, which is the knowledge required to teach specifically within different academic content areas. Shulman's contribution dramatically advanced the understanding of teacher knowledge and how it develops.

Social Network Analysis: Social network analysis focuses on the patterns of interactions among individuals in the network. Common measures in social network analysis include density, centralization and centrality degree.

Technological Pedagogical Content Knowledge (TPACK): Koehler and Mishra (2006) claim that effective teaching with technology requires TPACK, or an ability to integrate content, pedagogy and technology flexibly during the act of teaching.

Chapter 3
What are Alberta's K-12 Students Saying about Learning with Technologies?

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ABSTRACT

Students in Alberta, Canada expect rich opportunities to learn with technologies—opportunities that allow them to use technologies to improve their productivity when learning; to facilitate more complex, collaborative and authentic learning experiences; and to personalize their learning with respect to location, time and pace. While students in schools in Alberta share common expectations for learning with technologies, they do not report common experiences, citing individual preferences and/or contexts as their reasons. These findings derive from an analysis of student voice data collected through research projects and student engagement activities conducted in the province's K-12 community from 2006 to 2010. In this chapter the authors summarize the collected data and discuss themes common to students' expectations for learning with technologies as well as reasons why students' experiences using technologies for learning differ. The authors also outline ways in which Alberta's K-12 community is evolving to meet students' expectations for learning with technologies. In closing, the authors challenge the reader to consider what can be done to ensure that students have a voice in designing relevant, technology-rich learning environments that meet their expectations.

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INTRODUCTION

Alberta Education[1] and the K-12 community routinely collaborate to support the continuous improvement of public education in Alberta, Canada. Alberta Education is the government department responsible for K-12 education in the province. Stakeholder groups with whom the Department collaborates include school boards, professional development providers, faculties of education, and researchers. Alberta's K-12 public education system currently serves approximately 585,000 K-12 students and employs almost 45,000 teachers in 2,133 schools.

In an effort to expand their understanding about effective uses of technologies for learning, Alberta's K-12 community have participated in three research projects and a stakeholder engagement initiative over the past four years. The broad educational goals for the research initiatives included investigating the educational benefits of learning with technologies, determining levels of readiness among jurisdictions to integrate technologies, determining the technical requirements and implementation issues associated with integrating technologies for learning, gathering feedback from various education stakeholders, and disseminating lessons learned. The gathering of students' views regarding learning with technologies was an important component of each of these research initiatives. The engagement initiative also sought to involve students as well as other education stakeholders (e.g., parents, teachers, administrators) in conversations about the current and future state of education in Alberta. These initiatives employed student surveys, interviews, focus groups, and classroom observations to collect data about students' experiences and expectations regarding their use of technologies for learning.

Planning for the first two research projects, the *Emerge One-to-One Laptop Learning Project* (2006-2010) and the *Technology and High School Success Project* (2007-2010), involved reviewing current literature about the integration of technologies for learning. The literature spoke of several educational benefits and successful implementation approaches. For example, preliminary studies of one-to-one laptop implementations in schools in Canada, the U.S. and Australia reported educational benefits such as: (a) increased student motivation, engagement, interest, organization and self-directed learning; (b) improved student attendance; and (c) reduced student attrition (Alberta Education, August 2006). Similarly, classroom technology use was shown to: (a) improve the relevancy and richness of students' learning experiences, (b) improve levels of independent learning among students, (c) motivate and engage students, and (d) offer students choice and flexibility (Alberta Education, June 2007). The literature also indicated that successful implementations of one-to-one computing involved taking holistic approaches with an emphasis on educational goals and engaging school and community members (Alberta Education, August 2006).

Participation in the third research initiative, the *Speak Up National Research Project* (2009), provided another opportunity to gather student feedback about learning with technologies. For the past seven years, this U.S.-based initiative has employed quantitative surveys to elicit a variety of education stakeholders' beliefs about learning with technologies. *Speak Up* researchers report that,

students, regardless of community demographics, socio-economic backgrounds, gender and grade, tell us year after year that the lack of sophisticated use of emerging technology tools in school is, in fact, holding back their education and in many ways, disengaging them from learning. (Project Tomorrow, March 2010, p.1)

Project Tomorrow, the non-profit organization that leads the *Speak Up* initiative, believes that the voices of stakeholders, including students, should be included in national and local discussions about education.

In addition to these research projects, Alberta's youth participated in a student engagement initiative called *Speak Out: Alberta Student Engagement Initiative*. Alberta Education's *Speak Out* initiative provided Alberta's youth with opportunities to share their experiences and ideas about learning with decision makers. Engagement activities, informed by a case study[2] in deliberative democracy whereby citizens are engaged in joint decision making with government, were used to gather student perspectives about learning with technologies.

Taken together the findings from these four initiatives provide a clear picture of what Alberta's students are saying about learning with technologies. This chapter describes these initiatives in detail. Major themes evident from the collected data are discussed. In addition, the chapter offers descriptions of activities being undertaken by Alberta's K-12 community to further enhance students' experiences learning with technologies. The chapter concludes by challenging the reader to consider the importance of student voice in the design of environments that meet students' expectations for learning with technologies.

FOUR K-12 EDUCATION INITIATIVES IN ALBERTA, CANADA

Students' perspectives on their experiences and expectations regarding learning with technologies have been gathered through the *Emerge One-to-One Laptop Learning*, *Technology and High School Success*, *Speak Up*, and *Speak Out* initiatives. The goals, participants, contexts, methodologies and findings for each of these initiatives are discussed in detail below. An analysis of the findings can be found in the Analysis section of this chapter.

Emerge One-to-One Laptop Learning Project (2006-2010)

Alberta Education and researchers from The Metiri Group[3] and the University of Calgary collaborated with school jurisdictions to investigate one-to-one wireless learning in Alberta. Through the *Emerge One-to-One Laptop Learning Project* (*Emerge*)[4], researchers sought to answer the following questions:

- What are the potential educational benefits of one-to-one laptop learning?
- What are the technical requirements and innovative practices of one-to-one wireless learning?
- What expertise, experience and lessons learned have come from the *Emerge* project in Alberta?
- What is the level of jurisdictional and provincial readiness for systematically advancing 21st century learning[5] and effective uses of technology in learning?
- What are the trends and/or variances across indicators over time?

In addition, each participating school was required to design their implementation to support one or both of the following specific educational goals:

- Enhancing teaching and learning for specific student populations including students with diverse needs, English as a Second Language (ESL) students, and First Nation, Métis and Inuit students.
- Improving student learning in targeted areas such as literacy and numeracy.

Participants and Contexts

Over 2000 students (grades 4 to 12) and approximately 200 teachers from 50 schools participated in this study. Participating schools represented

20 school jurisdictions from across Alberta. Although learning environments differed from school to school, most students involved in the *Emerge* project had anytime, anywhere access to a computing device as well as several tools and resources including productivity software, assistive technologies, online learning resources and tools, rubrics, and collaboration tools. While at school, wireless local area networks enabled students to connect to the Internet. Many students also took their laptops home, giving them "24/7" access to their computers.

Participating schools addressed several components within a holistic implementation plan—components that are aligned with the National Educational Technology Standards developed by the International Society for Technology in Education (ISTE)[6] and deemed essential to the successful implementation of technology in schools.

Participating schools were closely linked through a community of practice. This network of participating teachers met regularly to discuss issues, solve problems, share best practices, and build a shared knowledge base to support the successful implementation of one-to-one laptop learning environments. In addition, Alberta Education provided *Emerge* participants with several implementation supports including funding, preferred pricing on selected technologies, planning supports, literature reviews, access to experts, site visits, annual conferences, collaboration opportunities, and professional learning supports.

Methodologies

Project researchers chose to use a mixed methods approach for this project. This approach involved the collection of qualitative and quantitative data and employed surveys, jurisdictional case studies, classroom observation protocols, and interviews with researchers. Surveys were administered at multiple times throughout the project to facilitate a longitudinal view.

A mixed methods approach is well-suited to projects that have a high degree of conceptual complexity and minimizes the limitations of a single research methodology. The mixed methods used in this project allowed researchers to take a developmental approach to defining the problem, to conceptualize the problem from different points of view, and to gather and triangulate both quantitative and qualitative data. Mixed methods approaches are not without their limitations however. For example, survey approaches are known to have self-reporting limitations (e.g., intentional deception, poor memory, or misunderstanding of the question) and longitudinal studies suffer from time and resource constraints and participant attrition.

The methodologies of interest to this discussion are the student interviews and surveys. Students' views about learning with technologies were ascertained by the researchers through interviews in the spring of 2008 and 2009, and surveys were used to assess levels of student engagement among 1019 elementary and secondary students in the fall of 2008 and the spring of 2009. During that same time frame, surveys were used to determine levels of self-directed learning among 761 students and to garner 1164 students' perceptions on the characteristics of their learning environments.

Understanding how the project researchers defined "student engagement", "classroom structures", and "self-directed learning" is important to the discussion of the methodologies used, as well as to the analysis of the findings. Definitions used by project researchers are as follows.

Student Engagement

Student engagement was defined by project researchers as "the degree to which students are actively pursuing deep learning related to established standards." (Alberta Education, 2010a, p. 22) Deep learning was defined as "learning that involves the critical analysis of new ideas, linking them to already known concepts and principles, and leads to understanding and long-term retention of concepts so that they can be used for problem solving in unfamiliar contexts." (Alberta Education, 2010a, p. 22)

The series of questions that were used to assess student engagement were based on the cognitive, behavioral, and social/emotional elements of this definition as follows: (a) Cognitive elements refer to students' investments in their efforts to comprehend complex ideas and master difficult skills; (b) Behavioral elements refer to students' participation in academic, social and extracurricular activities; and (c) Social/emotional elements refer to students' interdependence with classmates, academics, teachers and school.

Building on the research of recent engagement theorists, a taxonomy of student engagement levels was developed to distinguish different types and levels of engagement. Using this taxonomy, nine survey items were written to reflect each of the five levels of engagement for a total of 45 items. The engagement level of students was established by locating the level with the highest mean across the nine questions within that category. Students whose responses did not fit within the definition of one *range.* engagement level were classified as indeterminate (Alberta Education, 2010a). Using this taxonomy, one would expect an engaged student to respond positively to "I like anything I learn about in school." Similarly, a withdrawn student would rate a high level of agreement with the statement "I do not go to school activities after school. I like to leave school as soon as I can." (Alberta Education, 2010a).

A five-point subscale of student engagement was used as follows: (a) intrinsically engaged, (b) tactical, (c) compliant, (d) withdrawn, and (e) defiant. Intrinsically engaged students were those who see activities as personally meaningful, persist in the face of difficulty, believe they will accomplish something worthwhile when challenged, and focus on getting it right. Tactically engaged students were those who substitute their own, often extrinsic, goals for the work (e.g., grades, class rank, college acceptance and/or parental approval) and focus on what it takes to meet those personal goals. Compliant students were those who neither find meaning in the work nor do they substitute their own goals for the work. These students do the minimum to get the work done. Withdrawn students were those who are disengaged, emotionally withdrawn or are thinking about something else besides the work. They feel they are either unable to do the work or are uncertain about what is being asked and reject both the official goals and the means by which to achieve the goals. Defiant students are not only disengaged from current classroom activities, they are actually actively engaged in another agenda. These students were those who are often seen as acting out, inciting others to rebel (Alberta Education, 2010a).

Classroom Structures

Project researchers described the characteristics of learning environments that contribute to student engagement using three classroom structures. These "content", "process" and "product" structures are varied to help differentiate instruction and improve student learning. Content structures refer to the ways in which students gain an understanding of the learning goals within a content area through tasks that focus on key concepts and principles. Process structures such as flexible grouping and varied instructional approaches allow students to master the content while working together. Product structures involve assessment approaches that enable students with diverse interests, needs and abilities to demonstrate what they have learned (Alberta Education, 2010a).

Self-Directed Learning

Project researchers defined "self-directed learners", "as motivated participants who efficiently control their own learning experiences. This control includes "organizing and rehearsing information to be learned, and holding positive beliefs about their personal capabilities, the value of learning, and the factors that influence learning." (Alberta Education, Spring 2009, p.28)

A three-point subscale of self-directed learning was used. This subscale consisted of (a) Forethought and planning; (b) Performance/volitional control; and (c) Self-reflection. Characteristics demonstrated by students with forethought and planning were being goal-oriented, interested in self-improvement, spending time planning from the outset, using tools to organize their work, building interest in the task, and believing that through effort they can accomplish anything. Students exhibiting volitional control had skills and strategies for self-testing, self-tracking, seeking help when required, maintaining focus on the task at hand, improving the quality of their learning, and persevering through difficulties. The self-reflective students were typically accurate in their evaluations of themselves, handled failure well, attributed failures to things they can control, and viewed failures as learning opportunities (Alberta Education, Spring 2009).

Understanding students' views about their experiences learning with technologies and determining their level of engagement, their perspectives on specific characteristics of their learning environments, and their degree of self-directed learning were seen by the researchers as critical to understanding the educational benefits of one-to-one laptop learning.

Findings

The trends revealed through the student surveys and the insights gained during the student interviews are discussed below. The student surveys reflected moderately high degrees of cognitive, behavioral and social/emotional engagement. On average, student engagement remained in the moderate to high range over the first two years of the project (Alberta Education, Spring 2009 and 2010a), revealed through students' responses to engagement surveys that indicated students were either *intrinsically engaged* or *tactically engaged* in learning (79% of students in year 1 and 69% of students in year 2).

Survey results also indicated that students in the *Emerge* project felt their classrooms were moderately engaging in terms of content, process, and product characteristics (Alberta Education Spring 2009, 2010a). In other words, students believed that their learning experiences drew upon their prior knowledge, offered them opportunities to collaborate with others, and provided them with opportunities to demonstrate their acquired knowledge and skills. Students also reported having relatively high levels of self-direction across the first two years of the project (Alberta Education, Spring 2009, 2010a).

The degree of self-direction was determined based on students' mean scores on the Self-directed Learning Inventory surveys (Alberta Education, 2010a). Students' responses during interviews were reported via case studies in the second year of the project. The following quotes revealed participating students' appreciation of learning with technologies. The selected quotes were obtained from Alberta Education personnel following their review of various jurisdictional case studies submitted as part of the reporting requirements for the *Emerge* project. These quotes suggest that students believe that learning with technologies:

- enhances students' abilities to organize their work.

  Quotes that illustrated this benefit included:

  a. "I love having a laptop. It is easy to keep all of my stuff organized and at hand. I do not lose assignments or have a bunch of paper in my locker. It's environmentally friendly. I need this laptop because I have already adapted my life to it! I do not want to go back to hand cramps, a bunch of books, and no research;"
  b. "My laptop helps me stay organized and I can easily locate my assignments;"

   c. "I like to use Microsoft One Note™ to organize my work;" and
   d. "I find that [the technology] makes it easier for me to do my work. It helps me stay organized… iGoogle™ has a "to do list" gadget that allows me to put nine things on my list."
- improves students' abilities to personalize and support their learning.
  Quotes that illustrated this benefit included:
   a. "I like how the technology gives me the freedom to choose how I want to express myself;"
   b. "I like having access to the Internet because I can look up those things that I didn't quite understand in class;"
   c. "For me my laptop is my main resource for learning. Without it, the options and variety of resources I can access would be limited. The laptop has helped increase my ability to learn and taught me useful skills that I will use for the rest of my life;"
   d. "Especially for essays, typing [on my laptop] is way easier for me to brainstorm my ideas and start writing;" and
   e. "I can use the Internet to find out anything I want to know."
- allows students to communicate and collaborate with others.
  Quotes that illustrated this benefit included:
   a. "I like using online communication tools like wikis and learning management tools like Moodle™ because when I'm sick I can still contact the teacher or look up what I missed;" and
   b. "I can use Desire2Learn (D2L)™ to hand in assignments and collaborate with others."
- develops students' abilities to select and use a variety of tools to support their learning.
  Quotes that illustrated this benefit included:
   a. "We recorded [our voices] on Audacity™ and then we got to hear ourselves and see if we needed to use more expression or read the words more loudly;" and
   b. "I go to Read and Write Gold™ when I'm having trouble reading something or if there are any words I don't know how to pronounce."

Assuming that students' experiences of learning with technologies contribute, at least in part to student engagement and self-direction, the survey findings taken together with the sampling of students' quotes suggest that *Emerge* students' had positive experiences learning with technologies during the first two years of the project.

Technology and High School Success Project (2007-2010)

A research team, commissioned by Alberta Education, investigated the relationships between the effective uses of technologies and various indicators of students' success. The overall goals of the Technology and High School Success (*THSS*) Project[7] were to:

- increase understanding of the issues and considerations that impact successful implementation of classroom technologies in secondary schools; and
- develop and disseminate practices in the use of technologies that have shown promise in improving student engagement and success.

Each *THSS* school[8] defined student success differently, focusing on one or more of the following characteristics:

- Improved engagement, attendance, academic achievement and a sense of belong-

ing for students who are at-risk of not completing high school.
- Supported student transitions.
- Increased access, flexibility and choice in terms of learning opportunities.
- Improved opportunities for collaboration and mentorship among teachers and students.
- Enhanced teacher proficiency with respect to using technology to differentiate instruction.

Participants and Contexts

With support from Alberta Education, 24 school jurisdictions explored the use of technologies to improve student success in secondary schools. This research initiative involved approximately 22,000 students (grades 7 to 12) and 420 teachers from over 70 schools. Participants included those from rural and urban as well as large and small school contexts in the province. As was the case with the *Emerge* project, participants were closely linked through a community of practice. They were also offered a range of supports including dissemination of related research and evolving best practices, a project web site and online meeting space, professional learning opportunities, field visits, project planning tools and templates, assessment toolkits, engagement and satisfaction survey resources, and preferred educational pricing on selected technologies.

Methodologies

The multi-partner research team, with representation from the University of Alberta, the University of Calgary, and the Galileo Educational Network Association[9], used a mixed methods case study approach to answer the primary research question: "What is the relationship between the effective use of technology and student success?" This research methodology combined qualitative and quantitative data collection and analysis within a fixed group of participating schools The data was analyzed and triangulated with data collected by the schools or jurisdictions (e.g., attendance, retention, grades and logs). This mixed methods case study approach was chosen as a means to address the different goals, objectives, timelines and skills sets of each participating jurisdiction as well as to establish generalizable themes arising from each context. As was described in the methodologies section of the *Emerge* project, similar strengths and weaknesses are inherent in the mixed methods approach used for the *THSS* project.

Researchers used standardized online surveys and focus groups to gather student feedback regarding engagement, technology use and attitudes about effective uses of technologies. Early in the first year of implementation of the *THSS* project, approximately 1100 grades 7 to 12 students participated in an online survey, and 52 students also participated in focus groups during the latter part of the first year. The focus groups allowed for triangulation of the survey questions with in-depth discussion between smaller groups of students and the researchers.

Researchers also used structured classroom observation protocols to measure four levels of student engagement. These levels of student engagement were (a) Disengagement; (b) Ritualistic compliance; (c) Academic engagement; and (d) Intellectual engagement. Disengagement referred to characteristics such as inattention, attending to an alternative activity, off-topic conversation or misbehavior. Ritualistic compliance described students working on assigned activities without enthusiasm or personal investment. Academic engagement by students included on-task behaviors that signaled serious engagement in class work (e.g., attentiveness, doing the assigned work, and showing enthusiasm for the work by taking initiative to raise questions, contributing to group activities and engaging with their peers). Intellectual engagement referred to students who were absorbing, creatively energizing their focus through contemplation, interpretation, understanding, meaning-making and critique. These students made deep, personal commitments to explore and investigate an idea, issue, problem or question for a sustained period of time (Alberta Education, March 2010 Draft).

Findings

Students' responses to the surveys and their input during the focus groups revealed several insights at the early stages of the *THSS* project, each of which is described below.

Students' Beliefs about Adequacy of Access to Technologies are Mixed

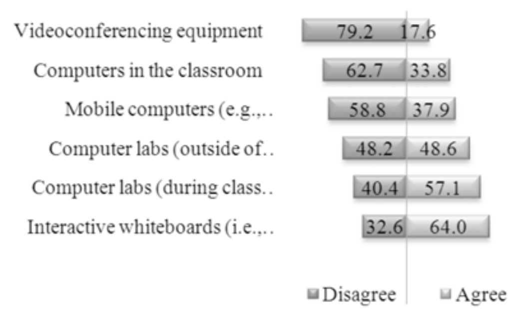
While students reported having adequate access to interactive whiteboards (64%) and computer laboratories (labs) (57.1%) during class, fewer than 50% of students felt they had adequate access to videoconferencing equipment (17.6%), classroom-based computers (33.8%), mobile computers (37.9%), and computer labs outside of class time (48.6%) (see Figure 1). These results reflect mixed perceptions among students concerning the adequacy of their current access to technologies.

In addition to the technologies listed above, students expressed a desire to access resources and technologies such as educational games, social networking sites (e.g., Facebook™), online videos (e.g., YouTube™), and Inspiration™ software. They also wanted to access personal email accounts and use their own laptops in school. In other words, students wanted increased access to a broader variety of technologies and personal devices.

Students' Experiences of Learning with Technologies are Mixed

Most students (71%) expressed positive or very positive opinions about the benefits of using technologies for learning. Students' positive opinions were supplemented with quotes that illustrated

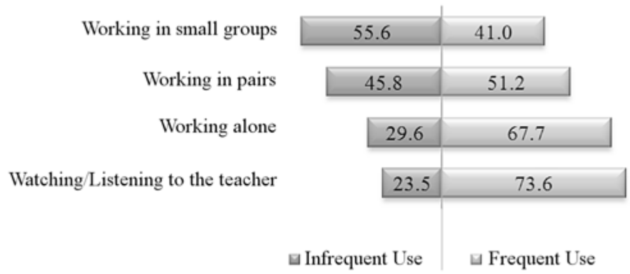
Figure 1. Survey question: Do you feel you have enough access to the following types of technology? (© 2010, Alberta Education. Used with permission.)



some of the benefits of learning with technologies. Students asserted that learning with technologies

- was more interesting.
  Quotes that illustrate this benefit included:
  a. "peaks my interest in otherwise boring topics;" and
  b. "provides us more information about [a] topic."
- was easier, faster and more fun.
  Quotes that illustrate this benefit included:
  a. "makes my work much easier—it's way easier to be creative and to express what I am trying to say;" and
  b. "makes our learning faster, easier and more fun."
- was more flexible.
  A quote that illustrates this benefit is "using the Moodle™ website made it much easier for me to catch up on work that I missed."
- suited their learning styles.
  Quotes that illustrate this benefit included:
  a. "helps a lot because it's a different way of presenting [information];"
  b. "an awesome alternative way to teach all learning types;" and
  c. "I like the technology because I can work on my own and figure things out

Figure 2. Survey Question: When you are using technology in class, how often are you…? (© 2010a, Alberta Education. Used with permission.)



in my own way" (Alberta Education, March 2010 Draft).

Students indicated that when using technologies in class, they most frequently watched or listened to their teachers (73.6%) or worked alone (67.7%). Students reported that working in pairs (51.2%) or in small groups (41.0%) occurred less frequently (see Figure 2). Students also reported spending the majority of their time on low challenge, low-level thinking assignments and tasks. These findings were consistent with researchers' classroom observations.

Students also cited several reasons for less than ideal experiences learning with technologies (Alberta Education, March 2010 Draft). Their reasons included

- limited opportunities to use the technology for learning.
  Quotes that illustrate this viewpoint included:
  a. "the teachers should be more open towards using the Internet and videos and podcasts in class so it makes it more interesting for us;"
  b. "using computers more often to look stuff up would help;" and
  c. "I think that there are plenty of opportunities for the teachers to implement technology during lessons, but the teachers rarely, if ever, use them."
- inadequate preparation by their teachers in the appropriate use of technologies for learning.
  Quotes that illustrate this belief included:
  a. "some teachers don't know how to use [technology];" and
  b. "half of the teachers use [technology], half don't, and those that do don't really involve us. They use the multimedia capabilities, but we just watch."
- poor performance and/or reliability of the technology.
  Quotes that illustrate this belief included:
  a. "the technology in our school is slow;" and
  b. "technology in the classroom is unreliable…. It limits the amount of learning time available as it constantly has problems, and is frustrating to both the students and the teacher."
- restricted access to information and email accounts.
  Quotes that illustrate this viewpoint included:
  a. "too [many sites] are blocked and we cannot access them—it is bothersome and inconvenient;"
  b. "We need email to help us with our education. It allows us to ask questions [of] other students and teachers;" and

c. "I wish we could have more freedom with the Internet" (Alberta Education, March 2010 Draft).

Although the researchers have indicated that it is too soon to draw generalizable conclusions based on this preliminary data, they suggest that students recognize the benefits of learning with technologies, yet feel that the full potential of technology use in classrooms is not consistently being realized. Students indicated that they want more reliable and less restricted access to a wider variety of technologies including personally-owned devices. Students also indicated that they want to use technologies in more interesting, motivating and challenging ways to enhance their learning. (Alberta Education, March 2010 Draft)

Speak Up National Research Project (2009)

Speak Up[10] is an annual research project facilitated by *Project Tomorrow*[11], a national education non-profit group based in Irvine, California. With *Speak Up*, the *Project Tomorrow* group aims to gather and report unfiltered feedback on key educational issues from students, teachers, parents, and administrators in the hope that the data will stimulate educational dialogue and raise awareness about the importance of stakeholder involvement in these conversations.

Participants and Contexts

Over the past seven years *Speak Up* has gathered and reported students' feedback on a range of educational topics from various countries including Canada. The project's most recent report provides a snapshot of students' views about how technologies are being used in schools and classrooms. (Project Tomorrow, 2010) Approximately 600 Alberta students from grades 6 to 12 participated in the *2009 Speak Up National Research Project*. Approximately 71% of Alberta's respondents were from grades 9 to 12 while the remaining 29% were from grades 6 to 8.

Methodologies

Students responded to 34 survey questions that probed their experiences and expectations for learning with technologies. The survey contained some open-ended responses and was designed to be grade and reading level appropriate. Survey methods were particularly useful for this project because they enabled the sampling of large numbers of students and allowed for the collection of data that would otherwise be difficult to observe directly.

Speak Up personnel summarized Alberta's student data in two separate reports made available to Alberta Education[12] in April 2010.

Findings

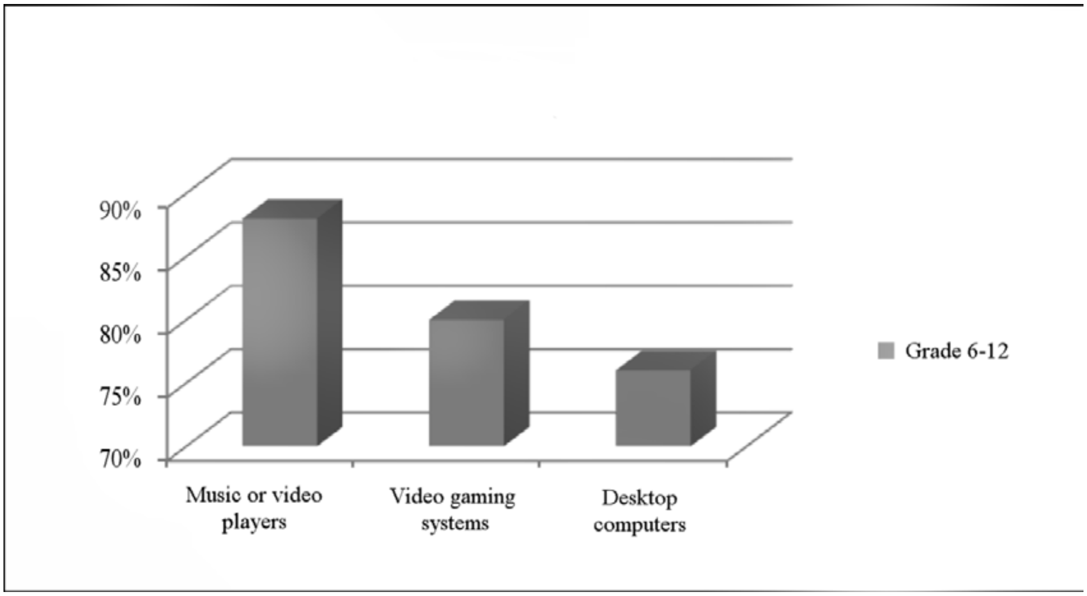
Students' responses to the *2009 Speak Up* survey are summarized below.

Students' Access to and Use of Technologies Outside of School is High

Students reported having access to a variety of electronic devices for personal use including cell phones and smart phones with Internet access; desktop computers, laptops and/or netbooks or mini-notebooks; digital readers; music or video devices; digital video cameras; and/or video gaming systems or handheld games. Students reported the highest levels of access to music or video players (88%), video gaming systems (80%), and desktop computers (76%) while fewer than 7% reported having access to digital readers or mini-notebooks.

Most students (88% of students in grades 9-12 and 74% of students in grades 6-8) reported having access to a computer with fast Internet access (e.g., DSL, cable or Broadband) outside of school (see Figure 3). Less than 1% of students reported that their access to computers or the Internet was

Figure 3. Most frequently reported electronic devices available to students for personal use. (Created from data reported in the grades 6-8 and grades 9-12 survey results for 2009 Speak Up (Project Tomorrow, April 2010)).



limited to the school. Yet 14% of students indicated that they did not have access to a computer or other technical equipment at school.

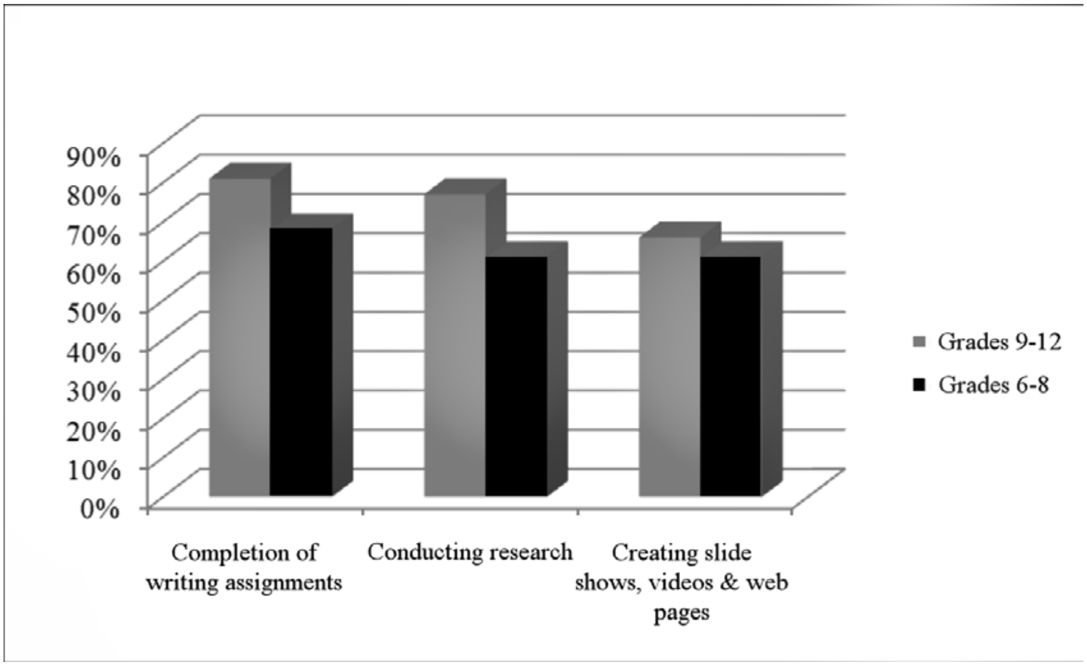
Students reported using technologies outside of school for the purposes of uploading or downloading media, creating new work using pre-existing media, communicating with others, participating in 3D virtual reality environments and online games, updating personal profiles, posting blogs or contributing to wikis, creating lists of resources, collaborative writing, and receiving notifications of things of interest. Of these, the three most frequently reported uses of technologies involved communicating with others (69% for students in grades 9-12 and 64% for students in grades 6-8); updating personal profiles (67% for students in grades 9-12 and 62% for students in grades 6-8); and uploading or downloading media (63% for students in grades 9-12 and 38% for students in grades 6-8).

Students' Beliefs about their Experiences Learning with Technologies are Mixed but their Expectations are High

The majority of the respondents (72%) considered themselves to be average technology users and comparable to most of their peers in that regard. In school, students reported using technologies for various types of schoolwork. The most frequently reported uses of technology in school (see Figure 4) included:

- completing writing assignments (81% for students in grades 9-12 and 68% for students in grades 6-8);
- conducting research (77% for students in grades 9-12 and 61% for students in grades 6-8);
- creating slide shows, videos or web pages for an assignment (66% for students in grades 9-12 and 61% for students in grades 6-8);
- accessing class information (e.g., grades, teachers' notes or presentations, podcasts)

Figure 4. Most frequently reported uses of technology in school. (Created from data reported in the grades 6-8 and grades 9-12 survey results for 2009 Speak Up (Project Tomorrow, March 2010).



(61% for students in grades 9-12 and 44% for students in grades 6-8);
- communicating with other students (62% for students in grades 9-12 and 49% for students in grades 6-8);
- using a profile (e.g., MySpace™, Facebook™, Friendster™) to collaborate with students on a project (43% for students in grades 9-12 and 32% for students in grades 6-8);
- taking tests online (38% for students in grades 9-12 and 26% for students in grades 6-8); and
- playing educational games (22% for students in grades 9-12 and 36% for students in grades 6-8).

Less frequently reported uses of technologies for schoolwork included uploading assignments to school portals (less than 22%); using online textbooks or other online curriculum (less than 21%); communicating with teachers (less than 19%); conducting virtual experiments or simulations (less than 17%); posting to blogs, wikis, micro blogs or Twitter™ (less than 13%); participating in online communities (less than 12%); taking an online class (less than 10%); listening to podcasts (less than 9%); participating in 3D virtual worlds (less than 6%); participating in videoconferences (less than 5%); getting help from online tutors (less than 5%); working on projects with students from other countries (less than 5%); and checking for plagiarism (less than 4%).

When asked how they might use mobile devices such as cell phones, PDAs and MP3 players to help with their schoolwork, the students offered suggestions that often mirrored their current uses of technologies in the classroom. For example, students suggested that they would use these devices to access online textbooks and social networking sites; communicate with peers and teachers; create and share documents, videos or podcasts; organize their work; coordinate their calendars; look up information on the Internet, receive alerts and reminders about homework and tests; take notes or record lectures; upload or download information; and work on projects with classmates.

Students in grades 9-12 and 6-8 concurred that they would most frequently use these devices for communicating with friends (over 60%) and looking up information on the Internet (over 62%).

Interest in taking online classes is low among students (29% for students in grades 9-12 and 41% for students in grades 6-8). Fewer than 10% of the students surveyed had taken an online course. Students cited several reasons for not having done so. Their reasons related to limited choices, inadequate marketing, learning style preferences, and lack of guidance and support when searching for and/or registering for classes.

Although the uptake by students is minimal, they did see benefits for taking online classes. The most frequently reported benefits of taking online classes differed among the grades 9-12 and grades 6-8 respondents. For example, high school students saw online classes as opportunities to take a class not offered at their school (36%), to fit a class to their schedule (34%), to control their own learning (34%), and most importantly, to learn at their own pace (46%). Middle school students also saw online classes as opportunities to learn at their own pace (42%) and to get extra help in subjects that they considered difficult (34%).

Students believe that major obstacles still exist in terms of their technology use in school (see Figure 5). Students' primary concerns were related to access, use, and/or performance of technologies as follows:

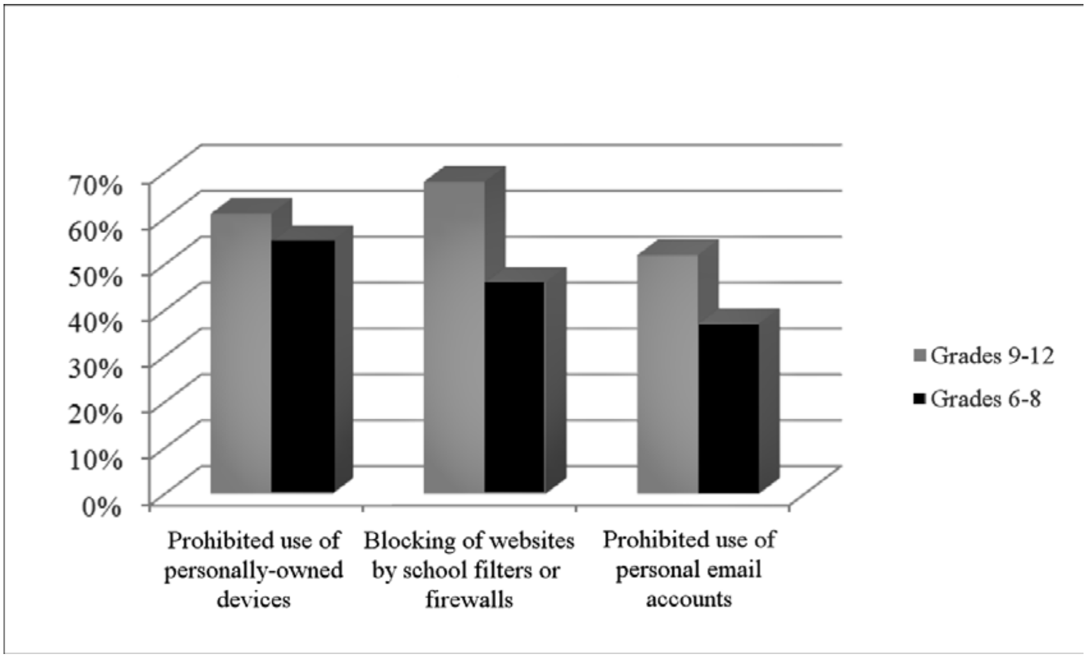
- Use of personal cell phones, smart phones or MP3 players is prohibited (61% for students in grades 9-12 and 55% for students in grades 6-8);
- Use of personal laptops in school is prohibited (27% for students in grades 9-12 and 37% for students in grades 6-8);
- Access to and/or use of personal email accounts is prohibited (52% for students in grades 9-12 and 37% for students in grades 6-8);
- Websites are blocked by school filters or firewalls (68% for students in grades 9-12 and 46% for students in grades 6-8);
- Teachers limit students' use of technology (42% for students in grades 9-12 and 30% for students in grades 6-8); and
- Internet access is not fast enough (27% for students in grades 9-12 and 41% for students in grades 6-8).

Not surprisingly, students' suggestions for how schools could make it easier for them to use technologies for their schoolwork involved allowing the use of personal electronic devices in schools, and improving access to various technologies and networks. Students suggested that schools should

- provide access to social networking sites;
- provide access to school networks and software applications from any computer at home or school;
- provide tools to help students organize their schoolwork, and communicate with classmates and teachers;
- provide unlimited access to the Internet throughout the school; and
- provide more electrical outlets for recharging purposes.

This data indicates that school students in Alberta are active users of technologies outside of school for personal use. It also shows that although many students are using technologies for learning in schools, their experiences do not meet their expectations.

Figure 5. Most frequently reported obstacles to using technology in school. (Created from data reported in the grades 6-8 and grades 9-12 survey results for 2009 Speak Up (April 2010))



Speak Out: Alberta Student Engagement Initiative (2008-2010)

In an effort to strengthen Alberta's K-12 education system, Alberta Education has been implementing its' multi-layered student engagement framework through the *Speak Out: Alberta Student Engagement Initiative*[13]. This initiative provides Alberta's students, aged 14 to 19, with multiple opportunities to reflect on and discuss their education with each other and with key decision makers.

Participants and Contexts

During 2008-2009, *Speak Out* held 38 local forums involving 1,590 secondary students as well as a first annual student conference with almost 200 students from across the Province. By early May 2009, students generated over 4,600 ideas and contributed 3,800 online postings. These consultations continued during 2009-2010. A total of 70 face-to-face forums were held involving 2,236 students in 29 school jurisdictions. A four-part online discussion forum series entitled the "Minister Wants to Know" took place. A student conference engaged 210 students, 85 educators and 61 chaperons from 54 communities across the province. Students (24) were also selected in 2009 to participate on a Minister's Student Advisory Council. Ongoing efforts are made to engage students from a variety of schools across the province as well as from groups representing diverse perspectives (e.g., students from rural, urban, and Northern locales, including First Nations, Métis and Inuit students, and at-risk and immigrant students).

Methodologies

In the *Speak Out* events students expressed their opinions and contributed their ideas at student forums, annual student conferences, through online and face-to-face discussions, during researcher- and student-led school-based focus groups, by completing monthly online surveys on various topics, and through participation on the Minister's Student Advisory Council. The forums and surveys, administered via the fully-moderated *Speak Out* web site, probed a range of students' views about their education including their perspectives about learning with technologies. Similar strengths and weaknesses were inherent in the data collection tools used to those mentioned earlier. However, the face-to-face discussions and focus groups provided sources of qualitative data that served to substantiate the survey results.

Input collected from fall 2008 to spring 2009 was organized into 25 themes. Students attending the May 2009 conference discussed these themes and drafted several recommendations. Students' recommendations were reported in *Year in Review 2008-09* (Alberta Education, October 2009). Themes ranged from individual learning styles and student / teacher relations to social / peer pressures and expectations. Integration of technologies in schools was one of the 25 identified themes discussed at the conference.

The 2009 surveys are germane here, as they focused on questions related to "using technology to learn" (January 2009), "learning anytime, anyplace, any pace" (April 2009), and "inspiring education" (June 2009). A total of 47 Alberta students responded to the January 2009 online survey about their use of technologies inside and outside of school. They also responded to questions about their anticipated needs for technology skills in the future. Seven discussion threads were initiated in conjunction with this survey. A question posed in part two of the 2009-2010 "Minister Wants to Know" online forum series was of particular interest to this discussion. The question was "How can technology be used to improve your school experience?"

Findings

Student responses and comments during these various student engagement events are summarized and analyzed below.

Students' Experiences Using Technologies Inside and Outside of School are Mixed

The following quotes illustrate the degree of diversity in students' beliefs about their experiences learning with technologies:

a. "My school always has the latest technologies, which is really cool and one of the reasons why I like school. We have smart boards in almost every single class. They are one of the greatest inventions ever!" (Student's quote from *Speak Out* 2009 forum.); and
b. "I happen to think that being able to do things like create, share, publish, and express using technology will be important skills to have. My school still depends on work sheets and work books and my teachers don't use technology." (Student's quote from *Speak Out* 2009 forum.)

The majority of students reported using technologies outside of school (91%) (see Figure 6) including the frequent use of social networking sites such as Facebook™ or MySpace™ (53% used these sites daily while 23% used them at least once per week). This is not surprising given that all respondents had either high speed or dial-up Internet access at home (89% and 11% respectively).

However, only 49% of these same students reported having adequate access to technologies in their schools and 6% reported that they did not have access to technologies in school (see Figure 7). When asked if they would like to be allowed to bring their own digital devices to school, 55% of students responded with a definite "yes" and many indicated that they were already doing so, either every day (53%) or at least once a week (23%).

Those students who had access to technologies in school reported using a variety of technologies for learning including movies or animations (57%), interactive whiteboards (47%), laptops (34%), wikis (23%), virtual field trips (13%), video conferencing (13%), and blogs (13%). Despite this

Figure 6. I use technology as part of my life outside school. (Created from data reported in "Speak out, Alberta student engagement initiative: we're listening…: year in review 2008-09" (Alberta Education, October 2009))

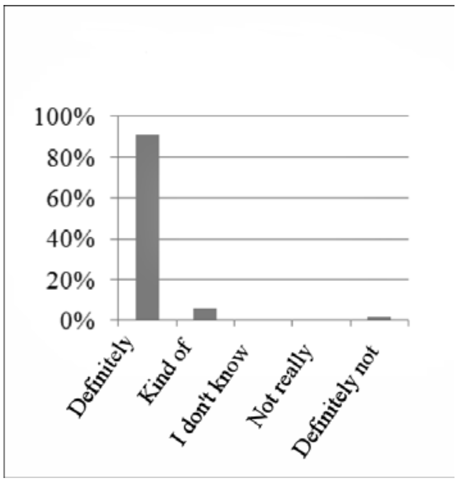
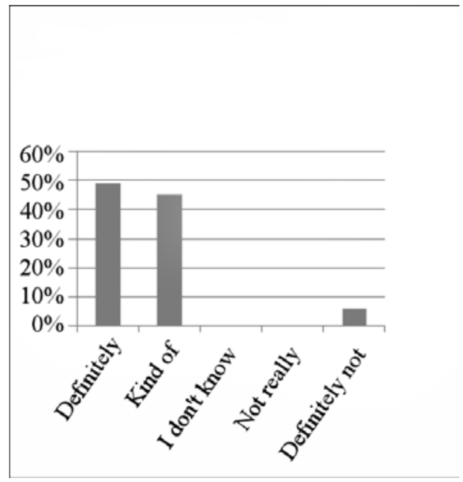


Figure 7. I have adequate access to technology in my school. (Created from data reported in "Speak out, Alberta student engagement initiative: we're listening…: year in review 2008-09." (Alberta Education, October 2009)



access, students reported that the use of computers in school for school work was infrequent (e.g., 75% reported using computers in school for less than 2-3 hours per week).

More students reported using computers/laptops at school for language arts (89%) and social studies (79%), while fewer students reported using these technologies for science (57%), optional courses (57%), second language courses (36%), mathematics (21%), and physical education (2%) (see Figure 8). Four percent of students reported that computers/laptops were not being used in any of these areas.

Most students "definitely" or "kind of" believed that technologies enabled them to show what they had learned (32% and 47% respectively) (see Figure 9). In fact, most students either "definitely" or "kind of" believed that their test grades were less indicative of what they had learned than what they were able to demonstrate through their creations using technology (49% and 30% respectively).

Students Expect Richer Opportunities to Use Technologies for Learning

A discussion thread prompted by the question "how could you use technologies at school for learning?" generated a variety of responses. Students suggested that technologies could be used in various ways including

- to enhance their learning experiences. Students indicated that access to technologies provides them with opportunities to engage in Internet research; to understand complex ideas or concepts through alternate forms of illustration; to better organize their notes and schedules; to improve their productivity; and/or to improve the quality of their assignments.
- to personalize their learning experiences. Students suggested that technology can be used to facilitate distributed learning[14] and to facilitate online access to learning materials when absent or ill.
- to enable communication and collaboration with peers and others.

Figure 8. I use computers in the following subjects at school (check all that apply). (Created from data reported in "Speak out, Alberta student engagement initiative: we're listening…: year in review 2008-09" (Alberta Education, October 2009))

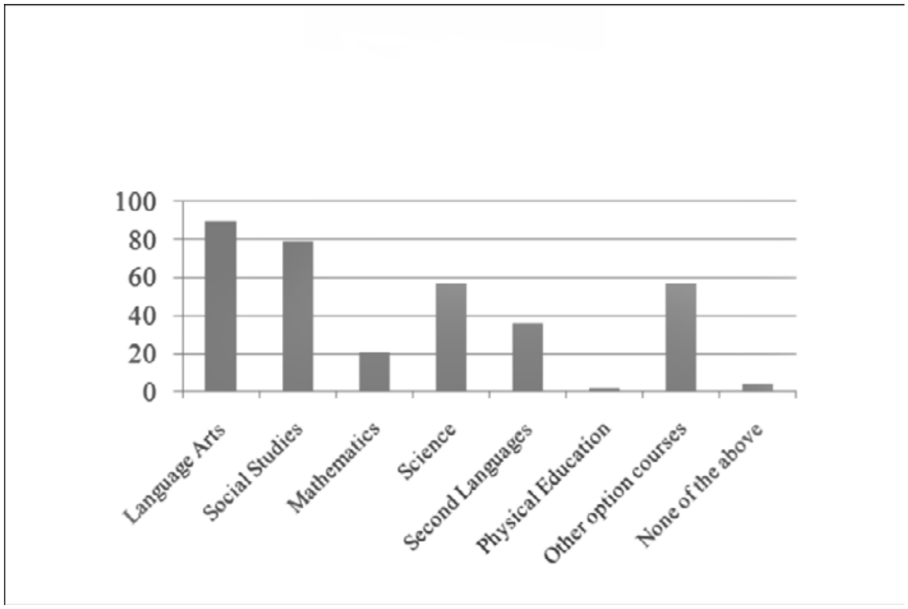
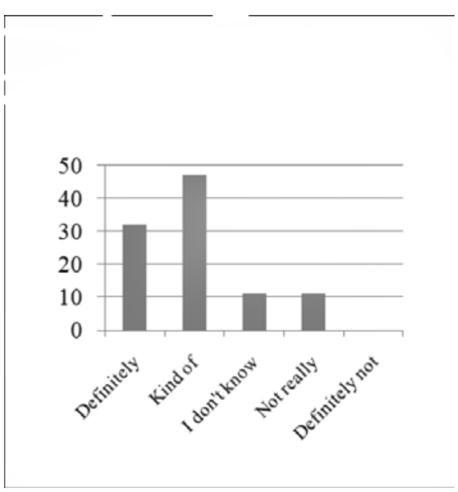


Figure 9. Using technology in my classroom helps me show what I have learned. (Created from data reported in "Speak out, Alberta student engagement initiative: we're listening…: year in review 2008-09" Alberta Education, October 2009.)



- to improve students' attitudes about school.
- to reduce negative environmental impacts by using electronic rather than paper learning materials.

This same discussion thread revealed that students were frustrated with restrictive technology policies, inadequate access to technology in classrooms, ineffective integration of technologies by teachers, and confusing online learning environments.

Most students believed that technology skills would be important to their future success (90%) (Figure 10).

When asked at the annual *Speak Out* conference in May 2009 "what can [Alberta Education] do to get to your vision of education?" students suggested the following strategies related to integrating technologies in schools:

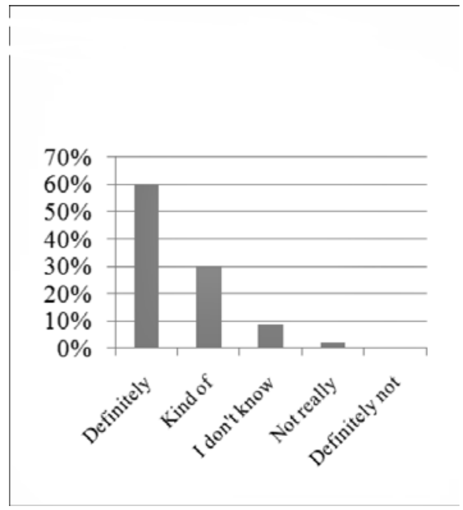
- Provide all teachers and students with laptops and Internet access as a necessary requirement for learning.
- Increase the integration of technology as it is environmentally friendly, efficient, relevant, and more convenient.
- Re-evaluate censorship policies on public Internet sites.
- Increase visual and media-based learning experiences.
- Provide online study groups/help for teachers and students.

Highlights from part two of the "Minister Wants to Know Series" revealed a variety of student responses to the question "How can technology be used to improve your school experience?" Students expressed the belief that technology is critical to their futures and should be embraced for learning. They believed that using these technologies enhanced their abilities to do research and collect and share information on current events. They also believed technologies should be appropriately funded and its use should be monitored to avoid abuse. Students also stressed the importance of properly training teachers in effective uses of technologies for learning (Alberta Education, August 2010).

Although the number of participants involved in the *Speak Out* surveys directly related to learning with technologies was small, much of their feedback mirrors what was found in the research initiatives discussed earlier; that is, students want richer opportunities to learn with technologies. The following student quote captures this desire succinctly.

I hope that by the time I have kids their school will be caught up to the 21st century and kids will learn with whatever technologies and online resources they want. Their teachers will be totally comfortable with it and know how to use it for teaching and learning. (Respondent to Speak Out discussion thread about using technology for learning held in January 2009.)

Figure 10. In the future, I will need to have technology skills in order to succeed. (Created from data reported in "Speak out, Alberta student engagement initiative: we're listening…: year in review 2008-09" (Alberta Education, October 2009))



ANALYSIS OF FINDINGS

What are Alberta's students saying about learning with technologies? Overall, the findings discussed in this chapter indicate that while students share common expectations for learning with technologies, their reported experiences vary depending on their individual circumstances. On the one hand, students are positive about their experiences when teachers are effectively integrating readily-accessible and reliable technologies to create flexible, productive, collaborative and authentic learning opportunities. This was especially evident in *Emerge* schools where students had one-to-one access to laptops and where the primary focus of project participants was to create environments that fostered effective integration of technologies for learning. Quotes from students involved in the *Emerge* project suggest that their experiences learning with technologies are closely aligned with their expectations.

Conversely, students indicated that they are less satisfied with their experiences when they are unfamiliar with a technology or are hindered by unpredictable access to technologies and online learning resources. Students were also less positive about their experiences when their teachers were unfamiliar with the technology and struggling to transform their pedagogical practices for the 21st century. Tech-savvy students who found themselves in the latter circumstance were particularly dissatisfied.

For many students who contributed their voice through Alberta's *Speak Out* initiative, Project Tomorrow's *2009 Speak Up* survey and Alberta's *Technology and High School Success Initiative*, experiences of learning with technologies did not necessarily meet their expectations. Students' responses about their experiences between these extremes were mixed. Students' varied experiences of learning with technologies appeared to be influenced by

- individual student learning preferences and familiarity with technologies;
- teachers' understanding and application of pedagogical practices that foster 21st century learning;
- teachers' effectiveness integrating technologies into teaching and learning;
- levels of access to technologies in and outside of school; and
- reliability of technologies, online resources, and technical supports in schools.

The most commonly reported expectations of Alberta's students with respect to learning with technologies involved a desire for opportunities to use technologies to improve their productivity when learning; to engage in more complex, collaborative and authentic learning experiences; and to personalize their learning by increasing the flexibility of their learning environments in terms of time, location and pace.

With respect to using technologies to improve productivity when learning, students said that learning with technologies is easier and faster. They reported that technologies can help them organize their learning, provide alternative presentations of difficult concepts, allow them to communicate and collaborate with others, and support them when they experience difficulties reading and writing. Students indicated they want collaborative and authentic learning experiences that are fun, interesting and challenging. They want to learn in environments that allow them to explore topics that they find relevant. They also want to use a variety of technologies to find information, communicate and collaborate with others, and to demonstrate their understanding in a myriad of ways. Students indicated that they expect their teachers to design these kinds of learning opportunities.

To personalize their learning experiences, students indicated they want one-to-one access to laptops or other similar devices at school and home. Some students said they want the school to provide the technologies, while others indicated that they are willing to use their own devices. Students also indicated that they want ubiquitous wireless access to the Internet at school. Students recognized that this level of access to technologies and the Internet increases their opportunities to pursue topics of interest, learn at their own pace, and make choices about where and when they access and share information.

Although the project researchers indicated that more comprehensive student data is warranted, Alberta's early findings regarding students' expectations for learning with technologies align with what is being reported by *Project Tomorrow* (March 2010). The *Project Tomorrow* authors suggest that students envision learning environments that are digitally rich, socially based and un-tethered. "Digitally-rich" learning environments involve a variety of relevant digital tools and resources to enhance productivity and not just student engagement. "Socially-based" learning environments leverage emerging communications and collaboration tools to create and personalize networks of experts, and "un-tethered" learning environments transcend classroom walls. Learning environments are not limited by resource constraints, geography or teacher knowledge and skills (Project Tomorrow, March 2010). *Project Tomorrow's* learning environment descriptors share similar characteristics with those desired by Alberta's students—learning environments that leverage technology to improve productivity, facilitate collaboration, and enable personalization.

IMPLICATIONS OF THESE FINDINGS

The findings analyzed above suggest that more can be done to transform K-12 classroom environments so that students' expectations for learning with technologies are met. The findings also suggest that educators should consider students' perspectives about learning with technologies when designing learning environments and experiences. In other words, educators should engage students as collaborators in educational transformation.

Alberta's K-12 community is taking several steps towards transforming classroom environments to meet students' expectations with respect to learning with technologies. For example, the successes being realized through the *Emerge* project are helping others intentionally address the conditions essential to the successful integration of technologies for learning. Lessons learned from the *Emerge* project are being shared through a recently released support resource (Alberta Education, 2010b). In this resource, participants describe promising practices in terms of leadership and innovation, planning and management, professional development, technology, infrastructure, technical support, assessment and evaluation, and parental/community involvement. Promising practices in terms of student voice involve establishing collaborative environments where student expectations are understood and students have opportunities to raise and address concerns and celebrate successes. These promising practices are informing existing and new implementations of one-to-one learning environments as well as other learning and technology integration efforts.

Alberta's K-12 community is also engaging in ongoing dialogue about the future of education in Alberta through an initiative known as *Inspiring Education: A Dialogue with Albertans* (Alberta Education, April 2010). Stakeholders, including students, are contributing their views through community discussions and online forums. The discussion paper resulting from this dialogue, *Inspiring Action on Education* (Alberta Education, June 2010), articulates a proposed vision for education and proposes several policy directions. Many of the proposed policy directions are directly related to increasing student voice in educational decision making and to enhancing students' experiences learning with technologies. For example, proposed policy directions make references to personalizing learning through a range of learning environments to meet diverse student needs; increasing student involvement in their education; providing adaptable digitally-based learning and teaching resources; supporting teacher professional growth including their ability to use emerging technologies to support student learning; and harnessing the power of digital technologies to enhance learning and innovation.

In addition, Alberta' K-12 community is working together towards enhancing student learning with technologies from both pedagogical and infrastructure perspectives. Work is underway to ensure that a comprehensive provincial technology platform supports current and future student needs. Ongoing efforts are also being made to enhance teachers' professional practice as they guide students' use of technologies to (a) enrich learning experiences and develop core competencies; (b) enhance learning through real-life contexts and community-based activities; (c) support individual learning styles and preferences; and (d) facilitate instruction in a variety of settings, at various times, and at various paces to suit students' individual needs. As Alberta's K-12 educational community continues to dialogue, refine and implement policy directions, it is anticipated that students' experiences of learning with technologies will more closely align with their expectations.

CONCLUSION

The data collected in Alberta's K-12 community between 2006 and 2010 gives voice to students' views about learning with technologies. Although Alberta's students describe a range of experiences of learning with technologies based on their individual preferences and contexts, they consistently report an expectation for richer opportunities to use technologies for learning. They want to use technologies to increase their productivity when learning; to enable more complex, collaborative, and authentic learning experiences; and to personalize their learning by creating flexible environments that offer choice in terms of time, location and pace. Where technologies are being effectively integrated for learning, students' experiences align with their expectations. This is especially true among those students participating in Alberta's *Emerge One-to-One Laptop Learning Project*.

Given these findings, Alberta's K-12 community recognizes that more can be done to better align students' experiences with their expectations for learning with technologies. To that end, Alberta's K-12 community is gathering stakeholder input about the future of education; revising educational policy and legislation; disseminating research and evolving best practices; and supporting the successful implementation of those initiatives that transform schools and classrooms in ways that provide students with opportunities for deep learning with technologies.

Student voice is critical to this transformation. We must continue to engage students in conversations that surface their evolving views about learning with technologies. This can be accomplished through student forums, focus groups, advisory councils, interviews and/or surveys. We must then use their input to inform the design of productive, collaborative and flexible learning environments that meet students' expectations with respect to using technologies for learning. "By listening to and leveraging the ideas of our … students we can start to build a new vision for 21st century education that is more reflective of [their] needs and desires." (Project Tomorrow, March 2010, p.1)

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KEY TERMS AND DEFINITIONS

21st Century Learning: Alberta Education (2010a) reported that "*Emerge* jurisdictions focused on a common set of 21st century skills including critical thinking, collaboration, global awareness, and information and technology (ICT)." (p. 1) These skills represent a subset of the 21st century competencies put forward by Alberta Education in *Inspiring Action on Education* (June 2010), namely critical thinking and problem solving; creativity and innovation; social responsibility and cultural, global and environmental awareness; communication; digital literacy; lifelong learning, self-direction and personal management; and collaboration and leadership.

Authentic Learning: Researchers (Alberta Education, 2010a) define authentic learning experiences as those that have value beyond school in "real-world" contexts. "Authentic learning includes three critical elements: deep inquiry of the content under study; relevancy to the student work to persons or entities beyond the school day; and students' demonstration of their learning through products." (p. 20)

Community of Practice: Wenger (2006) defines communities of practice as groups of people who share a passion for something they do and want to learn how to do it better by learning with others who have similar interests. Wenger describes 3 crucial characteristics of communities of practice including (1) a commitment to and competence in a shared domain of interest; (2) a community in which members build relationships, and engage in joint activities and discussions, help each other, and share information; and (3) a community in which members are practitioners who develop a shared collection of resources. (Wenger, 2006)

Deep Learning: Researchers (Alberta Education, 2010a) defined deep learning as "learning that involves the critical analysis of new ideas, linking them to already known concepts and principles, and leads to understanding and long-term retention of concepts so that they can be used for problem solving in unfamiliar contexts." (p. 22)

Engagement: Researchers (Alberta Education, 2010a) defined student engagement as "the degree to which students are actively pursuing deep learning related to established standards." (p. 22) A five point scale of student engagement was used to report their findings: (1) Intrinsically engaged; (2) Tactical; (3) Compliant; (4) Withdrawn; and (5) Defiant.

Self-Directed Learners: Alberta Education (2010a) described self-directed learners "as motivated participants who efficiently control their own learning experiences. This self-direction includes organizing and rehearsing information to be learned, and holding positive beliefs about their personal capabilities, recognizing the value of learning, and the factors that influence learning." (p.28)

Personalized Learning: Personalized learning or personalization refers to students' opportunities to pursue topics of interest, learn at their own pace, and make choices about where and when they access information and/or communicate and collaborate with others. Personalization is enabled through one-to-one access to personal computing devices at home and school as well as through ubiquitous wireless access to the Internet at school. Similarly, personalized learning is defined by Alberta Education (June 2010) as learning that "involves the provision of high-quality and engaging learning opportunities that meet students' diverse learning needs, through flexible timing and pacing, in a range of learning environments with learning supports and services tailored to meet their needs." (p.14)

ENDNOTES

1 More information about Alberta's department of education can be found at http://education.alberta.ca (Retrieved April 19, 2010).

2 More information about the deliberative democracy case study entitled "A Case Study in Deliberative Democracy: Dialogue with the City" (Hartz-karp, 2005) can be found at http://www.inspiringeducation.alberta.ca/LinkClick.aspx?fileticket=MaZn8kDlzAo%3d&tabid=84 (Retrieved October 21, 2010).

3 More information about the Metiri Group can be found at http://www.metiri.com/ (Retrieved October 21, 2010).

4 More information about the *Emerge One-to-One Laptop Learning Project* can be found at http://education.alberta.ca/admin/technology/emerge-one-to-one.aspx (Retrieved April 19, 2010).

5 Alberta Education (2010) reported that "*Emerge* jurisdictions focused on a common set of 21st century skills including critical thinking, collaboration, global awareness, and information and technology (ICT)." (pp. 1)

6 See the range of educational technology standards offered by the International Society for Technology in Education (ISTE) at http://www.iste.org (Retrieved April 30, 2010).

7 More information about the *Technology and High School Success Project* can be found at http://education.alberta.ca/admin/technology/techsuccess.aspx (Retrieved April 19, 2010).

8 More detailed *THSS* project descriptions can be found at http://education.alberta.ca/admin/technology/techsuccess/participants.aspx (Retrieved April 19, 2010).

9 More information about the Galileo Education Network Association can be found at http://www.galileo.org/ (Retrieved April 19, 2010).

10 More information about *Speak Up* can be found at http://www.tomorrow.org/speakup/ (Retrieved April 30, 2010).

11 More information about *Project Tomorrow* can be found at http://www.tomorrow.org (Retrieved April 30, 2010).

12 The April 2010 summary reports of the *Speak Up 2009* survey results for grades 6 to 8 and grades 9 to 12 are available by request from Alberta Education.

13 More information about *Speak Out – Alberta's Student Engagement Initiative* can be found at http://www.speakout.alberta.ca/ (Retrieved April 19, 2010).

[14] Distributed learning was the focus of another online survey and discussion forum hosted in April 2009. Students expressed their appreciation for the flexibility inherent in distributed learning environments but cautioned that structured learning environments with guidance and regular interactions with teachers and peers was also beneficial.

Section 3
Australia and Asia

Chapter 4
"A Community of Opinion and Debate": Postgraduate Students' Reactions to Compulsory Online Discussions

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ABSTRACT

Discussion-based learning is a crucial element in postgraduate professional development, particularly important in facilitating peer learning through the sharing of professional experiences. In courses with distance or blended delivery, educational technologies provide opportunities to encourage such peer learning. But do postgraduate students value asynchronous online discussions in the same way as they value the equivalent face-to-face experiences? Do educational technologies have a role to play in facilitating discussions even when students are meeting face to face? Is it helpful to make an online discussion compulsory? This chapter reports design-based research on student reactions to compulsory assessment tasks that involved a variety of asynchronous online discussion structures—from individual reflective journals to large group forums—in 14 Masters courses in development studies and museum studies at an Australian university. Using the students' own reflections on their learning experiences, this chapter considers the extent to which the use of technologies can enhance or impede the reflective and peer-responsive learning sought by the inclusion of discussions in the postgraduate education of professionals.

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INTRODUCTION

Skills of critical analysis and debate are a crucial focus of learning for professionals in any field. Those emerging from professionally-orientated graduate studies must be prepared to engage not only with the worldviews specific to their discipline and profession but also with the multiple perspectives of their employers, communities, governments and other stakeholders. In face-to-face settings, these higher-order skills can be modelled and stimulated effectively by discussion activities that engage students in debate, role-play, and opportunities to reflect on personal assumptions and values (Ramsden, 2003). When these kinds of student-centred activities focus on reality and thoughtful engagement, they lead to deeper approaches to learning, and hence to better educational outcomes (Prosser & Trigwell, 1999). Today's professionals, however, have little time for "sitting at the feet of greatness of a Professor" (Churchman, 2006, p. 9): although they still seek to advance their professional knowledge and competence by learning from the best in their field, commitments to study must be balanced against work, family, social and financial responsibilities. The result has been an increasing demand for postgraduate education delivered via the Internet to working professionals (Cookson, 2002), with online discussions an obvious substitute for classroom dialogue as teachers seek to recreate the "immediacy and energy" of face-to-face engagement (Meyer, 2003) in a more flexible mode. In addition, globalisation and the "digital revolution" mean that all professionals benefit from practising the communication skills that allow them to engage in high-level professional debate online.

To create genuine off-campus learning communities, as opposed to managing sets of individual distance learners, academics have to adopt different ways of managing teaching and learning, and focus on the qualitative advantages of distance technologies rather than their functional aspects. Ensuring that the experiential learning that occurs in on-campus teaching activities such as class discussions, group work, role plays and field trips is replicated through authentic and equivalent flexible/online learning experiences is thus an important goal for those who are teaching professionals through distance or blended delivery. In short, the primary aim must still be the engagement of students in meaningful learning activities (Alexander & Boud, 2001).

For those involved in professional education, therefore, an important pedagogical challenge is how to ensure that students develop the higher level skills of dialogue and critical exchange with their peers that will be useful not only when they meet face-to-face, but also when they are in different locations or time zones. Although videoconferencing approaches that involve real-time 'chat' may offer the virtual experience closest to a face-to-face meeting, these approaches are often not feasible if students and lecturers are in many different time zones, require high levels of individual flexibility, or are in areas less well served by high-speed internet connections (Beckmann & Kilby, 2010). Asynchronous interactions thus remain the more realistic options in most cases of teaching that involve distance or blended delivery.

There are many platforms and tools available for online discussions, including many commercial and independent social networking (Web 2.0) tools (Alexander, 2006). However, universities are often concerned by issues of students' privacy and intellectual property rights in the wider online environment. These, and other concerns, often constrain lecturers to use only the discussion tools within their institution's learning management system (LMS, also known as a virtual learning environment or VLE), even when those tools are less than satisfactory pedagogically (Gibbs & Gosper, 2006).

Although the online technologies themselves must obviously be robust (Volery & Lord, 2000), and preferably visually attractive and user-friendly, Kimball (2001) argues that the actual teaching strategy and style are more likely to influence the learning than the technology itself. For a lecturer to become "proficient" in the use of online discussion tools as a mean of facilitating professional learning thus depends as much on developing an understanding of how students are likely to respond to the online educational setting as on developing competence with the chosen technological tool. In particular, lecturers must know how best to use discussion tools for both "on-campus" students (including those on a weekly trek from the office as well as those studying full-time) and those who are fully "off-campus".

Understanding students' experiences with online discussions can therefore help lecturers shape their use of online technologies to support students in the reflective, experiential and peer-responsive learning that fosters professional engagement with current debates. By considering the experiences of students' in both on- and off-campus postgraduate learning communities at an Australian university, this chapter looks specifically at the opportunities and concerns created by the use of online discussion spaces in professional learning.

BACKGROUND

The Disciplinary Contexts

This chapter reports on a design-based research approach (Design-Based Research Collective. 2003) to data collection and analysis of students' experiences in, and responses to, asynchronous online discussions run in 2008 and 2009 in 14 semester-long courses across two contrasting fields of postgraduate professional study — 13 courses in a Development Studies Master program and one course in a Museum Studies Master program. In all courses, most of the students were professionals with several years' experience working in the sector, and the remainder were recent graduates in cognate disciplines establishing their career path. All had experienced at least three years of undergraduate study, in diverse universities in Australia and many other countries, and therefore had at least some insights into their own learning styles and preferences.

To understand the students' experiences in context, it is necessary to understand these two disciplinary settings, and the university setting, in a little more detail. The university is in Australia's capital city, and has a predominately face-to-face teaching focus, but is expanding its emphasis on flexible learning. The Development Studies courses use practical evidence from development projects to explore theoretical paradigms about the participatory processes in community and social development in different cultural contexts (The Australian National University, 2010). This program has been very well-received not only for its quality and its highly regarded practitioner-lecturers, but also for its opportunities for off-campus, transnational enrolment, which allows those working in development projects in countries around the world to participate in high-level study without leaving their positions overseas (Beckmann & Kilby, 2010). In 2008, when this design research started, about a third of enrolments in these Development Studies courses were off-campus students located outside Australia, taking the courses as distance education, while the remainder were on-campus students attending face-to-face lectures. The importance of online technologies in supporting off-campus enrolment is considered crucial, and online discussions are important in allowing both on- and off-campus students to engage in, and share, structured critical reflection on their learning through a common assessment task.

As a contrasting educational and disciplinary context, the comparison course for this research was in Museum Studies, specifically a course that explored the theory and practice of why and how museums and cultural heritage sites communicate with their audiences. Unlike the Development Studies courses, this was a fully face-to-face course taught on campus with weekly classes and fortnightly visits to local heritage institutions. However, it also included a compulsory online discussion as an assessment task. This discussion was designed to allow students to demonstrate their ongoing critical and reflective engagement with key issues. Students were encouraged both to contribute ideas from their personal or professional experience and to engage with other students’ perspectives in an online environment, complementing their face-to-face encounters.

DESIGNING ONLINE DISCUSSIONS: FUNCTION, FORMAT AND FACILITATION

Stages in Designing an Online Discussion

Designing a learning-focused online discussion is about much more than choosing an attractive and user-friendly tool. In the author’s view, there are three key design stages required to incorporate an online discussion successfully into a course. First, the pedagogical purpose of the discussion must be clear. The discussion should be included not because the technology is available but because some kind of forum or peer exchange is an integral part of course design and has a clear pedagogical function. This is especially true if the discussion task is intended to be used as an assessment item, when its design must take into account, and somehow reflect, at least some of the intended course learning outcomes. Second, the format of the discussion must be decided. This includes choosing an appropriate technology on which to host the discussion, and understanding the strengths and limitations of technology in general and the chosen platform in particular. Third, one must decide on the approach that will be used in facilitating the online discussion—that is, the roles of lecturer and students in initiating and guiding various aspects of the discussion at different times.

In the contexts described in this chapter, for each course these three processes were carried out jointly by the course lecturer and an educational designer. For the 14 courses under consideration here, there were seven lecturers, who differed markedly in terms of both their experience in online or blended learning and their confidence with educational technologies. Four were particularly confident and happy to experiment while the others were willing to travel down the necessary path to improve opportunities for off-campus students, but were less engaged with the notion of technology-enhanced learning for its own sake. The author acted as educational designer for all Development Studies courses, as facilitator for one Development Studies course, and as both lecturer and educational designer for the Museum Studies course.

The Educational Function of an Online Discussion

The key educational design task for all 14 courses was to rethink classroom discussion formats into online forums, and to do so in ways that integrated opportunities for experiential, reflective and peer learning securely within the learning/assessment process for all students, whether on- or off-campus. For each course, this design task was initially a joint exercise between the educational designer and the course lecturer, with the aim being to make all lecturers self-sufficient in designing and facilitating online discussions. In the context of this task, the educational designer’s role was to help the lecturer informally review past face-to-face or online experiences in that course; to understand and focus on the constructive alignment of learning outcomes, activities and assessment (informed by Biggs, 1999); to provide advice and support about structuring, facilitating and assessing the online discussion; and to provide immediate technological and other support for both staff and students in the first weeks of the new course being implemented.

Each lecturer’s role was to define learning outcomes; to develop discussion activities, with appropriate marking criteria relevant to the context of other course assessment tasks; and to facilitate the actual online discussions in such a way as to support all the other learning activities in the course.

Although still in its early days, empirical research on the use of asynchronous online communication tools has already provided useful pointers to effective design, so there was a specific effort to include elements known to support learning within a constructivist approach (Mishra, 2002). For example, the design took into account research findings that suggest:

- Effective learning is most evident when the online tools are well-integrated into the teaching/learning process (Funaro & Montell, 1999; Salmon, 2004).
- Meaningful discourse in online discussions is improved by facilitator guidelines, assessment rubrics and posting protocols (Gilbert & Dabbagh, 2005).
- Threaded formats, where topics/themes are clearly labelled and the sequence of posts and replies can be easily followed, increase the amount of time students spend on meeting course objectives and on reflection (Meyer, 2003).
- Atmosphere, response, efficiency, interactivity and communication are key areas of difference between asynchronous online discussions and face-to-face discussions, and online discussion require significantly more time allocation to reach the same depth of engagement (Wang & Woo, 2007).

In all the Development Studies courses, the initial approach to introducing online discussions was to review, and if necessary change, course design to ensure, wherever possible, a correspondence of the on- and off-campus student experiences. All lectures (in audio, visual and multimedia format), readings and other resources were made available online. Importantly, the group discussions were embedded firmly into the teaching and assessment context for all students, becoming compulsory elements in each course, weighted at 15 to 25% of total course marks. This approach contrasted with the previous use of online discussions in these courses, namely either as an optional, usually socially-orientated, element for on-campus students, or as a separate element only for off-campus students, which often served to increase their sense of isolation from campus life.

In most of the courses, a specific design objective was to encourage peer-to-peer interactions, which Boud (1999) identifies as being especially relevant to effective professional education. To support peer learning, therefore, emphasis was placed on students as being knowledgeable and influential, and in several courses they were given opportunities to both start and steer discussion processes. However, creating effective opportunities for peer learning in online environments requires care in creating appropriately-sized groups, structuring learning activities, and facilitating group interactions (Graham, 2002). In effect, one is aiming to create an online learning community (Salmon, 2004).

With each course having different numbers of students, different sub-disciplinary backgrounds, and different teaching approaches/activities, the lecturer and designer had to think carefully about the nature of the individual learning communities. For example, what were optimum sizes of groups engaging in a debate on a topical issue? What was the right mix of on- and off-campus students in the groups? Should specific roles (debt leader, discussant, devil's advocate) be assigned to each student? Although there was nominally a week-by-week structure to most courses, how did time limitations fit the intention for flexible learning that could accommodate both time zones and student availability? University administration also contributed some issues to consider: new course enrolments were possible until the third (out of 13) week of a course, and withdrawals without penalty were still possible after this date, so each lecturer had to maintain a careful eye on discussion group membership and adjust groups when new students joined or current students left, and follow up on students who were not contributing when this threatened the viability of a discussion group.

Refining the Discussion Format

Once all the design parameters for the online discussion task had been debated and agreed, detailed explanations of the discussion task were

Figure 1. Example of online discussion task description given to students in a Development Studies course in Semester 1, 2008. (The evaluation process showed that the expectation of six separate discussions was too great, and that the roster of student roles needed simplifying to make it more responsive to students' timing needs.)

Your Online Discussion Assessment Task

You will be allocated to a small group of six for the duration of the course. You and the five other students in your group will interact with one another through seven separate online workshops hosted on an Alliance site.

You will have two roles in the online workshops. For one workshop (date specified in advance), you will lead and facilitate the discussion. For the remaining six discussions, (including Week 1), you will be expected to respond and contribute to the discussion.

The Week 1 Workshop will be facilitated by the lecturer to start the process off. Student contributions will not be assessed for this workshop.

You will be rostered to lead the discussion in Week 2, 4, 6, 8, 10 or 12. You will be asked to post a discussion starter (300-400 words) which will analyse the discussion topic (usually in the context of the relevant lectures and readings), identify some key issues and pose two or three key questions for your group to consider. You will subsequently guide the group's discussion by responding to, and making connections between, the contributions of other members of the group.

For all six discussions that you are not leading, you are expected to contribute by making considered responses (150-300 words) to the discussion starter.

written (Figure 1), which were presented in course outlines and on each discussion site. In addition, detailed support documents about the task were also developed and provided to students. Although these were created individually for all courses, consistency across courses was maintained as appropriate. For example, the "Protocol for contributing to an online discussion" was generally similar for all courses, and included sections on the timing of postings, word counts, acceptable language, expected content, and the importance of academic honesty and integrity. There was also an assessment (marking) rubric for each discussion, which clearly identified between four and nine assessment criteria, giving qualitative descriptors at each grade level.

The 14 different courses had a wide variation in their specific learning outcomes, which influenced the purpose of the online discussion in each lecturer's mind. The lecturers also had clear views of their own approach and level of commitment to monitoring and facilitating the online discussion in their course. This diversity necessarily gave rise to significant variability in the final designs of the online discussions. For example, among the 14 courses, the types of tasks set included:

- highly structured discussions with multiple groups of four to six students and specific assessment-focused objectives (e.g. students took it in turns to post discussion starters at regular intervals);
- reflective discussions in a group context (e.g. reflecting on a group visit to a study site) for a whole class of 16 students (see case study in this chapter);
- multiple peer review groups of just three students each (e.g. each group member posted a commentary on the case study proposals of the other two group members);
- content-driven tasks where each student in the class of up to 60 students individually posted in the same forum (e.g. posting an abstract of that week's reading and commenting on another student's abstract); and
- unstructured conversation opportunities about any aspect of the course, open to all enrolled students.

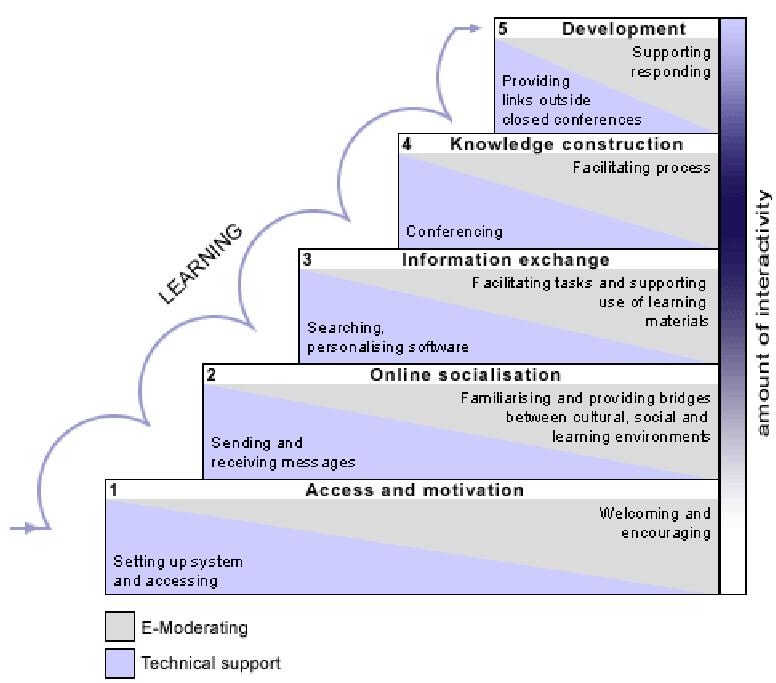
Choosing the Technology

In the university at which these courses were taught, the choice of technology available in 2008 was somewhat limited. According to internal staff and student feedback, there was significant dissatisfaction with the physical format and presentation of the online discussion tool in the university's main LMS (LMS1), through which teaching resources were generally presented. However, the university also maintained an online collaboration environment based on a second LMS platform (LMS2). As these discussion forums were considered reasonably attractive in their format, presentation and functionality, it was decided to establish the online discussions for each course in LMS2 using the (relatively simple) 'Forums' discussion tool, which allowed students to initiate and reply to standard threaded discussions, and to attach text, Internet links or visual attachments as required. Using LMS2 rather than LMS1 also differentiated between the two: LMS2 became a learning environment where the emphasis was on ideas being exchanged among students and LMS1 the source of information flowing from lecturer to students (the common perception and use of an LMS). All sites were password-protected to allow access only by students enrolled in the relevant course, and, in some large-enrolment courses, individual discussion groups of six to eight students were set up to optimise communication within forums.

Deciding the Approach to Facilitation

The most critical factor in learner acceptance of discursive "e-learning" appears to relate not so much to the precise design of the online processes or tasks but more to the capabilities of the online facilitator: thoughtful, sensitive input contributes to positive learning experiences (Nunes & McPherson, 2003). Salmon (2004) describes the role of facilitator of online discussions as that of an "e-moderator", who promotes "human interaction and communication through the modelling, conveying and building of knowledge and skills" (p.4). Salmon's five-stage model of "e-moderating" (Salmon, 2004; Figure 2) provides a careful analysis of the stages of learning that students go through as they engage with online discussions, and the differing technical support required, with identification of the distinct roles

Figure 2. The five-stage model of e-moderation (Salmon, 2004) © 2004 all things in moderation



that the e-moderator should play during each of these stages to facilitate development of a sustainable learning community.

In the courses described in this chapter, each lecturer took on the facilitation role for his/her own course(s), and implicitly aimed at achieving stages 3, 4 and 5 (the key ones for interactivity according to Salmon). However, while Salmon's model was available as background information to support the educational designer and the lecturers' thinking about their facilitation role, it was not used in any formal way, largely because the lecturers still saw themselves as traditional face-to-face lecturers adding an online platform to their approach, rather than specifically as "e-lecturers". Although Moule (2007) has argued that Salmon's five-stage model may be less valuable in courses that integrate face-to-face with online delivery (i.e. blended delivery)—which was the case with all these courses—the importance of the individual lecturer's style in facilitation is an important variable, which unfortunately was not accessible for scrutiny in this research.

USING DESIGN-BASED RESEARCH TO INFORM FUTURE DEVELOPMENT

According to Wang and Hannafin (2005, p. 6), design-based research (DBR) is "a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories". DBR is thus characterised by being pragmatic; grounded in both theory and the real world; integrative, in that it relies on a variety of methods; and contextual (Design-Based Research Collective, 2003; Wang & Hannafin, 2005). Taking this approach to engaging with the outcomes of the different designs of online discussions in the 14 courses under study allowed intrinsic and ongoing formative and remedial evaluation as necessary to improve the online learning environments and inform subsequent design.

The 13 Development Studies courses were taught in the first and second semesters (February to June and July to November respectively) of 2008 and 2009, with some repeated in the second year, while the Museum Studies course was taught in second semester 2009, when some design lessons had already been learnt. An action research model—a continuous cycle of planning, implementing, observing and reflecting (Kemmis & McTaggart, 1988)—was used to explore student and staff reactions during initial design and implementation phases. Key research questions guiding the data collection were:

- What are students' reactions to the use of technology to create online discussion spaces?
- What constraints, if any, does the technology itself place on the quality of the online discussions?
- What, if any, benefits accrue to students when both on- and off-campus students are integrated into learning communities through online discussions?
- Are the online discussions providing meaningful peer learning experiences for both on- and off-campus students, and are they of additional value in supporting face-to-face teaching?

The data collection processes (approved under the university's Human Research Ethics Protocol 2009/222) focused on qualitative data to allow the students' responses to the online learning experiences to take centre stage. For the Development Studies courses, anonymous online surveys of the 100 or so enrolled students were conducted in May 2008 (38 respondents) and May 2009 (59 respondents). Both surveys used a broad set of open-ended questions about students' experiences of technological constraints, peer learning opportunities, and general responses to the online activities. The 2009 survey introduced a more quantitative element by assessing students' levels of agreements with various statements about online discussions. For the Museum Studies course, students' reactions to the online discussions were gauged from the 16 students' own posted comments, especially those posted in a student-initiated thread specifically related to the role and value of online discussions as assessment tasks, as well as in an anonymous online survey in November 2009. All data was categorised and coded, with the main referential criterion being whether the students were on- or off-campus enrolments. All unreferenced quotes in the remainder of this chapter are direct quotes from students' responses to open-ended survey questions or from postings in evaluative discussions (identifying details suppressed).

STUDENTS' REACTIONS: OUTCOMES AND DISCUSSION

Impacts of Technological Constraints

Before students can even consider their preferences for becoming active members of an online learning community rather than simply passive downloaders of information from an online repository, the technology must be fully mastered and must not impose any barriers to learning. This means that students need affordable, reliable access to appropriate hardware, software and the Internet. While excellent resources are available 24 hours a day on the campus in question, technological constraints can be an issue for students contributing to online discussions from home, and certainly for those studying in developing countries. With Development Studies students in developing countries such as Afghanistan, Cambodia, Madagascar, Malaysia, Uzbekistan, Vanuatu and Vietnam, to name just a few, technological hurdles were not uncommon (Beckmann & Kilby, 2010).

For example, a student in Papua New Guinea became incommunicado when the local internet café closed unexpectedly, while a student in Timor Leste found online learning a constant effort: "I only have Internet access at work—one dial-up line for 25 people. I don't even have a phone line at home [so] I can only use the Internet for study on weekends." Technological limitations such as these often affected students' abilities to be logged on for long enough to read and contribute to online discussions in a relaxed manner. Beckmann and Kilby (2010) discuss the impact of technological issues on the learning of transnational Development Studies students in some detail, but here it is sufficient to say that educational designers must not underestimate the restrictions that inadequate Internet services may place on the online learning capacities of students, and must accommodate those restrictions as far as possible.

Moreover, as with any kind of education, learning is facilitated by attractive, student-friendly environments. While discussion tools are common in every LMS/VLE, not all are equally functional, user-friendly or aesthetically pleasing. As explained above, the decision to use the LMS2 platform rather than the university's primary LMS was made for reasons that included a relatively attractive layout, but it still was not to every student's taste: "… the platform is a barrier to its own use … such an eccentric website." Again, it is up to the course designer to continue to seek quality learning environments even when the best available tool may be imperfect.

Learning Preferences in a Digital World

Although Barlow (1996) and Prensky (2001) have fostered the notion of "digital natives" and "digital immigrants" as an expression of the greater facility that younger generations may have with communications technologies, this idea has been well critiqued (e.g. Jenkins, 2007; McKenzie, 2007; Bayne & Ross, 2007). In reported experiences of online learning, the student's generation seems less important than his or her incentive to study online: students either relish online opportunities (Brown, 2000) or report real or perceived barriers to their engagement. Concannon, Flynn and Campbell (2005) identified these barriers as including motivation, peer influence, and study strategy, as well as access to technology and computer skills.

In the context of professional development, where students are usually highly motivated in their learning, encouraging graduate students to acquire or enhance their confidence and skills in technology related to communication and information literacy can only be to their advantage. Professionals in both Museum and Development Studies benefit from being competent users and potentially innovative generators of digital content: the museum sector has made rapid and very creative incursions into the digitized world (Hawkey, 2004; University of Leicester, 2007), and many communities in developing countries are choosing to engage with communication technologies even ahead of acquiring safe water supplies (Aker & Mbiti, 2010; McBride, 2003). Yet, despite the additional benefits of engaging with educational technologies beyond the course itself, in all courses some students expressed their concern at the compulsory use of technologies, particularly in terms of online discussions as assessable tasks.

Wozniak and Silveira (2004, p. 959) make the important point that "students who collaborate effectively in face-to-face sessions will not automatically demonstrate such abilities online". Hiltz and Turoff (2005) confirmed perceptions that a significant minority of students prefer, and believe they learn best in, face-to-face environments. This finding was evident among some students in this study, who commonly cited time delays and apparent circumscribing of topics as reasons for concern about engaging with their peers online. This view is typified by one student's comment that "I find face-to-face discussions more worthwhile due to the immediacy of exchange and scope for debate".

About 32% of all Development Studies respondents in 2009 agreed with the statement that, for them, it was more difficult to contribute to an online discussion than to a classroom discussion. Interestingly, this view was held more commonly among on-campus respondents (62%), one of whom commented "I find the online discussions very forced—people are trying to impress because they are assessable, so they are rarely free-flowing and spontaneous". This finding therefore had implications for the merging of on- and off-campus students in many of the Development Studies courses (and resulted in some Development Studies lecturers in 2010 offering their courses in either fully online or fully face-to-face mode, and rejecting the blended delivery mode).

In a reflective forum on online discussions as assessment tasks (see case study below), one Museum Studies student provided an eloquent insight into the perspective of an online-sceptic:

… I have a slight aversion to bloggers …. What I don't understand … is why do they have the expectation that somebody out there might read their stuff when there's so much other stuff out there they're in competition with. What's the chance that they are as good a writer as Virginia Woolf, … as philosophical as Ludwig Wittgenstein, or clever as Roger Penrose? … I can't be bothered reading those guys even. This forum does have some merit in that we students can share our observations and anxieties. There is a mild sense of virtual community generated by it, and the feeling of emotional support that provides. And it does provide an excuse to practice writing. All up though I could easily live without it. I'd rather some sort of online journal that we could all contribute to. Something that would entail researching a topic in depth.

Somewhat paradoxically given its thesis, this extended quote (from a student who contributed rarely) clearly demonstrates reflection both on self and on the benefits of the online discussion, in a style that is not only analytical, but also ends with a positive suggestion (although notably for a different, less community-focused learning task). Notably, even this student's apparently negative commentary was in fact in line with the intentions of the online discussion as an assessment task, in that the student clearly demonstrated the ability to reflect critically, which was one of the stated learning outcomes of the task.

While it was not surprising that there was resistance to the online discussion tasks, and associated new skills, among some students, it was reassuring that 49% of the Development Studies students surveyed in 2009 felt they had benefited more from participating in the online discussions than they had expected, and 59% felt online discussions had provided them with additional learning opportunities:

... online discussions are terrific—much better than most of the face-to-face tutorials ... during my undergraduate degree ... When people know they are assessed, and they can't "waffle" so easily as they can when speaking, their input tends to be of a much higher quality. This goes for me as much as anyone else!

Reactions On- and Off-Campus

The online discussions had been specifically included in the Development Studies courses to provide equivalent learning opportunities for off-campus students while enhancing opportunities for peer interactions for those studying on-campus. Although there was ample evidence that this approach had worked very well in encouraging peer learning (Beckmann & Kilby, 2008), it was disappointing to find that a few on-campus full-time students remained uninspired:

... requiring on-campus students to participate online ... is a classic case of mistaking novelty for progress. ... too much attention ... to make everything equally accessible and equally framed so that in essence the on-campus and off-campus student get the same ... experience. ... I may be old-fashioned ... but I think face to face learning should still be the preferred method.

Although a notable minority of the 2009 Development Studies respondents (18% of all, 26% of on-campus respondents) agreed with the statement that online discussions were "really only beneficial for off-campus students", there appeared to be no real on/off-campus divide. Overall, 70% of all students believed online discussions that linked on- and off-campus students were especially valuable in the context of Development Studies as they allowed first-hand exchanges with fellow students who were actually working in development roles during the course:

that many of these students are ... working on the specific issues we are studying is fascinating! I personally prefer face-to-face interaction in the classes but I do appreciate that the online forums allow us to interact with those who are currently working abroad.

Interestingly, some on-campus Development Studies students actually reported that their interactions with on-campus peers were actually enhanced by the online discussions, which they felt provided a sheltered entry-point into the world of debate, especially for less confident or non-English-speaking-background students (Beckmann & Kilby, 2008, 2010). This was echoed in the findings of the face-to-face Museum Studies course (discussed below).

Commitment and Effort

An unexpected survey finding was that most (64%) of the Development Studies respondents in 2009 felt that "an assessable online discussion generally involves more work than most other forms of assessment". A Museum Studies student also voiced this clearly:

The time it takes to post shouldn't be underestimated. I try to think a lot about what I post before I post it—so it takes time! More than I expected. I'm also quite stunned by how many "blogged" words I've racked up over the semester—far more than I would usually submit in word-counted assignments in all other courses.

One on-campus Development Studies student reported focusing "so much on getting things done for online forums [that] I did not have enough time to build depth in my field". This kind of feedback provided lecturers with a reality check to ensure that the online discussion structures did not involve too much "busy" work (e.g. writing/posting multiple abstracts of readings) and not enough opportunity for peer-centred reflection and critical exploration of a topic. The intent of the design-based research model was that educational design could be substantially improved by experience: for example, the task described in Figure 1 now involves far fewer discussions, as the original design was found to be unnecessarily cumbersome and demanding.

Knowledge Creation and Academic Integrity

Personally experiencing the role of practice in knowledge creation and learning (McFarlane, 2006) is a value-added opportunity for development workers, who often have to be innovative in engaging the social processes of learning at both community and institutional level (Roper & Pettit, 2002). The Development Studies students frequently reported that ideas expressed online enhanced their learning and encouraged deeper critical reflection on material presented in lectures or readings:

Online discussion facilitates broader understanding and learning ... makes us learn ideas that sometimes we failed to comprehend from our independent reading.

I drew my analysis from other comments expressed by other students. It helped me reflect on my own positions on particular readings and resources.

This, however, led to concerns about attribution, as a student explained: "[it raises] questions over how and to what degree other students' ideas should be cited in one's own work… whether a student's idea is original to him or her …". Although policies and advisory material on academic honesty are available for these students, lecturers using online discussions must ensure that students know how to cite unpublished material or a fellow student's posted ideas or experiences in their postings and other forms of written work.

ONLINE DISCUSSIONS AS ASSESSMENT TASKS: A CASE-STUDY

Reflection as the Purpose of Discussion

The online discussions in the on-campus Museum Studies course deliberately focused on reflection on both professional practice and learning, and were designed as a compulsory assessment task worth 20% of the total course mark. The compulsory nature of the design approach makes it useful to consider the 16 students' responses to the online discussions in a case-study style.

The students were given detailed guidelines on protocol related to online etiquette, appropriate language, content and academic honesty, and a rubric identifying grading expectations for the discussions across four unequally-weighted criteria—number of contributions; style of posting; demonstration of knowledge and understanding of topic, including appropriate reference to readings; quality of postings. At least 10 postings were requested, each 150 to 400 words: for grading, students were asked to nominate the three they felt best showed how they had learned something new or put something they already knew into a different context. A High Distinction (80%+) grade would be earned for postings that were consistently "thought-provoking, clearly linked to topic and course content, fostering a range of discussion options, and showing significant originality", as described in the rubric. As well as a numerical rating, the lecturer/facilitator gave students constructive qualitative feedback.

Threads and Postings

Simple headings and focus questions were provided for all forums (individual discussion themes) and most threads, with several threads started by students. Six forums sought comments on museum or heritage sites visited; five asked for thoughts on specific topics (e.g. audience research); three canvassed students' reactions to the three assessment tasks (exhibition review; exhibition/communication plan; and the online discussion itself); one gave students a chance to discuss other sites they had visited during the semester; and two asked for reflective feedback (on course design and on learning experiences). Most students made at least one posting to each forum. Overall, the 16 students produced 196 posts over 12 weeks, giving an average of 12 posts per student: the most productive student posted 23 contributions, while two students failed to post the required minimum of 10 posts (1 and 7 posts). As facilitator, the author contributed an additional 78 posts (some quite short): these created links back to classwork, readings and other postings, suggested new resources, congratulated innovative thought and fostered critical analysis.

Writing Style

Students were certainly happy about being able to write in a more relaxed style than that usually found in academic discourse, and the word count became immaterial for most:

Often academic assessment is tied into more formal and structured pieces of writing and it was enjoyable to write a more conversational and free-form style. I ... really relished the opportunity to communicate this way. ... either I have a lot to say, or I can't write succinctly to save myself.

The opportunities to provide feedback to the lecturer and student cohort received good attention, with highly reflective posts. This allowed the author, in the lecturer role, to gain interesting insights into these students' learning processes. Here, for example, is one student's reflective response about the major assessment, an exhibition plan:

I was quite worried about this assignment early on ... But once I settled on my idea, my natural passion for creating meaningful connections between objects took hold and I actually produced my presentation with an unanticipated degree of enthusiasm. ... my enjoyment of this assignment confirms to me I have chosen the right discipline to study. Bar the word count and limits of time, I'm looking forward to producing a written exhibition proposal (take my temperature—maybe I am sick)!

Note the informal ending of the last quote, which exemplifies the way in which the discussions, at their best, created a friendly, supportive and stimulating conversation among professional colleagues. This aspect is what makes online discussions such powerful tools with which to build and support a community of practice:

... My rush of posts today has not been to make up the numbers (I was already doing all right on that count) but because the thoughts that many others

have put up here have sparked other thoughts for me (some of mine half-baked, admittedly).

... really made me see the benefit in having the forums... we could voice our struggles ... it made at least me feel better that I was not the only one having them.

Reflecting on the Assessment of Online Discussions

After three months of online engagement, an intriguing and unsolicited example of meta-reflection occurred at the end of the course. Asked "What have been expected, unexpected or interesting outcomes of this course for you?", one student immediately started a thread entitled 'Online discussions: are they effective assessment pieces?' Every student chose to contribute to this discussion, probably because having a reflective online discussion as an assessment task had been both novel and challenging to all:

I had mixed feelings about this forum as an assessment ... how do you effectively compare and contrast what people have submitted? ... I really enjoyed reading other people's postings and found it a very engaging and informal way to write about my own observations, experiences and readings ... Perhaps because it is [assessed] makes me hesitant to post. I approached it more as an assessment than a forum for posting ideas and thoughts. ... less assessment (simple pass/fail to oblige students to use it) ... might be a little less imposing.

I have never had ... online posts for an assessment before, ... I had to keep reminding myself to post because I was not used to it.... A few questions do arise ... how truly unbiased can you be if you know you are being marked on them? However I agree they should be marked because otherwise people wouldn't post. ... attaching a mark to it ..., forces people who wouldn't normally post, myself included, to do so, and I have found it very rewarding. Hearing everyone's opinions, especially about the site visits, which we never get much time to discuss in class, adds this extra dimension to class discussions where people can talk freely.

Interestingly, when this task was assessed against the given criteria, several students were awarded maximum, or close to maximum, marks (an unusual occurrence in this area of studies) because they had indeed produced a quality of posting well within the highest level of expectation. As a lecturer, I would now ensure that students were aware of the possibility of achieving full marks from the beginning of the course, as I think it would alleviate some of the students' (unfounded) anxieties about the assessed nature of the task.

Lurking and Confidence

The reading of asynchronous online discussions without contributing has long been derided by members of online communities, as evidenced by its common description as 'lurking' (Heppell & Ramondt, 1998). However, Salmon (2004, 122-124) considers that such behaviour in student learning communities may reflect the concerns of many students that do not have the capacity to make valuable contributions. This reticence was certainly identified as a significant issue for several of the Museum Studies students in their reflections, as exemplified in this posting and response:

Personally, I found something about the [discussion] inhibiting. I appreciated the chance to discuss and reflect outside of the classes and I read nearly all the postings but it takes me ages to get up enough steam to write something to post. I think it's called 'lurking'! This has been the first time I've had an online forum as part of an assessment, and I've found it an interesting experience. It's *been really good to see everyone's opinions on things, but I have to admit I—like X—spent a lot of time lurking before actually posting anything. It makes sense to have it as an assessed piece, as otherwise people probably wouldn't feel the need to post as readily, but on the other hand, I sometimes found it hard to find things to post about, especially once the site visits finished.*

Another pair of students shared their apprehensions online in a way they could not have done in person, and learned they had support in each other:

While it's really nice to be offered a break from having to write another essay, there was a great degree of difficulty in this for me in many ways. I like being challenged to "raise my voice" as I am ... apprehensive about speaking up in class. ... everyone else seems to talk so confidently and with great intelligence on the matters and I don't feel up to scratch. I still felt a great hesitation to respond to many of the posts as I felt that I wouldn't really be contributing any new insights ...

It would take a great deal of time to get myself to write something ... the bare minimum (10 postings)... was my personal limit of what I could confidently contribute. I think many of you may think, okay grow up, it's not THAT difficult, but I guess it really takes a lot out of me, you have to pay much more than a penny for my thought! ... the online discussion forum is good for those very shy people, like myself, who would never willingly volunteer an opinion in class. Having said this, I haven't yet made enough postings ... mainly because I feel I don't really have anything worth contributing. Like Z, I guess I am a bit intimidated by the confident and intelligent discussions of others in the class, who all seem to have so much experience! Of course, I really enjoy reading what everyone else has to say on these matters, even if I haven't contributed much myself.

Perhaps the most interesting aspect of the sequential pairs of quotes above was the way in which the second peer in each case responded to the first who was brave enough to express concerns. This peer-responsiveness was a crucial aspect of the community-building outcomes of the online discussion, and in their meta-reflection students recognised that awareness of their audience influenced their postings:

Did I use it reflectively? Sometimes, sometimes not... but usually the process of going online and reading everyone else's posts did make you stop and think about what exactly it was that you had to say that was worth anyone else reading...

... all my posts seem to go so horribly off-topic! So in response to Y's initial question about whether it was lack of initiative or the style of assessment, for me, it was just trying to think of something to say that was actually going to be worthwhile to the rest of the group....

Despite their anxieties about making contributions of value to others, the students clearly recognised that their comfort in online environments was crucial to their development as professionals in the museum sector:

This kind of forum is also something that a number of cultural institutions are starting to trial as part of a way of opening up to an online community so it's an interesting and relevant exercise [for us] on several levels.

Some even saw a role for similar forums in their subsequent professional life:

A permanent forum to discuss reflections about museum visits would be fantastic for all those frustrated exhibition analysts who don't have an outlet for considered reflective thought (other than 'what are you talking about?' partners and friends).

Overall, then, students' initial concerns about both the medium and the task thus appeared to be effectively countered by the experience. The discussions provided opportunities to say and explore different aspects of the course from the in-class discussions, and almost all students became fully engaged in the reflective and peer-responsive processes. Although the use of an online discussion as a forum for professional reflection, and as an assessable task in an educational context, was something new and potentially confronting to the students, the outcomes were recognised as being positive:

... although it has not been [my] most favourite part of the assessment process, I have got a great deal out of reading other people's posts. ... it felt like a community of opinion and debate... and we got to hear from all the people who don't speak out in the classroom.

FUTURE RESEARCH DIRECTIONS

Understanding and addressing students' concerns about online discussions is very important to ensuring that students are afforded the benefits of technologies to support learning. The five key points of focus for design-based research in these courses are the assurance of equity in learning experience for both on- and off campus students; the need to provide guidelines, scaffolding and support for students who may be new, or relatively new, to online discussion in the professional sphere; the acceptance of online discussions as learning spaces that can benefit from careful design just as much as physical classrooms; the opportunities to extend opportunities for peer learning; and recognition of the significant level of work required for consistent and quality postings in an online study forum.

Providing equitable experiences for both on- and off-campus students is obviously a legitimate educational goal but lecturers and designers must also be cognisant of the concerns of on-campus students who seek face-to-face experiences. Certainly more "social presence" and "sense of place" may be required in online environments (Northcote, 2008), and lecturers may have to consider physical and temporal distinctions between private and public spaces online (Fernandez, 2009), especially in creating collaborative spaces shared by both on- and off-campus students.

The variety of opportunities afforded by different LMS and Web 2.0 communication tools may allow some interesting work in creating different access areas for students that help to scaffold their use of online discussions. Already, at the university described in this chapter, the introduction of a new LMS in 2010 has led to a re-design of the online discussion tasks yet again, to make full use of newly available tools. Wozniak and Silveira (2004) found that student-student interactivity was more effective when students were given orientation to the online learning environment and shown how to use asynchronous discussion efficiently. Since the study with Development Studies students reported here, lecturers in the relevant program now provide short videos and audio clips to help students understand the technology in use in the course, including the discussion forums.

Peer learning in the classroom can provide powerful experiences. With the right supportive structures in place, peer interaction online can similarly allow students to engage first-hand with a "multiplicity of voices or perspectives" and to understand the "variety of possible interpretations or solutions" (Harasim, 2000). Indeed, when online interactions allow a voice to less confident students, or to those on the other side of the world physically or metaphorically, they become powerful tools in the democratisation of learning. The impact of online discussions on peer learning in the Development Studies courses described in this chapter has already been shown to be significant (Beckmann & Kilby, 2008). Lecturers and facilitators will benefit from continued exploration of the nature of peer learning in online discussions, and how students perceive these online tools in terms of interactions with peers.

The students consistently reported that the amount of effort for online discussions was significantly more than for the face-to-face counterparts. This raises the question of whether numbers of polished words in a research essay should be considered equivalent to numbers of words in online postings, and emphasises the need of lecturers to recognise the impact of online discussion tasks on workload and commitment. More work is required to help lecturers develop a good understanding of what they are actually demanding of students when they create an online discussion task with a given format and specific learning demands.

CONCLUSION

In all the courses investigated in the research reported in this chapter, there were noticeable benefits to both students and staff from the flexible learning opportunities created through the use of online technologies. In the Development Studies program, the greater focus on these approaches has seen an increase not only in the proportion of off-campus enrolments (from about 30% of enrolments in 2008 to about 50% in 2010) but also in the number of enrolments overall. Students clearly appreciate the prospects of engaging directly with their peers, whether this occurs on- or off-campus: online technologies provide a greater scope and choice about how, when and where this occurs.

The online discussions described in this chapter were designed specifically to give postgraduate students opportunities to demonstrate the skills in critical analysis, reflective thinking and peer-responsiveness that characterise the professional practitioner. Undoubtedly the use of technology required many students to move beyond their comfort zones in terms of learning environments and information literacy skills. However, the online discussions created opportunities for these emerging professionals to experience for themselves how informed discussion of practice in the field feeds back into the creation of professional knowledge and theory. McFarlane (2006) believes that understanding this process, whereby learning is recognised as a social process and practice becomes a key driver of knowledge creation, is crucial for development workers, and it seems likely to be equally relevant to most practice-based professions. For this reason, lecturers who truly see students as individuals, and want to be better teachers for all, cannot simply ignore the sensitivities of those students who are wary of online discussions as assessment tasks, but must rather work hard to engage those students too in understanding the benefits of online learning that can accrue to them both as individuals and as a group of professionals learning together.

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KEY TERMS AND DEFINITIONS

Asynchronous Online Discussions: Discussions that take place in an online environment, or forum, by means of contributions uploaded ('posted') at different times, allowing for conversations and learning activities distributed over different time zones and locations.

Blended Delivery: A combination of different modes of delivery of teaching and learning activities, most commonly a mix of face-to-face learning with online content and activities.

Course Outline: (Also known as course guide or course overview) A written student guide to a course that is designed to help the students participate most efficiently and effectively, usually including information such as relevant university policies and support mechanisms, names and contact details for lecturing and tutoring staff, venue and times of teaching sessions, reading lists, detailed descriptions of topics, assessment tasks and deadlines, marking criteria, and other relevant material.

Development Studies: A multidisciplinary social science that addresses issues of concern to developing countries, and trains professionals to design, implement and evaluate development projects.

E-Moderating: The act of moderating, or facilitating, an online discussion, meeting or conference, usually with the specific role of building a self-supporting learning community over time, especially used with reference to the 5-stage model of e-moderating first developed by Professor Gilly Salmon in 2000 (Salmon, 2004).

Learning Management System: Also known as a Virtual Learning Environment (VLE), a learning management system (LMS) comprises a high-end web-based software package designed to support teaching and learning in educational settings by automating administration processes and providing online tools (including tools for uploading content, resource sharing, discussion, and assessment) to help lecturers create course websites with a minimum of technical skill. Despite variations in the proprietary and open-source systems in widespread use globally, a current LMS will generally not only provide an e-learning resource platform for simple and rich media formats, with options for RSS feeds and social networking tools such as blogs and wikis, but will also register users, track courses, record data from learners (including access, test results and assignment input), and provide reports to course teachers and management. Originally created to support distance education, LMSs are now often used in the blended delivery of educational activities.

Off-Campus Student: A student who is taking a scheduled course, usually through distance education or open learning, in a way that does not require the student to attend face-to-face sessions.

On-Campus Student: A student who is attending face-to-face sessions for at least part of a scheduled course.

Peer Learning: Scheduled or unscheduled activities that lead to learning by one student from another student, especially relevant in postgraduate programs where the students are practicing professionals.

Postgraduate Students: Those students who have completed a first (bachelor’s) degree and are enrolled in an advanced degree (e.g. Graduate Diploma, Masters, other Graduate School program), commonly called graduate students in North America.

Chapter 5
Learning in a Virtual World:
Student Perceptions and Outcomes

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ABSTRACT

During the past four years over 500 university students have explored the educational potential and value of learning in the virtual world of Second Life™. This research examined from the perspectives of on and off-campus students, their experiences of learning in this virtual world, through activities underpinned by adult learning theories. A compilation of student reactions to their learning in Second Life™ was collected through three pilot studies, and this chapter examines in particular, the students' perceptions of engagement, immersion, communication, interaction, collaboration and distractions, of learning virtually. The positives and negatives of learning in Second Life™ from the points of view of the students, are discussed. Students who participated in this study were drawn from a variety of groups who were studying different subjects: on-campus students were required to participate in the virtual world educational activities; and the off-campus students, took part voluntarily. This research demonstrates that the students were highly engaged in their virtual learning, as voiced through their perceptions and reactions.

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INTRODUCTION

At the University of New England, a regional university in Australia, three pilot studies have been conducted since 2008, with students enrolled in Information Technology Communication (ICT) in Education subjects, who participated in virtual world sessions during their studies. These pilots were established to determine whether a virtual world was engaging for the students; whether real life workshops can be replicated and/or improved using a virtual world; and to make a comparison of interactive online tools for enhancing the quality of students' assessment responses. In each of the pilots, students were requested to complete an end of semester survey, and the online conversations used in the virtual world activities were recorded and analyzed.

Virtual worlds provide interaction and engagement for the users. These virtual environments combine asynchronous and synchronous content to provide a context for collaboration and simulation, and these virtual environments can emulate contexts, such as a classroom or lecture theatre. Due to the availability of synchronous communication within virtual worlds, these environments also provide enhanced interactivity for distance learning (Petrakou, 2010). Synchronous communication allows for immediate feedback so students feel more like participants in a community of learners rather than isolated individuals.

Second Life™ is a virtual world that is a low cost computer-based simulation space with features of real and fantasy lives, and can be used as a substitute for many real world activities, such as demonstrating the piloting of a rocket to another planet to test the make-up of the soil content or having a group discussion with people from all over the world in the same space at the same time and not have to go to the expense of physically meeting each other. Second Life™ is just one of over 100 virtual worlds, and these numbers are growing rapidly (Collins, 2008), with several researchers indicating the number is now over 200 (Farley & Steel, 2009; Lemon & Kelly, 2009; Honey, Diener, Connor, Veltman, & Bodily, 2009). Mitham (2008) predicts the number of virtual worlds available online will be approximately 900 by 2012.

People enter a virtual world via their avatar, which is an electronic presence that imitates real life in the form of a personal presence (Gregory & Smith, 2010). In the virtual world an avatar can move virtually by talking, walking, running, sitting, dancing, flying, driving, riding, teleporting, making gestures (such as clapping or waving), changing appearance (such as clothing, gender, hair and skin color), and interacting with other avatars and the environment, which includes land formations (Gregory & Smith, 2009). For example, if an avatar walks into a wall, it cannot go through it, it has to go through doors that open, just like in real life. In Second Life™ gravity exists and if the wind blows, the leaves on the trees move. Second Life™ enables a high level of freedom allowing members to inhabit and build their own 3D world.

Second Life™ appears to be the choice of most universities using virtual worlds (Linden Research, 2009). Lester, (2008a) the prior Academic Director of Linden Lab (the proprietors of Second Life™), states that there were approximately 1,000 educational institutions worldwide using Second Life™ in 2007-08. In 2010, approximately 750 educational institutions operated their own islands in Second Life™ (Cummings, 2010). These figures do not include smaller parcel-owned virtual lands. Second Life's™ high usage figures compared with those of other competing platforms demonstrates its dominance of virtual worlds for educational purposes (Warburton 2009).

This chapter presents the findings from the three pilot projects with students enrolled in different ICT education subjects who used the virtual world Second Life™ in either a voluntary and compulsory capacity, and were either on or off-campus education students. This chapter also explores the variations in experiences reported by these two student groups.

BACKGROUND

The university in which this study was conducted is a traditional distance education provider with approximately 80% of its students enrolled in an off-campus mode of learning. Traditional distance education approaches in Australia have been understood as students studying independently from paper-based resources, with little or no support from academics or peers (Gregory & Tynan, 2009). At the University of New England, students now learn through virtual classrooms, or Learning Management Systems (LMS), that provide interactive tools from the one portal. Students access their study materials from an online learning management system with very few materials being provided on paper or CD ROM. The university's learning management system provides students with the ability to interact with their peers and academics through online tools such as blogs, wikis, chat rooms and discussion boards. Static pages for retrieving information from websites and downloadable PDF (portable document format) documents are also available to the students.

Virtual worlds enable students to enter a setting and observe how it works from the inside and, in Second Life™, the educator and students can interact and determine the course of events through computer graphics, sound, text, interactive and immersive technologies. With the introduction of virtual worlds such as Second Life™, students can come together in a context that feels like face-to-face lectures and workshops with which they are familiar, but from the comfort of their own homes. When students are not on campus, a virtual world provides students with flexibility so they can connect through highly interactive, multi-modal learning environments (Wood & Hopkins, 2008). The term "immersive" in this context encompasses both the physical aspects of being located in the environment, and the psychological sense of intellectually being engrossed in the environment (Dalgarno & Lee, 2010).

For adults to learn and be engaged in a virtual learning environment, adult learning theories of andragogy (Knowles, 1985), transformative learning (Mezirow, 1978), constructivist learning (Bruner, 1986, 1990), and connectivism (Seimens, 2004), are all useful to be taken into consideration, as each theory offers a perspective to theorizing about how learning might occur in a virtual world. For this study, a combination of these theories has contributed to developing an understanding of learning in virtual environments, and as such, these respective theories are discussed briefly. It can be seen that using these theories as a backdrop, educators can claim virtual worlds as learning spaces for social and educational purposes with adult students (Schutt & Martino, 2008).

THEORETICAL BACKGROUND

Virtual worlds have been created for all ages with the majority designed for the younger audience. However, it is the education sector that has embraced virtual worlds as a space for teaching and learning of adults. There is no definitive theory on how adults learn in a virtual world. Adult learners are those who choose to participate in formal learning activities either by choice or because it is required of them through their employment or institutional establishments (Finger & Asun, 2001). Theories on how adults learn have been around since the time of Ivan Illich (Smith, 2008) in the mid 1950's, and it is almost impossible to describe a unifying framework or theoretical model to fit all the ways in which adults learn (Cranton, 1992). Technologies however, can alter how academics teach and adults learn (Swallow & Laney, 2004).

Virtual worlds facilitate independent learning making it suitable for autonomous, self-directed adult learners (Chou, 2009). Second Life™ can be used as an enhancement to the approaches to learning that educators already use (Hollins & Robbins, 2008). Virtual worlds can also assist educators meet the learning demands of their students using methods with which the students can identify (Carr, Oliver, & Burn, 2008).

Variations in learning approaches using virtual worlds will occur among educators depending on their level of experience with a virtual world (Gregory, Reiners, & Tynan, 2010). Virtual worlds have been designed for adult learners and there are many examples of simulations, problem solving and group work that occurs within the environment. As Second Life™ is experiential, collaborative and immersive, strong scaffolding and support is required to provide authentic experiences for the learner (Salmon, 2009). Wicks (2009) suggests the role of an educator when teaching students online is to make use of the tools available to allow learners to develop deeper understandings and to foster the abilities of students to gain knowledge through discussion and reflection using a combination of the theories outlined.

Discussed here are four adult learning theories that are applicable to learning in virtual worlds.

Andragogy

The theory of "Andragogy", introduced by Knowles in 1968, was developed to explain self-directed adult learning, as opposed to pedagogy that was developed to explain how children learn (Cranton, 1992; Knowles, 1985). Adult learners take responsibility for the decisions they make (Green, 1998; Kearsley, 2009b). They usually undertake study as an adult because they want to learn or make changes to their life (Green, 1998).

Adult learners require their learning to focus on the processes of learning, and are best taught through case studies, role-playing, simulations and self-evaluation (Kearsley, 2009b). Role-play and simulations lend themselves to learning and teaching in a virtual world as they can be undertaken anonymously and in context. As an adult matures, they increase their knowledge reservoir. They are ready to learn, to engage more in their learning and to become more motivated (Knowles, 1985; Smith, 2002; Cranton, 1992). As such, learning in a virtual world is suitable for highly motivated students as considerable time is required to learn the potential uses of a virtual world for learning purposes.

Transformative Learning Theory

According to Mezirow (Cranton, 1992), "Transformative Learning Theory" involves the processes of reflection and action in order to become aware of one's own tacit assumptions. Transformative learning involves two kinds of learning: instrumental learning which focuses on learning through task-oriented problem-solving activities that involve the students in determining cause and effect relationships; and communicative learning approaches which involve students communicating about individual feelings, needs and desires (Kearsley, 2009b).

Transformative Learning Theory relies on adult learners to be critically self reflective of their learning. As Finger and Asun (2001, p. 55) state, "true adult learning occurs when meaning perspectives are transformed through critical reflection and when a perspective in transformation happens". Transformation of students' understandings occurs when he or she critically reflects on the learning and actions they have undertaken, and when they pay particular attention to when their reflections took place. For example, at the end of each virtual world session used in this study, students reflected on activities that had taken place, and reflected on what they had learned. Transformative Learning Theory can be considered as an extension of Andragogy but the former includes an emphasis on psychological change, where values and beliefs are challenged and self-concepts are threatened (Cranton, 1992).

Teaching and learning in a virtual world uses elements of transformative learning. Students are asked to reflect on what they have learnt in their virtual world setting so they can transfer these skills to real life. Transformative learning can be enhanced through "visual learning, information research and retrieval, collaborative activities, rapid feedback and imaginative and creative self-expression" (Maloy, Verock-O'Loughlin, Edwards, & Park Woof, 2011, p. 31), all of which occur when learning in a virtual world.

Constructivist Theory

"Constructivist Theory", developed by Jerome Bruner (1986, 1990) but sometimes attributed to Jean Piaget (Kearsley, 2009a), theorizes that learners construct new ideas or concepts based on their current or past knowledge. According to constructivist theory, learners access information and internalize knowledge, where "knowledge is constructed in the mind of the learner" (Bodner, 1986, p. 873). Students learn by building on knowledge and information already acquired.

To change information into knowledge, students require a space for experimentation and exploration. A virtual world is very suitable for experimentation and exploration within a simulated environment. Students can construct their own understandings through interaction with teachers, peers, the subject matter and the virtual environment (Evans, Mulvihill, & Brooks, 2008). The virtual world provides an environment in which to try out ideas without putting one's personal safety at risk.

To build knowledge, information has to be organised, structured and restructured around thoughts and then modified and expanded upon (Bodner, 1986). Teaching and learning in a virtual world follows the constructivist approach through teacher-led activities, where knowledge is user-constructed, and students integrate new experiences into their knowledge-base over time (Slone, 2009). Second Life™ is an ideal medium for learning from a constructivist perspective because students can reflect on their learning processes and the learning theories or models they use, to make sense of their experiences (Bruner, 1990). In virtual worlds such as Second Life™, students are able to learn, test their understandings and then reshape these understandings in an ongoing manner, based on their experiences (Gensburg & Herman, 2009).

Connectivism Theory

"Connectivism Theory" emerged to take into consideration the changes in educational practices that have been occurring in the "digital age" (Siemens, 2004). According to "Connectivism theory" knowledge is considered to exist within organizational systems which are accessed through individuals participating in activities within those systems. Siemens (2008) reports that with the introduction of technology "knowledge is growing exponentially". As such, "connectivism" is based on the individual's ability to find the correct information by connecting it with current and past information to increase knowledge (Wicks, 2009). As Siemens explains:

Connectivism is the integration of principles explored by chaos, network, and complexity and self-organization theories. Learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual. Learning (defined as actionable knowledge) can reside outside of ourselves (within an organization or a database), is focused on connecting specialized information sets, and the connections that enable us to learn more are more important than our current state of knowing. Connectivism is driven by the understanding that decisions are based on rapidly altering foundations. New information is continually being acquired. The ability to draw distinctions between important and unimportant information is vital. The ability to recognize when new information *alters the landscape based on decisions made yesterday is also critical (Siemens, 2004, p.1).*

Teaching and learning in virtual worlds requires educators and students to learn new things that they once, only a short period beforehand, could not perceive or conceive as being possible. To include a virtual world in their repertoires of educational practices though, educators have to think how they could use a virtual world and to what end, and then to rethink their teaching and learning practices accordingly, in light of these aforementioned theoretical frameworks.

Themes

Informed by the above theoretical backdrop, this research conducted three pilots in which students were requested to complete an end of semester survey, and the online conversations used in the virtual world activities were recorded and analyzed. Eight themes emerged: engagement, communication, anonymity, distance, interaction and collaboration, learning, technology, distractions.

Engagement is a multidimensional concept and encompasses the affective (feelings), behavior (observable actions or performance) and cognitive processes (perceptions and beliefs) (Finger & Asun 2001; Jimerson, Campos, & Greif (2003); Russell, Ainley, & Frydenberg, 2005). It is important that educators know what engagement looks like in a teaching and learning environment, and should be aware of these components (Gregory & Lloyd, 2010) so that they can ensure that students are engaged in the tasks they are undertaking. By measuring teaching and student reporting through surveys and observation it is possible to gain insights into meaningful ways to measure engagement (Reading, 2008). When someone is said to be "engaged", they "have a sense of energetic and effective connection with the activities they are undertaking" (Schaufeli, Bakker, & Salanova, 2006, p. 702), where "engagement is a function of the interaction of the student and institutional characteristics" (Hu & Kuht, 2002, p. 571).

Educators have to understand what engagement means to the students. For students to be engaged, they should be involved in "authentic learning activities designed to achieve desired learning outcomes" (Raeburn, Muldoon, & Bookallil, 2009, p. 821). Engagement also refers to the "time, energy and resources students devote to activities designed to enhance learning" (Krause, 2005, p. 3). In this study, students stated regularly that a virtual world is engaging.

Communication was seen as a very important component of learning and teaching in a virtual world. Both text and audio were used to communicate in the virtual world, however, text was the predominant form to enable all students the ability to participate as there were some students who had continuous technical difficulties and were unable to hear on many occasions.

Anonymity was afforded through the virtual world. Not all students decided to take the opportunity of remaining anonymous, but they were encouraged not to reveal their real identity if they did not want to do so. The students had the opportunity to say things they may not say if it were in a face-to-face situation, with the students indicating this view on several occasions. The anonymity available through the virtual world was an aspect many students indicated they enjoyed.

Distance, or off-campus study, enabled students to attend in-world sessions with their academic and peers synchronously, from their home. Many students saw the potential of using a virtual world for those students who were studying at a distance. The students commented on the nature of the "anywhere technology" and "anytime resources".

Interaction and collaboration were seen as important characteristics of learning in a virtual world for the engagement of the off-campus students, while the ability to learn in a virtual world was an aspect of the experience the students discussed and valued.

Technology was relevant for learning and teaching in a virtual world on several occasions. To support the on-campus students participate in the virtual world activities, a computer laboratory was set up at the university with 30 desktop computers. These computers had the Second Life™ software installed, high broadband capabilities, sufficient RAM, a graphics card, and the students were given avatars to use for their sessions. Students were encouraged to create their own avatars if they were going to explore the use of Second Life™ in the future. However, to ensure a productive workshop, the students were lent avatars for the initial workshop.

For off-campus students, all the technology requirements were the responsibility of the individual student. The off-campus students were encouraged not to participate if they did not have the necessary hardware capabilities to avoid building initial negative experiences. Some students who wished to participate, upgraded their own computer. There were also students who persevered even though they had issues with the technology, such as slow bandwidth or the audio was not working, which impeded their experiences.

Distractions were identified as a theme emerging from the student texts as a risk to learning in a virtual world.

METHODOLOGY

Since 2008, over 500 Australian higher education students at the University of New England have explored the use of a virtual world as part of their learning in an ICT teacher education subject. Over the four years, 200 students voluntarily chose to use the virtual world of Second Life™ as part of an assessment task in the education technology subject. Furthermore, 300 first year pre-service teachers were required to use Second Life™ as part of their studies. The students participating in this study were considered as either "on-campus" or "off-campus" students. Most students were located in Australia but some were in other locations worldwide, with several students living in Europe participating in the study. Students were able to participate in the virtual world sessions no matter where they lived in the world. Sessions were conducted in an afternoon and of an evening in the Australian Eastern Standard Time (AEST) zone. Using this time zone catered for most students worldwide that wished to participate. There was only one student who was not able to participate due to their time zone.

The focus of the data collection was on pre-service and postgraduate education students' perceptions of using a virtual world as a learning tool. Both qualitative and quantitative data was collected through online conversations and a survey instrument developed by the researchers. All the online conversations were recorded with student consent, and the students completed surveys at the completion of their education technology subject.

The three pilot studies conducted each had individual methodologies, and these will be discussed shortly. There were however, some common elements in the data collection across the three pilots, and the post semester surveys shared some common questions in all three pilots. The research was conducted with ethics approval from the university and with permission from each student to record their online conversations.

Students, Second Life™ and Assessment

In 2008 a voluntary assessable task on virtual worlds was added to two ICT in education subjects. In 2009 a compulsory, non-accessible virtual world activity was introduced to first year pre-service on-campus teachers. In 2010 and 2011 more groups of students enrolled in different ICT education subjects participated in the virtual world sessions. This expansion in the numbers of students was due to the introduction of off-campus study by pre-service teachers, and to the offering of a Masters in Education (eLearning) qualification that included subjects utilizing Second Life™. All the off-campus students using the virtual worlds component of study did so voluntarily, with an optional assessable task to complete.

The learning objectives of the studies by the under-graduate and post-graduate students varied, depending in which education subject they were enrolled. However, the objectives were all based upon the same themes: to integrate social computing technologies such as virtual worlds as tools for learning in educational settings; use and evaluate software suitable for classroom use, including social networking and computing tools; construct and present a personal philosophy for uses of social computing tools in educational settings; and discuss the use of emerging tools in the context of technology development, educational paradigms, usage by various social groups, and innovation and adoption of technologies by different social groups. Students in this study were able to achieve the outcomes of their subjects by attending the Second Life™ sessions. Students were able to complete the assessment tasks without attending the Second Life™ sessions if they desired.

In 2008 and 2009, only off-campus students participated in the virtual world sessions. Combining 2008 and 2009 students, 21 students completed the survey who were using a virtual world for a component of their studies. In 2010 there were 65 on-campus students and 74 off-campus students who participated in virtual world sessions and completed the end of semester survey. Students were asked to complete an end of semester survey to ascertain their overall knowledge of Web 2.0 learning tools and were provided with the opportunity to state their views, feelings and perceptions of using a virtual world in their studies.

Through a comparison of age, it was found that on-campus students were mostly aged under 25 (89%) (n=58 of a possible 65), while the off-campus students were predominantly in the 25 to 54 age range 90.5%, (n=67 of 74 students). This comparison was made to show that the off-campus students were mostly mature aged, for example, with 48 of a possible 74 students (65%) over the age of 35, while the on-campus students mostly fell into the under 25 age group.

Of the on-campus students, there were only 12 comments made in the survey in total, whilst for off-campus students there were 84 comments in total (some students made several comments). It is only a belief, however, the on-campus students were in a class situation when completing the surveys and wanted to complete them as quickly as possible and therefore did not take the time to add comments. These results could have an effect on the nature of the student views because off-campus students have "lived" longer and had more life experiences. Some students only attended the sessions because they wanted to learn about the educational potential of Second Life™.

Pilots

There were three pilots in this research and they are outlined below.

Pilot 1

The aim of Pilot 1 was to determine whether a virtual world was engaging for the students who participated in the sessions. Off-campus students enrolled in ICT education subjects were invited to participate in virtual world sessions using Second Life™. In 2008 and 2009 students were enrolled in either a Graduate Diploma or a Double Degree in Education. In 2010 and 2011 pre-service teachers and Masters of Education (eLearning) students were given the opportunity to participate.

In 2008, 9 students signed up to participate; in 2009, 31 signed up to participate; and in 2010, 81 students signed up to participate. These students were in a mixed group of students studying ICT in education, comprising students studying several different subjects. The students attended virtual world sessions to:

- Participate in group discussions and go on virtual tours and excursions;
- Interact with guest educators from national and international educational institutions;
- Learn how to use a virtual world in teaching and learning;
- Undertake role-play activities;
- Collaborate in web quests; and
- Learn basic building and scripting.

The author was the educator who led, organized and taught all the virtual world sessions. For one group of students in this pilot, the virtual world sessions comprised an assessable task where they had to demonstrate how they would use a virtual world in their teaching. For example, one student demonstrated a chemistry lesson where an experiment illustrated the consequences of mixing the wrong amounts of chemicals together. For another group studying a different subject, there was a choice of assessment tasks, with virtual worlds being one of the tasks and required the students to discuss how they would use a virtual world in their teaching.

Over a semester students attended weekly sessions where they spent the first half of the sessions in a space created for them to discuss topics relevant to educating with technologies. The second half of the sessions was spent attending virtual lectures from educators worldwide or going on virtual excursions. Students also undertook role-play activities and web quests in the virtual world. Data was collected for analysis by saving the text of all Second Life™ discussions and students completed end of semester surveys.

Pilot 2

The aim of Pilot 2 was to discover whether real life workshops could be replicated and/or improved using a virtual world. In 2009, first year pre-service teachers were required to participate in a role-play activity in real life and then to repeat it in Second Life™. Students were given a survey to complete at the end of each session. These students were all on-campus students and 79 students participated in the pilot. This was a compulsory, non-assessable task.

The process of using "Six Thinking Hats" (de Bono, 1985) was used for the pilot as it could be easily replicated in Second Life™. To understand different kinds of thinking, de Bono (1985) developed the metaphor of "Six Thinking Hats". This strategy encourages people to think about their thinking. It provides a scaffolding tool to assist this thinking and consider different perspectives on a topic. A lecture was conducted to provide students with the background and approach of de Bono's "Six Thinking Hats". Students were to take on the "personality" of the colored hat they were wearing. Students were required to comment on a topic of common interest from the point of view of the colored hat. The hats were: Red (Intuitive – How do I feel about this right now?); White (Informative – What information do we have? What information do we need?); Yellow (Constructive – What are the good things about this? What are the strengths and pluses? How will it help us? Why will it work?); Blue (Reflective – What is our focus? What thinking is needed? What have we done so far? What do we do next?); Green (Creative – What is possible? What ideas do you have?); and Black (Cautious – What are the minuses about this? What are the weaknesses? What might go wrong with this?) (de Bono, 1985).

A workshop using the "Six Thinking Hats" was conducted in real life, and then replicated in Second Life™. The workshop was conducted so that the students could experience the use of this teaching method. Students were allocated to a group of six participants and were given a Second Life™ group membership. This meant they could participate in a group conversation without others nearby hearing. The students were required to consider the efficacy of the Second Life™ classroom and playground from the six perspectives of the "Six Thinking Hats". Students in real life and students' avatars in Second Life™ wore a different colored hat to discus the topic using the hat's personality (according to de Bono's "Six Thinking Hats"). Students changed hats and went to a computer laboratory to use Second Life™ to discuss another topic from another hat's perspective.

In the on-campus workshops, a teacher with 30 years of real life teaching experience but who was a novice Second Life™ teacher took both real life and Second Life™ workshops. The workshops in real life appeared to be a success as all students were engaged in the activity and the role-play exercise had been conducted many times in the past. The workshops in Second Life™ improved as each workshop progressed however the student reactions were not as positive as they could have been with more in-world teaching experience. The educator taking the de Bono role-play sessions was as much a novice to Second Life as the students. All conversations were recorded.

In 2010 and 2011, the "Six Thinking Hats" role-play exercises were conducted in Second Life™ with off-campus students. These role-plays were perceived to be extremely successful and were scaffolded with feedback loops so as to gain student reactions, perceptions and reflections. Student involvement, engagement and immersion in the sessions led the author to believe that students enjoyed the opportunity to learn de Bono's Six Thinking Hats through the use of a virtual world. The discussions that took place when undertaking the role-play activity indicated this. As these virtual sessions had been taught in the past, they were conducted in a manner that worked more effectively than those conducted in 2009. Student feedback was positive, and this workshop showed that role-play exercises could be conducted very successfully with off-campus students located around the world through the use of Second Life™.

In both the real life and Second Life™ workshops, all students completed surveys at the completion of their workshops. For on-campus students, these were paper-based to ensure the completion of the survey immediately following the workshop. Off-campus students were encouraged to complete online surveys at the completion of the workshop. All online dialogue from both groups were recorded for analysis and for the on-campus real life workshop, transcriptions of student reflections were made.

Pilot 3

The aim of Pilot 3, conducted in 2010, was to undertake a comparison of interactive tools for enhancing assessment responses by students, through the use of chat rooms and discussion boards in the university's learning management system and in Second Life™. This pilot compared discussion board and chat room conversations in the learning management system with conversations conducted in Second Life™. All the conversations were text-based. Forty students chose to explore the educational potential of Second Life™ in this pilot. All off-campus first year pre-service teachers were offered the opportunity to participate in the pilot study. These activities were non assessable. All conversations were recorded by saving the text, and the students were asked to complete an end of semester survey to give their view of the learning tools being compared.

RESULTS FROM THE PILOTS

Over 500 students took up the opportunity to explore the value of learning in a virtual world at the university in which this study was conducted. The results presented here focus on the student views of their learning in that virtual world, analyzed according to the themes that emerged. In addition, comparisons of student reactions and responses were made on the following bases:

- On and off-campus students studying the same subject;
- On and off-campus students studying different subjects;

- Voluntary participation versus compulsory participation;
- Age of students;
- Real life versus Second Life™ workshops; and
- Student engagement in the virtual world sessions.

After teaching the education students how to use a virtual world for their learning, there were only small differences in the students' views on teaching and learning in a virtual world from all groups of students. Comparison of the age of students showed these were the same as comparing on- and off-campus students from the same group, on- and off-campus students enrolled in different subjects and voluntary and compulsory participation. It was found that age was the same as mode of study, as were their perceptions of learning in a virtual world the same. All voluntary mature age students were more positive in their feedback about learning in a virtual world than the younger students who were required to participate. All comparisons had the same result: the off-campus students were more positive about their experiences of learning in a virtual world than the on-campus students. The off-campus students were experiencing first hand the potential of teaching and learning in a virtual world as they were undertaking their sessions from various locations around the world. They did not have the opportunity to ask face to face questions, they had to use the virtual world. Feedback from voluntary participation indicated that the students could see the potential of the virtual world for their future teaching and learning.

Findings Analyzed by Themes

Using Leximancer™ for the analysis of the recordings of the online dialogue of sessions, eight themes informed by the theory, emerged. These were engagement, communication, anonymity, distance, interaction and collaboration, learning, technology, distractions, and there were other comments which did not fit into these themes. Students were categorized according to whether they studied on or off-campus. Different comparisons of on-/off-campus, age, voluntary/compulsory and students enrolled in different subjects indicated that these were the same students. On-campus students were not as positive about their experience using a virtual world as a teaching and learning tool as the off-campus students. On-campus students undertook compulsory workshops in Second Life™ in a computer laboratory. However, the comments from on-campus students do not reflect the overall feelings of the students who participated. Negativity came from what students voiced out loud to each other in the computer laboratory, even though they were required not to speak. As there were only 12 open-ended survey responses, it was felt that the more negative feelings were not voiced, although they were observed.

Following are the views of the students, reporting their reactions to learning in a virtual world. Prior to presenting these students' voices, is an explanation of each theme with comments from the educator in this study. All themes are divided between on-campus and off-campus students to demonstrate the differences in the student voices, as the results indicated that this factor of location was the main variation in the views from the different groups of students. All the dot points presented below are quotations from students. The students' voices have not been altered and words that depict the theme are *italicised*.

Engagement

The findings from this study suggest that student engagement was an important component underpinning learning in a online world. Students' engagement could be broken into three categories: "affective engagement" or feelings, "behavioral engagement" and "cognitive engagement".

Affective Engagement: Feelings

Below are student voices that demonstrate that the students felt they were engaged in the virtual world.

- Statements from on-campus students
    - It [Second Life™] could be used in a classroom fairly effectively, however, I *feel* it could also have problems, such as students not keeping up during group discussions.
    - Great for *feeling* "included" as a long distance student and for a teacher to witness the contributions of an otherwise shy student.
    - It would be a fantastic tool to use if you were an external student. You could actually *feel* like you were there - *involved*.
    - I found a lot of people *did not feel* the same as me or agree that it was effective but I *found* it interesting and fun because it was different.
    - I *feel* as though this is the direction education is going and it is important to be aware of and familiar with programs that will fully engage the students. Second Life™, I *feel*, does this.
- Statements from off-campus students
    - Students will be having *so much fun*, that they will *not even realise* they are learning.
    - Virtual worlds are incredibly stimulating educational environments. They are constructivist in essence, which means that every learning experience is *meaningful* and *enjoyable*. Virtual worlds have limitless educational possibilities and I am very *excited* to be at the forefront of this innovative new method of education. I am *looking forward* to being able to implement the use of virtual worlds into my own classroom.
    - I must say I *feel privileged* to be part of this small group instead of the other students.
    - As an educational tool, virtual worlds are *incredibly engaging*. I *can only imagine* that *engagement* is incredible high for students.
    - Second Life™ has been a *surprising discovery*, and *has exceeded my expectations*. Initially I was *cautious*, and chose to join partly out of *curiosity*...but found with each visit … more possibilities for use in education were introduced to me. Its very *exciting* and I intend to continue visiting and learning in Second Life™.
    - I *believe* they are *engaging* because of the creative factor… Virtual worlds are new and modern and colourful, just what kids want to see… It is *engaging* because its visual and you *feel* part of it… Lots of visual stimulation, that can be *active*, not passive - like television… It is *engaging* because the only limit here is your *imagination*… Virtual words are *engaging* to students as they like real *interaction*… It can work with any style of learner but in particular visual and kinaesthetic... Yes, learning through play… Kids don't realise they are learning… Teaches them in an environment that they are comfortable with.
    - It was *very interesting and fun* -:). This lesson was very *engaging* and assisted in a full understanding of the topic. It is very *engaging* once you understand it.
    - In a strange way I think exploring a virtual world can actually make that *world more real* than say looking at pictures or reading texts or even viewing a video.

Behavioural Engagement: Observable Actions or Performance

Over each semester recordings were made of Second Life™ conversations. In 2008, there were 190 pages of recorded Second Life™ conversations; in 2009 306 pages and in 2010 there were 195 pages of recorded Second Life™ conversations.

Students were so immersed and engaged in what they were doing they often commented that they lost track of time or wanted to learn more, as depicted in the two student voices below. Sessions were scheduled for two hours in 2008 and 2009 and one hour in 2010. In 2008, on average, students stayed for two hours fifty-one minutes and on two occasions stayed for over three hours. In 2009, students stayed on average three hours twenty minutes and on three occasions they stayed over four hours. In 2010, where sessions were advertised as one hour long, students stayed on average for 2 hours and 9 minutes and on four occasions stayed over three hours. Some of the student voices were:

- … so much for *not staying* the full 2 hours!
- … wow *time flies* in here

In 2010, 74 students indicated they wished to attend the virtual world sessions. However, over the semester, nine did not attend any sessions (this was because of either technical difficulty or time issues in participating as indicated by correspondence received by the students). There was an average of 16.1 students who attended each voluntary session.

The Second Life™ session for on-campus students was a required component of their study. From observation of workshops for on-campus students by both the researcher and two other observers it was found that the students participated in the workshops, laughed and talked a lot, and were observably engaged in the task at hand. The online dialogue recorded from these sessions confirmed that the students were engaged in the task.

Cognitive Engagement: Perceptions and Beliefs

Below is a selection of student views that depict their perceptions and beliefs of engagement in the virtual world.

- On-campus students' views
    - We didn't have a great amount of time, *I believe*, to use it as an educational tool. If we had more time or had used it previously, then it would be a good educational tool.
    - I would more implement as a rewarding tool, because *I believe* it is too hard and children would loose focus and muck up in a lesson context
    - *I believe* it would be useful, but with the right students. Maturity would play a huge part.
    - Was interesting but *I believe* would be disruptive in the classroom
- Off-campus students' views
    - I had my first visit to Second Life™ on Wednesday and it was a blast. I can *see* the *students engaged* in this environment and developing understanding in life skills and applying these to real life.
    - This is great, love the change *almost like face-to-face*with lecturer.
    - We have *seen so much variety* tonight … which is great to keep students interested. … Your … work … doesn't just recreate classrooms and lecture halls but *seriously uses the creative potential* of Second Life™ of teaching.
    - Everyday I am more and more *intrigued and excited and bewildered* by the wonder of Second Life™ and it's possibilities.
    - It's a bit like being a kid in a toy store, *what do you touch first*! And the beauty is you can touch and experi-

ence whatever you like; no hands off like so many real life situations.

- *I think* that if we took the time, the *rewards would be infinite*, rather than battling with teens about reading boring stuff, they would *go nuts* for this.
- At first I could only see problems with using it as a tool in a classroom however as I have learnt more I *can see* a huge benefit for students especially the quieter ones or even ones with a learning difficulty who may be able to be *engaged through this type of learning*. As we aim to engage all students this is very important.
- Second Life™ *gives students* an opportunity to use so many different skills and to communicate in a way that they may otherwise be unable to. I will be *very disappointed* if I am unable to continue to use Second Life™ or something similar with my future students *as I think this is the way* education needs to go.
- Using the virtual world *opened my eyes* to a new learning tool. It has *provided inspiration* and opened possibilities that I previously *did not know* existed.

These statements capture the students' voices: what they believed, thought, and did, that demonstrate they were engaged whilst learning in Second Life™. Because the sessions felt so real to the students, as if they were actually there, it shows how immersed and engaged they were in their learning in the virtual world. Students lost track of time, they wrote large quantities of text and talked about their feelings and perceptions of their learning that had taken place.

Communication

Students indicated they felt that communication in Second Life™ was not only effective, but also a way of engaging with others from a distance. Communicating with peers and educators gave the students a feeling of not being so isolated as they traditionally would with more conventional means of studying by distance as the use of a synchronous tool using an avatar gave them the feeling of being there in the same room with the other participants, as the following selection of students' views below, illustrates.

- On-campus students' views
    - You could not learn much from Second Life™. The only benefit I see is the *communication* with other people but not using it as a learning tool.
    - This would be great for students who live away from the uni campus as it will allow them to *engage and talk* to their peers and teachers
    - There may not be social interaction but it is still some sort of *conversation* that they can engage in.
- Off-campus students' views
    - I found it a very effective way of *communicating*.
    - In the virtual learning environment it might be *possible to be able to teach from home*, and students will be able to attend from home. It is possible that this technology will get so good that eventually there will be no schools and everyone will work and study from home.
    - *Communicating when away sick* so as there is no information that you miss out on and fall behind.
    - Having a *discussion* with your tutor that was happening in *real time* was a benefit to our studies.

Students could see the potential of a virtual world even if only as a communication tool. They stated that virtual worlds could be used for synchronous and asynchronous communication and was an effective tool that could be used if face-to-face communications were not available.

Anonymity

The educator decided from the beginning that everyone would be referred to by his or her avatar's name when in the virtual world. Although all students knew the educator's real name, they rarely used it. By keeping this anonymity among the group enabled quieter students to speak out in ways they did not normally, as depicted by the comment "You know, in a real life class situation, I am that *shy person* - although most of you may not believe me in here [Second Life™]". Some of their voices demonstrate how important this feature was to them.

- On-campus students' views
  - I have fun talking to everyone and *not knowing* who they were (sometimes when you know who it was you could be biased to what they have to say).
  - It was very effective but as we *didn't know* who other people are was unsure who to talk to.
- Off-campus students' views
  - I guess for diversity in the classroom it kind of makes *everyone equal* in a way. As you don't see the actual real-life person.
  - Students feel they can *ask any question* whether they think it is stupid or not.
  - People will *say things if they feel* there will be no knowledge that it was them that said it.
  - The anonymity *frees students up* to explore aspects of themselves they may not in real life. It can really help them grow as individuals in a safe environment.
  - *Allows the self-confidence* of a pre adolescent take on responsibility that they would not do in real life.
  - It *boosts confidence* 10 fold, I know it has boost mine.
  - You could use the environment for music students who had *performance anxiety*. They could practice here before performing live.

Students felt that a virtual world provides the opportunity and confidence to be honest in their opinions and did not have to say what they felt should be said. It also provided opportunities in which people could perform or practice, before they had to do so in front of a live audience.

Distance

Sessions were timetabled to enable busy, working, off-campus students the ability to attend and interact with their peers. As students have stated, it is like a face-to-face encounter bringing distance closer for them so that they feel like they are really there with each other.

- On-campus students' views
  - I can see how it could be a good tool, *mostly for distance* education though.
  - It would be much more useful as a distance education tool and *more productive with people not in the same room.*
  - Virtual classrooms would be useful if *geographical location* is an issue
  - It could be used for people from *different towns/ remote areas*
  - I think it would be highly valuable for *remote students* with instant internet access. It allows them to explore school environments and the resources readily available to other students

    - It is good so you can interact online with *people around the area and world*.
    - If everyone *did this from home* it would be difficult trying to find the right time and being able to have everyone on line at the same time.
- Off-campus students' views
    - I believe they are engaging because they people can participate, *anywhere*.
    - Visit the *world from their armchair*.
    - For me it has been a lifesaver, I can *career change without leaving my house*.
    - Online education is the way of the future because it is so *convenient* like for me now.
    - For adult education it is definitely the future as it can *be fitted in to busy lives* easily.
    - *I couldn't study if I had to do it face to face*.
    - Students who are *on holidays, long ones or overseas trips with parents*, could be schooled this way.
    - As our lives get busier we are looking for *convenience, drive through, online learning*.
    - Off-campus learning is the only way in which I would be able to complete a degree as I have no university near by that I could attend. It also *works in well with my life style* and being able to work around my children.
    - I know I keep saying it, but I am absolutely loving this course.:) And not just SL: the entire subject is so well presented - for instance, I have heard your voice! It helps *avoid the feeling of isolation* so many of us externals feel and the way in which the information is delivered makes it so easy to learn.
    - Great for *feeling "included"* as a long distance student and for a teacher to witness the contributions of an otherwise shy student. I found it frustrating at first, but after I had the hand of it, was engaged.

All students could see the potential of a virtual world as a teaching and learning tool for those students who were studying from a distance (off-campus) as it provided an immersive environment where they could collaborate and liaise with their academic and peers from their own home.

Interaction and Collaboration

There was only one comment about interaction from an on-campus student. On-campus students used the virtual world for the sole purpose of role-playing in the "Six Thinking Hats" activity, and therefore may not have thought about the interaction that occurred between each other in a virtual world. For off-campus students this ability to interact with others online was a major attraction.

- On-campus students' views
    - I thought it was good. Once the hype slowed down, we had some good points. *It was engaging and constant*, meaning the *interaction levels were high*. I liked it. I think it could work well, so long as it was scaffold effectively. Students need to know the point of what they are doing
- Off-campus students' views
    - *Weekly interaction* in Second Life™ allowed me to *feel connected to lecturers and students and content* from this subject, and to listen to guest speakers was of great value, not always to this subject but to my general learning for myself and in the future as a teacher.

    - The use of Second Life™ … was vital to *my motivation and learning*. Having *someone there in real time, able to answer questions*, reading what other wrote, prompted more question and the general feeling that the lecturers are spending their time on us was motivation in itself.
    - I enjoyed the *interactive side* of the software. I like Second Life™, but if you tried to use something like this in the classroom, it may be a bit distracting for the students. It was different, but fun. It was also different in not being able to physically talk to each other, however, *I like the interactive objects*.
    - Since beginning my studies this year, I am excited again about learning. *The interaction with my groups and lecturers has been inspiring*.

When learning in a virtual world all students were given the opportunity to collaborate and interact with each other on tasks. Students found this type of learning gave them motivation and confidence in their learning and enjoyed the opportunity to interact with their peers.

Learning

Students indicated that they valued the ability to learn in different contexts and to learn with their peers in a collaborative environment, as the following excerpts from the students' views presented, illustrates.

- On-campus students' views
    - Well I think that it is good *for the creative side of things*, like dressing your character and what not but it is tooooooo confusing.
    - I don't know about you but if I can *physically see and touch something I tend to learn a little quicker*… I do like Second Life™ though, so I would possible use something like it, but only really to compliment other learning.
    - I think children would be more *creative in a virtual classroom* as there are a variety of things available using it. By using the many activities, creativity is formed and allows everyone to take part… Also a familiar thing to us, using this sort of thing.
    - All distance education subjects would be online so having Second Life™ as an *enjoyable way of learning* could promote social and educational concepts.
- Off-campus students' views
    - It was rather effective for *learning* purposes.
    - Well, had another interesting session in Second Life™ last night. It all seems to be coming together as our understanding and control increases... I think that this tool has great potential for use in schools... At first I did not see the use for English in particular but have since changed my viewpoint and now feel that it would be a *great learning tool for students*. It has the *capacity to be individualised for every class and teacher* and therefore will become essential in the future.
    - I learnt a lot whilst experiencing virtual worlds, both about virtual worlds and about the members of my group. It was *fun and engaging as well as extending my learning*.
    - Virtual worlds are an outstanding educational tool. They are *exciting and empowering*. They enable students to *take control of their own learning*, thus *creating deeper learning experiences*.

Students found the virtual world an effective place to learn, as the learning could be put in context. They were able to go on virtual excursions where it would have been impossible to do so in real life.

Technologies and Technical Issues

Some students indicated that the technology was a problem and others indicated they saw technology as a way for the future. The technical problems that were voiced all came from on-campus students who did not experience any technological problems at all but could see how there could be if there were using the virtual world from their own home. However, for off-campus students, where technology could be a problem (due to Internet connection, RAM, video cards or sound) they did not voice their concerns. The following statements from the students illustrate the range of views expressed during the pilots.

- On-campus students' views
    - I found that this subject opened my eyes to all the *different types of technology* and how to use them. I now feel more confident in using this *technology*.
    - I don't think that it will work because the kids will *focus more on the technological side of things*. They will also get bored if they use it all the time.
    - It was a good example of *where technology is heading*.
    - Allows children to use computers in an educational and social level. Was an interesting way to *learn about how technology* is and is going to impact on the classroom.
    - The potential Second Life™ has in the future of teaching is so high! I had a very high interest in the topic... I would have liked to put more in but there were restrictions such as *Internet downage* and *connection problems* running the videos.
    - Its engaging and students will be introduced to *technology which is vital in surviving in the current society*.
- Off-campus students' views
    - *From a student who had to overcome technical problems prior to being able to attend:* I'm only sorry I missed so much - the weeks since I *finally got here have been amazing - a highlight of my uni week*.

Technology is always going to be a problem when it is not in a controlled environment. However, students were able to overcome many of the technical issues they experienced to provide them with a positive experience in the virtual world.

Distractions

The students indicated that if they were to use the tool themselves when teaching, they would have to be alert to distractions in the virtual world, just as in real life classrooms in schools, and so the pre-service teaching students in this study had to make sure they focused on the tasks set them in Second Life™. In addition, some experienced "gamers" felt that a virtual world was a clumsy technology compared to software made for highly visual online games. Once these students saw the potential virtual worlds could have for teaching and learning however, their attitudes were not so negative. It is also important to note that not using microphones was beneficial to the learning experiences of the students, as hearing people speak, compared to reading their texts, could be distracting.

- On-campus students' views
    - It'd be fun. I think kids would be *distracted the first lot of times* they were in. It'd be good if there's something

interesting on in Sydney and you could attend on the Internet!
    - I think that children may *get a little off task* in a virtual classroom and find it *hard to stay focussed*.
    - It is *distracting, too much going* on in the surroundings. Children will become *off task very easily*.
    - It's *hard to be on task* on this thing I feel it is *too distracting*.
    - I still think it is *too distracting* as there are *too many other things to do that are more interesting*.
    - It was *exciting that the class was not to talk*.
- Off-campus students' views
    - I thought that its prime benefit would be as an incentive to get students to participate in or take interest in learning they would otherwise try to avoid. I felt though that the World had *potential for students to be distracted from the actual learning* by the mechanics or difficulties of using the World (e.g. absorbed in unrelated private chats, difficulties getting their avatar to do what they wanted it to, dressing their avatar, etc.)
    - The *mechanics* of using the world itself can be *distracting* and *unnecessarily time-consuming* for new Second Life™ participants… for those who are used to video games and graphics technology, the Second Life™ world is no longer a technology of fascination, but can *appear somewhat mundane*.
    - *Not using microphones is better. Talking all at once could be distracting*.

It is always important to ensure that students understand the positives and negatives in any learning situation and they could see that a virtual world could be distracting as it is a very immersive and engaging environment once in a session. They also thought that technical problems could become distracting for them.

Other

Some student voices did not fit into the above themes, but nonetheless are important to note. It is interesting that play was not seen as learning, and that the students also recognised the importance of face-to-face contact, as the following statements show.

- On-campus students' views
    - We didn't really do much *'learning' just played*.
- Off-campus students' views
    - I found Second Life™ to be full of *incredible opportunities* and am very excited about the thought of implementing a similar virtual world into our curriculum.
    - There are *mountainous possibilities* that this can be used for in all situations both in primary, secondary and tertiary education.
    - I think that it is good for HSIE [Human Society and its Environment] and *learning about other cultures by talking to students from other countries*. Going on tours of overseas locations to gain more knowledge.
    - Having just done a residential school there is *definitely a place for contact education* as well.
    - Some things cannot be taught online.
    - Face-to-face will always be important, but as we move further in time the IT [information technology] skills we will need will make *education of the online variety a necessity* in preparation for the workforce.

Students felt that a virtual world provides the potential for a variety of teaching and learning tasks. They could also see the value of learning in a virtual world as some tasks just could not be undertaken or taught by any other means.

Adult Learning Theories and Student Voices

Overall then, the students expressed opinions on the advantages and disadvantages of using a virtual world as a teaching and learning tool. It can be seen from analyzing the students' perspectives of their learning in a virtual world, there are components of the four adult learning theories discussed earlier (Andragogy, Transformative, Constructivist and Connectivism) evident in the students' comments. Higher education and distance learning students tend to be self-directed learners, who take responsibility for their own learning. They are engaged and motivated learners, all of which are components of Andragogy.

Students did reflect on their learning and take action to create cause and affect relationships, which are components of Transformative Theory. The students constructed ideas based on their current and prior knowledge and interacted with students, peers, lecturers and the topics of study in a virtual environment, which reflects components of Constructivist Theory. Finally, students connected information based on current and past experiences and developed their knowledge, which demonstrated components of Connectivism Theory.

From the research described in this chapter, the biggest factor impacting on gathering students' views about using a virtual world as an educational tool was whether the students participated voluntarily from their own home or office, or whether their participation was a requirement of their studies. Analysis of the data indicated that although there were some issues working with the technology the student voices were mostly positive about their experiences, as the following quotation from a student indicates: "It has been one of the highlights of my entire uni life! (This is my 7th year of uni.... and only performing in operas has been better)." This student has since completed her Master's degree, moved overseas to work and attends Second Life™ sessions with new groups of students whenever she can. She has been coming back to these sessions for four years.

FUTURE RESEARCH DIRECTIONS

Some students have returned to attend Second Life™ sessions even though they are no longer enrolled in any of the subjects offering this component in their studies. As such, there is room for research to investigate what it is these students value in attending the Second Life™ sessions. For example, one student, after completing her compulsory session in 2008 returned in 2009, 2010 and 2011 to learn more about teaching and learning in a virtual world. Five students who participated in sessions in 2009 returned in both semesters in 2010. The return of these students suggests further research is required to determine the students' motivations for continuing to learn in Second Life™.

We do not know what the future holds in terms of technologies and their role in teaching and learning in virtual worlds. There has been an enormous change over the past five years in relation to the degree of interactivity, engagement and immersion available in web based tools and virtual worlds. Educators have to understand how tools such these can be utilized based upon sound theoretical principles. More research is required on the ways in which immersive tools are being used to educate students, to ascertain whether these tools are engaging, and more importantly, educational. Using a student voice to illustrate:

I had a defining experience last week when we sat down in that [virtual] open air lecture space and I sat on one side and the rest of you sat on *the other side. Suddenly I felt lonely and without thinking got up and moved to where you were all sitting. And then I thought that felt so real!*

The sensation of participating in real classes with other students albeit in a virtual world requires further research. There has been little work to date, undertaken for example, into adult learning theories, to test their veracity in virtual worlds or to investigate the interpersonal dynamics between students learning in virtual worlds and their peers, or between the students and their teachers. New theories of learning are required to meet the new generations of learners who require greater autonomy, connectivity and opportunities for socio-experiential learning (McLoughlin & Lee, 2008). As such, there is a much room for further research into the educational potential of learning in virtual worlds by students of all ages.

CONCLUSION

This chapter set out to compare the experiences of different groups of students studying different subjects in regard to their perspectives and reactions to learning in a virtual world, through a comparison of on- and off-campus students' experiences of learning in Second Life™. The students' views, perceptions and reactions to learning in Second Life™ were supported by the literature, data collection and results. Student reactions to their learning in Second Life™ demonstrated a combination of the four adult learning theories discussed: Andragogy, Transformative, Constructivist and Connectivism.

This study shows that the off-campus students, who ordinarily undertake their studies in a distance mode, were engaged when attending activities in Second Life™. These students contributed to the virtual world discussions and went beyond what was asked of them in terms of time, learning and depth of participation. Many off-campus students asked if they could participate in the discussions when they were next being offered (even if they were not enrolled at the university). These types of queries demonstrate that the off-campus students valued the learning they received in Second Life™. The on-campus students did not see the full potential a virtual world has to offer them in terms of teaching and learning, although they had the benefit of learning in face-to-face settings.

This study has also shown that a virtual world is very suitable for experimentation and exploration within a simulated environment in order to construct their own understandings through interaction with teachers, peers, the subject matter and the virtual environment. Virtual worlds provide the academic and student a space where they can explore teaching and learning activities in context, in an immersive and engaging environment. Students regularly state that learning in a virtual world is just like a face-to-face encounter and this brings the distance students closer to being there. More research needs to be done on the efficacy of teaching and learning in a virtual world.

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ADDITIONAL READING

More findings of the research outlined in this chapter by the author can be found at: http://www.virtualclassrooms.info /papers.htm

KEY TERMS AND DEFINITIONS

Adult Learning Theories: Are the documented researched theories on how adults learn.

Anonymity: Is remaining unknown.

Anytime Resources: Resources that are available at anytime during the day or night.

Anywhere Technology: Technology that is mobile and can be used anywhere.

Asynchronous: Communicating with someone at different times, such as discussion board postings or a letter where someone states something and a while later the recipient responds.

Authentic Experiences: The experiences are real or they can be related to real life experiences.

Avatar: Someone's personal online/inworld presence.

Blogs: Online diary.

Chat Rooms: A space to talk (usually via text) with others who are online at the same time but not necessarily in the same location.

Communication: Is verbally interacting with others via voice, text or visually.

Discussion Boards: A place to post information, ideas and questions and have others responds to the query at different times.

Distance Learning: Enrolled in study in locations remote to the campus in which studying. That is, receiving all study materials from sources other than face-to-face.

Engagement: Is a combination of feelings, observable actions, perceptions and beliefs.

Gamers: Online Internet users who play games, usually synchronously with and against other online users.

Information Communication Technology (ICT): Computer based technology.

Interactive Tools: Tools that can be used that respond to touch, voice or other means.

Learning Management System (LMS): An online space where many different Internet tools are housed together, such as blogs, wikis, discussion boards and chat rooms. A LMS requires the user to sign in with their username and password to access the online tools.

Multi-Modal Learning Environments: A variety of ways in which learning can take place in the space provided.

Off-Campus Students: Those students who opt to receive all their study materials via a learning management system where they can download documents and participate in online activities, These students may live on-campus but choose to study as off-campus students or they may be located in areas remote to the campus, from any location worldwide.

On-Campus Students: Those students who opt to physically attend face-to-face lectures, workshops and tutorials, on campus.

One Portal: One place.

Scaffolding Tool: When tasks are built upon each other. One must complete a task before going on to the next.

Second Life™: A virtual world.

Synchronous: Communicating with someone at the same time, such as postings to a chat room or face-to-face conversation where the conversation is instantaneous.

Virtual Worlds: Are a low cost computer-based simulation with features of real and fantasy life and can be a substitute for many real world activities.

Wikis: Collaborative tool that enables several authors to add and update information which can be interlinked to different pages.

Chapter 6
Student Voices and Digital Technologies in Australian School Education

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ABSTRACT

As digital technologies become more widespread and integrated into Australian school education there is a challenge to better understand the policies that are designed to guide their use. There is little education research however, which explores how school students understand and respond to policy regulations; their voices are largely absent from the landscape in this field. Drawing on an interpretative and critical inquiry, this chapter examines the intersections between policy trajectories and ethical concerns related to teaching and learning with digital technologies, from the perspective of Australian school students. The students in this study demonstrated an understanding of the importance of policy interpretation and language particularly in their discussion of ethical considerations, and indicated they want more consultative and participatory approaches to digital technologies policy developments. This study also shows that students would like to see policies gradually move from a less restrictive and generic approach based on blocking and filtering, to ones that provide them with opportunities to maximise their educational opportunities and become ethically responsible users of digital technologies.

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INTRODUCTION

One of the roles of educational policy is to regulate student conduct by mandating standards of behaviour and rules (Ball, 1990; Ozaga, 2000). This chapter examines the ways in which digital technologies and the policies designed to regulate their use, are understood and perceived by students in two secondary schools in Australia, one Government (public) school and the other a Catholic (private) school. The study informing this chapter was concerned about ethics in relation to notions of 'right' and 'wrong' uses of digital technologies in school contexts, as seen through the eyes of Australian school students. The analysis of the students' voices in this study, builds on previous research to establish a space that positions and expands knowledge of how students understand and respond to digital technologies policy regulations in their school environments.

The findings in this study are based on data collected from semi-structured interviews conducted with students during 2008 and 2009, involving 16 male and female students, aged between 16 and 18 years of age. The interviews explored these students' understandings of the ethical issues and debates which concern the use of digital technologies in their schools. The interview questions focussed on the students' interpretations of policies designed to prescribe desired behaviour and attitudes in regard to ethical issues of concern to educators. The interviews were also concerned with students' views in relation to the blocking and filtering of the Internet, the potential of enhancing consultation in policy development and the role that education can play in engendering the ethical use of digital technologies in schools.

Analysis of the students' interviews was conducted through interpretative and critical lenses, and explored a range of discursive and practical issues from the students' perspectives. To interpret the various discourses collected through the semi-structured interviews, critical and interpretative theories were used. A discourse or discursive practice embodies meaning, social relationships and power relations (Ball, 1990, 1993). Language forms a vehicle for discursive communication and according to Michel Foucault, discourse is formed by institutional practices and the nexus between power structures and knowledge (Foucault, 1974).

There are various forms of critical theory, the most influential is commonly associated with the "Frankfurt School" in the 20th century (Deetz, 2005). Critical theory questions the nature of the social order and the use of language particularly as they function to form repressive ideologies (Deetz, 2005). According to critical theory the selection, classification and transmission of knowledge is never neutral, but critical in terms of social control and the distribution of power (Habermas, 1987; Tesse & Polesei, 2003). Employing a critical analysis allowed for an exploration of the empowerment and disempowerment of students in regard to their experiences, knowledge and understandings of the ethical dimensions of the use of digital technologies in school communities (Gibson & Brown, 2009).

Interpretative theory is concerned with understanding the formation of systems of meaning and interpretation of social realities that are largely shaped by language and the discourses which emerge from their use (Klein, 2001). The recognition of values and the process of meaning construction are central to interpretative analysis (Habermas, 1987). An interpretative approach was used in this study to clarify, explain, interpret and enable further understanding of students' perspectives and their experiences with digital technologies in school settings.

The findings from the interviews with students, fell into the following five 'prisms' through which the students' views were interpreted:

- Consultation processes concerning digital technologies policies;
- Unauthorised sharing of information and images;

- Reactions to digital technologies policy regulations;
- Understandings of meaning and language in digital technologies policies; and
- Reactions to blocking and filtering of the Internet.

These five 'prisms' are used to guide the discussion section in this chapter.

BACKGROUND

Schools, education departments and governments around the world develop policies and guidelines designed to steer and regulate the use of digital technologies by children and adults. These policies are informed by legal, ethical and technical standards. As such, there are intersections between school education policies and ethical issues concerned with teaching and learning with digital technologies. Such policies represent what Selwyn (2007) describes as a socially constructed set of practices and responses to technologies. But these policies can sit in tension with past understandings of the role of education in building free thinking people, in the way authors such as Dewey proposed at the beginning of the last century:

The essence of the demand for freedom is the need of conditions which will enable an individual to make his (sic) own special contribution to a group interest, and to partake of its activities in such ways that social guidance shall be a matter of his (sic) own mental attitude, and not a mere authoritative dictation of his (sic) acts. (Dewey, 1916, p. 218)

In Australian education there are a range of policies to direct the use and integration of digital technologies in schools. These policies are located at many levels in political, administrative and institutional bodies including national and state education departments, regional educational organisations including the Catholic and Independent school sectors, and in schools themselves.

In Australian Government schools digital technologies policies are primarily overseen by State and Territory education departments, who themselves are guided and influenced by Federal Government policy and funding guidelines (Department of Education, Employment and Workplace Relations, (DEEWR), 2010a). In the Catholic and Independent schools, digital technologies policies are overseen by education offices and jurisdictional bodies pertaining to their respective sectors.

All Australian schools, both public and private, have some degree of autonomy over the design and implementation of their policies related to the use of digital technologies. For example local "Acceptable Use" policies (sometimes known as "Acceptable Codes of Practice") are usually written by school-based personnel, although oftentimes based on generic guidelines from the state, or jurisdictional level. These polices outline what behavior is "acceptable" and "unacceptable" in relation to using digital technologies in schools for both staff and students. They are not usually constructed in the form of a mutual agreement. Students, staff, and often parents, are usually required to sign such "Agreements" in order to access digital technologies such as the intranet and the Internet while at school. "Acceptable Use Agreements" however, regularly contain language that represents a discourse of compliance and control rather than one of student empowerment and engagement. (Brown, 2009).

The policy profile concerning the use of digital technologies in schools has been raised recently (Reid, 2009), with the introduction of the Australian Federal Government's \$2.2 billion "Digital Education Revolution" policy (DEEWR, 2010a; Rudd, Smith & Conroy, 2007). This policy has supported a national roll out of computers to all school students in years 9 to 12, with the aim of achieving a one to one student to computer ratio (or as close as possible to this target) by 2012

(DEEWR, 2010a; Reid, 2009). By injecting a considerable level of funding for technologies into the secondary school sector since late 2007, this "Digital Education Revolution" policy has gained a high profile in the landscape of contemporary school education in Australia, by giving impetus to the greater use, access and integration of digital technologies in schools, especially computers, (Reid, 2009; DEEWR, 2010a). As a result, the "Digital Education Revolution" policy has raised considerable public and political debate, particularly in regard to its' implementation phase. But much of this debate has concerned the nature of the consultation or lack of it, with schools (Reid, 2009).

At the same time there has been a national roll out of computers to Australian schools, ethical issues associated with the use of digital technologies have also been receiving increasing attention in the Australian media and wider public. The relationship between ethics and digital technologies policies and practices in schools has been of growing concern in Australian education (DEEWR, 2010a; Information and Communication Technology (ICT) Learning Innovation Centre, 2010). Issues raised have included cyber-bullying, unfettered access to online content including that of a violent or sexual nature on the Internet, and the use of mobile phones to film and photograph incidents at school, and then to transmit those images to wider audiences (Australian Communication and Media Authority (ACMA), 2009; DEEWR 2010b; Generation Next, 2010). Of major concern to some government agencies has been the ways in which school-aged children and adolescents have been involved in anti-social online behaviours (ACMA, 2009). Little consideration however, has been given to how school students themselves perceive and understand the ethical dilemmas involved in the use of digital technologies (Moyle & Owen, 2008). Yet students are the group considered most engaged with digital technologies in schools and arguably are at greatest risk of experiencing problems related to their unethical use.

Australian education responses to some of the ethical issues posed by access to a wide variety of online content of varying educational value has been to institute filtering and blocking of certain websites. Students' access to the Internet in Australian schools and debates about what constitutes responsible ethical behaviour with digital technologies however, is contrasted by approaches in Scandinavian countries and the Netherlands, where filtering and blocking systems at the school level, are generally not used (Consortium for School Networking (CoSN), 2007; Moyle, 2009). In these European countries an emphasis is placed on educating students about responsible ethical practices with digital technologies and entrusting local authorities to oversee policy guidelines in this area, rather than attempting to control students' online behaviors through electronic means (Moyle, 2009).

Against this policy backdrop, there is an emerging body of Australian literature which gives recognition to the voices of students, and to other groups in school communities (Department of Education Victoria, 2007; Li, 2007; Moyle & Owen, 2009; Neal, 2005; New South Wales Department of Education, 2007). Published research examining how students in Australian schools relate to and interpret digital technologies policies within their own context though, remains relatively small and mainly quantitative in approach (Moyle & Owen, 2008). This lack of a student voice around the use of digital technologies in schools however, is a major gap in the knowledge-base of educators, concerning the way digital technologies influence teaching and learning in Australian school education (Moyle & Owen, 2009). As such, this chapter explores Australian students' perspectives about digital technologies policies in schools, and how their responses are represented in language and mediated as forms of discourse.

THEORETICAL BACKGROUND

The term 'digital technologies' for the purposes of this chapter includes computers, computer software and related peripherals such as data projectors, mobile phones, television, DVD, video, satellites and interactive whiteboards. But digital technologies are more than simply devices. They are also the artefacts of "a culturally contested zone, where users, advocacy groups, consumer organisations, designers, producers, sales people, policy makers and intermediary groups, create negotiate, and give differing and sometimes conflicting forms, meanings and uses to technology" (Oushoorn & Pinch, 2003, p. 24). Similarly, education policies are socially constructed to achieve predetermined preferred futures by setting certain expected standards of behavior through rule-setting (Ball, 1990). Indeed a policy can be considered to be "both text and action, words and deeds, it is what is enacted as well as what is intended" (Ball, 1994, p. 10).

According to Ball (1990) policies project images of an ideal society and represent the policy makers' views about the operational statement of values and their allocation. The authors of policies have specific intentions, but the reception and enactment of these policies can vary. While policies, according to Ball (1993,1994), are consistently in a state of becoming, for Australian school students, who are largely alienated from the process of policy construction, policies represent non-negotiable artefacts that value certain actions over others (Brown, 2009).

One model of policy development follows a process of design that produces a written text, which is received by an intended audience who are then expected to interpret and transform the overarching policy into different discursive forms including educational and social discourses (Ball, 1990). Students are one of the intended audiences for digital technologies policies in schools, yet in Australian education little is known about how students receive and interpret digital technologies policies. It is these intersections between school education policies and associated ethical issues concerning the use of digital technologies by students in schools, and how students' views of these intersections can be critically interpreted (Habermas, 1987), that informs the theoretical background used in the study reported here.

Social Construction of Technologies and Education Policies

Both digital technologies and the policies that control their use in schools are socially constructed, as are the understandings that emerge when people engage with them. Indeed digital technologies, located as part of current Australian school contexts are not neutral, but rather represent the values of vested interests (Wyatt, Henwood, Miller & Senker, 2000). For example, in schools, computers have come to be associated with notions of modernity, progress and technical sophistication (Shaw, 2008). Indeed, the selection and adoption of certain technical standards for interoperability over others, highlights the contestable nature of technologies in schools (Moyle, 2006a).

Students constitute a distinct group of users of digital technologies, and the way they understand and use technologies can reflect different and sometimes conflicting forms of meaning. But students' uses of technologies are also constrained and shaped by existing social practices, including those practices influenced by policies and ethics (Kritt & Winegar, 2007; Brown, 2009). Furthermore, the influence of online communication practices on prevailing value systems and ethical precepts (Bottery, 1992) is an important dimension to analysing schools' digital technologies policies, as school students construct and interpret the policies and practices that influence their behaviours, and these interpretations are informed by their experiences with technologies including in school contexts (Neal, 2005: Moyle & Owen 2009).

The development of ethical competence of digital technologies users in schools is essential to students' future lives, and requires students to have a knowledge of not only policy regulations but of policy development (Whitton, 2007), so that they can respond in informed and constructive manners to ethical dilemmas as they arise. Education provides a means of engendering a greater awareness and understanding among students about the ethical uses of digital technologies. Teachers can engage students in discussions that involve a mixture of consultation and guidance about what is expected of them. Such educative approaches can go beyond expecting students to merely be compliant to a set of rules prescribed by digital technologies policies, with some arguing that supporting students to develop a consciousness and understanding of ethical considerations in online environments is essential to their well-being (Fusco, 1999; Nordvelle & Olson, 2005). Without this awareness of the policies and programs created to support them however, students' learning with technologies is likely to be less effective than the potential suggests (Fusco, 1999). Others argue for a re-framing of the issues concerning digital technologies in schools (Nordvelle & Olson, 2005), emphasising the role of policy and discourse, rather than the technologies themselves.

Ethics and Digital Technologies in Schools

The field of "ethics" is complicated to define, and has broad applications in the domains of education, social life, religion and philosophy (Audi, 1995; Tavini, 2006). Ethics involves the creation and implementation of moral standards and principles intended to guide behaviour, based on notions of goodness and right actions (Audi, 1995; Tavini, 2006). Central to all notions of ethics is an examination of values which underpin decisions about the correct course of action or stance in regard to particular issues (Tavini, 2006). Ethics intersects with education in a range of ways including debates and convictions regarding what standards of behaviour to expect from students and staff, and what consequences to impose if these expectations are not met. Policy is a major vehicle used in schools to project statements of ethical principles in relation to desirable and undesirable forms of behaviour.

Pertinent in this chapter, is an analysis of ethical considerations which encompass notions of power and responsibility, and the dynamics between policy and practice (Tavani, 2006). These notions are particularly relevant when ethics intersects with educational policies and digital technologies, as all policies are contested and involve competing values and differential access to power (Bell & Stevenson, 2006). For example, some digital technologies policies are loaded with utopian sentiments which are predicated on notions of progress and computers functioning as a panacea to existing social and political issues (Moyle, 2005), while others make specific claims on students' behavior. Some policy regulations in schools for example, prescribe that offensive material should not be accessed by students on the Internet. However, what is considered offensive is the subject of debate. In some instances, so-called offensive material can be of educational value. As da Costa (2007) challenges:

When filters of the Internet try to control the information which people have access to, a question appears. Are these filters a valuable tool to eliminate all of the ethical problems of the Internet? Each one of these filters is subjective and some of them eliminate information whose content could be considered useful information. (Morais da Costa, 2007, p. 2)

To illustrate da Costa's view further, students researching world poverty on the Internet may locate images of starving people and dead bodies. These images can be disturbing to people and are offensive in the sense that no human beings should be without the basic necessities of life. However, these images can serve to educate students as they graphically show the consequences of extreme poverty and deprivation, and may foster a greater sense of compassion and social justice. This issue of viewing offensive images also illustrates that context, intentionality, teacher judgement and ethical awareness are relevant factors to regulate and monitor what students and or staff may access via the Internet. The above example also suggests that terms such as “acceptability”, “offensive”, “disturbing” and “inappropriate” are contested and can produce multiple interpretations based on the school community’s social and cultural frames of reference (Brown, 2009). Furthermore, the education students have received about the ethics of suitable Internet usage becomes important in regard to their ability to take ownership and responsibility for their actions and ethical choices.

Teaching students to act ethically online requires them to learn how to act ethically. Taking ethical action though, involves more than simply acting legally and correctly, and to go beyond treating every matter as if it were a technical matter for adjudication. Education involves values and the enactment of social and cultural practices of a community (Groundwater-Smith, Brennan, Mitchell, McFadden & Munns, 2009). Building understandings of the social and cultural dynamics that underpin understandings about ethical issues concerning digital technologies in schools policies provides a framework for inculcating values in young people and directing them in determining what is right and wrong behaviour. As such, school students’ expressions of their attitudes, values and cultural practices of what constitutes ethical educational practices, in relation to digital technologies ought to be sought and used to inform teachers’ practices.

Critical Interpretations of Students’ Views of Education Policies

The exploration of students’ views in the study informing this chapter involved listening to ‘student voices’, and took account not only of their views in relation to aspects of their learning environments, but also encompassed their views about students’ active participation in discussions and reforms regarding educational programs and policies concerning the use of technologies in teaching and learning. As Cook-Sather (2002, p. 12) explains:

Students’ voices are important to all aspects of school education because of who they are, what they know and how they are positioned. Students must be recognised as having knowledge essential to the development of sound educational policies and practices.

Giving greater recognition and attention to student voices in relation to digital technologies, there is greater scope for students to engage and participate in their schools and to cultivate a greater sense of social and ethical responsibility (Neal, 2005; Department of Education Victoria, 2007). Acknowledging and attempting to comprehend what students think about the nature of their behaviour and engagement with digital technologies enables an authentic dialogue to be fostered, which allows students to feel their views are respected and valued. Ignoring and marginalising students’ views can contribute to more disengagement and disempowerment for students (Flutter & Ruddock, 2004). As such, the research reported here, created spaces in which students’ views on the educational and ethical issues concerning the educational uses of digital technologies could be explored.

Furthermore, to analyse and better understand the views of school students in relation to a range of digital technologies policies, this study examined students’ perspectives regarding the policy regulations intended to control and regulate ethical behaviour at school. Ozaga (2000) has argued that it is important to bring together structural, macro level analysis of education systems and education policies and micro level investigation, especially that which takes account of people’s perceptions and experience (Ball, 1993). The student views presented in this chapter provide micro level representations of macro and micro level policies, and their transformation into discursive practices and understandings.

RESEARCH METHOD

To examine the students' views, in-depth interviewing was used to collect data. Analysis of the findings from the interviews was based on interpretative and critical analysis. Interviewing represents a form of discourse (Mishler, 1986), and for this study it was utilised to shed light on the assumptions and perspectives of students. Interpretative and critical approaches were used to guide the inquiry, focusing on the students' construction of meaning through the language they used to express their views. Consistent with the principles of interpretative inquiry the interviews were semi-structured and provided a means of examining the educational settings and processes through the eyes of the students, not just the researcher (Cohen, Manion & Morrison, 2000).

To reduce the power imbalance between the researcher and the students, care and consideration was taken to ensure that students could freely express their views during the interviews and were given the option not to respond to questions. The students were interviewed in pairs and groups of three to allow for a sharing of ideas and to create opportunities for a more conversational dynamic to emerge from which to examine students' voices (Mishler, 1986). The interviews were mainly concerned with discussing the students' views and perceptions of their ethical concerns about the policy regulations that control their use of digital technologies in their school environments.

This interpretative approach allowed for an investigation of how meanings are shared, constructed and positioned between students in social contexts such as schools. The interviews also permitted a dialogue between the students and the researcher, which assisted in the joint construction of meaning (Mishler, 1986) between the researcher and the students.

Interviews and Analysis

All interviews were conducted at two large co-educational senior secondary schools in Canberra, Australia. One was a private, Catholic school the other was a public, Government school. The Government school has a laptop program which provides students with laptops to use at school and also provides students with access to computers in laboratories. The students at the Catholic school use only desktop computers situated in computer laboratories and in the library.

Eight students were interviewed from each school. The students were aged between 16 and 18 years of age and were in grades 11 and 12 (the final two years of secondary school), comprising an equal gender balance between the young men and women. In Australia young people become legally recognised as adults on turning 18, which includes the right to vote and sign their own consent forms and other legal documents. The interviews lasted between 20 to 35 minutes in duration. To protect the anonymity of the students their names have been changed in the reporting of the findings in this chapter.

The interviews were digitally recorded and the data was then transcribed, read and then organised according to categories, themes, conceptual frameworks and discursive features of language. Coding of data from the interviews was carried out by applying category labels to the interview responses in the form of abbreviations which related directly to the principle issues and subject areas. The coded data was then analysed in relation to themes and conceptual categories (the five prisms, discussed below), and then interpreted according to critical and interpretative analysis. This analytical approach to the interview data allowed for critical interpretations of the students' perceptions and understandings of digital technologies policies and uses made in their schools. It allowed for an in-depth analysis of meanings developed by students from the ways they interpret the discourse of digital technologies use, particularly in terms of the way it is represented in policy guidelines in schools. Furthermore, critical and interpretative analysis was useful to engage with the complexity and multi-layered nature of understandings that exist in this area (Scott & Usher, 1999), and to reveal the way meaning is both constructed and mediated through analysis of texts and language. Commonalties and differences in the patterns of responses were examined to arrive at more general observations and theoretical conclusions.

FINDINGS FROM THE STUDENT INTERVIEWS

The findings from the interviews with students, fell into the following five 'prisms':

- Consultation processes concerning digital technologies policies;
- Unauthorised sharing of information and images;
- Reactions to digital technologies policy regulations;
- Understandings of meaning and language in digital technologies policies; and
- Reactions to blocking and filtering of the Internet.

Before exploring these prisms, the following general observations were drawn from the data.

Students did not see clear boundaries between the use of digital technologies in and outside of school. For them these domains were inexorably linked. But speed and ease of transmission of digital images and information was believed to amplify the scale and level of their involvement in a range of ethical issues. The students did not clearly discriminate in their responses between computer and mobile phone use or any other forms of digital technologies but used language which displayed an awareness of the different and multiple functions of the mobile phone, and about the speed and portability of information and images that can be spread using mobile phones. They were also aware of the potential damage to people's character and reputation of such actions. Students did not think the use of email or cyber bullying represented significant ethical issues, but were more interested in discussing issues relating to mobile phone usage and social interactive sites. Similar evidence (Moyle & Owen, 2009) has been also reported in other recent research focused on school students' views of digital technologies.

Consultation Processes Concerning Digital Technologies Policies

Students were asked questions about the ways teachers, students and parents could participate in informing digital technologies policies. They were also asked to provide comments in relation to the content and efficacy of existing policies. Students advocated more participatory approaches where all members of school communities have opportunities for greater ownership, engagement and influence over policy trajectories. Students did not necessarily want to be the authors of policies but wanted to have opportunities for consultation and thought it was important that their parents and teachers have similar opportunities. Most students were adamant they had not had any input into digital technologies policies at their school or elsewhere, nor did they feel they had been consulted about whether the ways of using digital technologies at school would suit them.

Some students expressed enthusiasm about the possibility of having input into the formation of policies related to the use of digital technologies in schools. However, there was a divergence of views expressed about how this could be done and how effective this would be. These differences were exemplified at one school where the Facebook site had been blocked without consultation with the student body, despite the fact that students expressed comments such as "everyone wanted it to stay". One student Michael was of the view that the right decision was taken to block the Facebook site but believed that the majority of students wanted to have continuing access to it. As such, a consultation process may have proved futile from the students' point of view, but it may have facilitated discussions within the school community about the contrasting views of students, to those in authority.

In the interviews, the students also expressed a sense of agency in relation to policy development. They argued that their knowledge and experience of digital technologies in schools gives their voice legitimacy. Some students expressed a lack of confidence in the school leadership. These students did not think those in positions of decision-making and policy formation had the experiential knowledge to enable them to make well-informed decisions. The students in this study considered the school leadership too detached from the contextual realities of school life.

Josh, expressed the view that it is the students and teachers in his school that have the experience of using digital technologies in lessons, and are therefore, more familiar with the problems encountered with their use. Two other students at the same school indicated they believed that students and teachers had similar understandings of what was necessary in relation to digital technologies in schools. They illustrated their point by arguing that the assistant principals and principal rarely came into their classrooms, but in contrast teachers and students were in their classrooms all day. These students argued the views of teachers and students therefore held more legitimacy on this matter than the school leadership, albeit students and teachers did not always hold exactly the same perspectives.

Some students suggested conducting an open forum for students to express ideas about reviewing the "codes of conduct" or "acceptable practice" for the use of digital technologies in their school. A student called Julie commented that this type of forum would "give power back to the students. I know as a senior student I like having a grip on what I can and can't do". These students argued that open forums would give students a more active role in having input into the guidelines for the use of digital technologies at school. Interestingly, these students were also concerned that parents' views and perspectives be taken into account, concerning what sites their children can access at school.

While several students saw benefits from involving parents in decision-making about the use of digital technologies at school, others could foresee problems associated with allowing parents a greater level of participation in such decision-making. Students recognised that by allowing parents, teachers and students more opportunities for participation and consultation in regard to the development of digital technologies policies would not necessarily lead to a consensus. Acknowledging there are differences of perspective between parents, teachers and students, the students nonetheless argued for the process to be conducted.

Some students however, were concerned that a parent committee established to inform policies would be not be sufficiently representative of the parent community. Anna Maria commented "the problem with a committee or forum is that it gets representation from only a small number of people". She also argued that by letting parents have input into policy development would result in a lot of difference of opinion among the school community, because of the diverse background of the parent body, and as such it would be difficult to satisfy them. Other suggestions were offered to achieve greater consultation and participation including the conduct of surveys which could sample a much wider range of views in the parent and student bodies.

In summary, the students felt largely unconsulted and left out of the decision-making processes in relation to digital technologies. This may be a common predicament which reflects students' lack of input into school policies in general, but it has the capacity to contribute to creating a sense of disempowerment. It could be argued though, that this sense of being excluded from input into policy regulations is felt more acutely by students in the field of digital technologies, since it is a domain in which young people generally feel comfortable, in which they have a vested interest, and have considerable knowledge and skills. The students in this study indicated they thought many students would like to have more ownership over the ways they are allowed to access and use all forms of digital technologies in schools. The students argued that as they are from a generation born in the 1990's they have been largely immersed in digital technologies from a young age and have rich experiences of them in their lives outside of school where they have often had more control and freedom in using them.

Unauthorised Sharing of Information and Images

Students were asked to identify and discuss ethical issues related to digital technologies in the school, with the interview discussions exploring what the students believed. Several students identified as a source of concern to them, the spreading of gossip and rumour via mobile phones, (through texting and visual images). These students indicated they are particularly concerned about this behavior given the ease at which it can occur. One student indicated that a high school student could have up to 300 students' phone numbers stored on his or her mobile phone, thus allowing others to send the messages or images out to a large number of students who can then send them out to many more people, including those in the wider community. Another student did not see the main issue of the technologies generating the problem, but rather that text messaging as the means of transmission, speeds up the process of spreading gossip. The student explained that the distribution of images to a large number of students can inflame situations rather than resolve problems that involve negative gossip and rumour.

Students also reported that it was common to use mobile phones to film funny incidents, fights and stunts (such as a student trying to jump over a row of chairs, or falling over). One student from the Catholic school stated that he knew some students at local Government Schools had "whole folders in their phones of all the fights that's happened". A number of students however, stated that filming student fights and student antics diminished considerably in the senior years of high school compared to the junior years. Students also reported instances of the use of Facebook had led to bullying and harassment related issues. Some of the problems regarding the use of Facebook however, were considered by some students as more of a problem in terms of wasting time, money and allocated Internet credit.

Another issue identified by the students related to the lack of privacy involved an individual who was the victim of the gossip spread by digital technologies. Two students related an incident where a mathematics teacher's privacy and integrity was comprised by some students who took photos of him without his permission, and used them as a source of humour and derision. Students saw the central issue in this type of incident as a violation of an individual's privacy, and that getting permission from the person/persons involved as to whether it is acceptable to them to be filmed, would redress such issues. Students also believed that other students sometimes made suggestions or provoked other people into doing things or reacting in a certain way so they could film them. Although students talked about filming incidents such as fights they did not mention that that footage could be uploaded on the Internet through sites such as YouTube.

In summary, students identified as a source of concern to them, the spreading of gossip and rumour, as well as the capacity of technologies to broadcast unauthorised pictures and video by peers over mobile phones. Lack of authority by those in the images to have images of themselves broadcast was identified by students, as one reason such use of technologies is unethical.

Reactions to Digital Technology Policy Regulations

Students' reactions to policy regulations designed to oversee digital technologies use in their schools were varied and multi-layered. Students were asked what their views were on policies that regulated the use of digital technologies in their schools such as the "Acceptable Use Policy" and the associated "Agreements" they are required to sign. The "Acceptable Use Policies" in the schools of the students in this study indicate what specific behaviors are condoned or not when using technologies at school. Students and their parents are required to sign the "Agreement" to indicate they abide by the school's rules outlined in the policy. The students were asked about their understanding of the nature of these "Agreements" and how effective and relevant they thought they were.

In the course of the interview discussions, from a variety of perspectives, the students questioned and criticised the relevance and viability of these "Agreements". Students expressed little engagement or awareness of the policy content of these regulations. The "Agreements" seemed distant from the students' lived experiences, with some students conceding they had forgotten they had signed them. Students also indicated they did not think policy regulations such as "Acceptable Use Policies" were useful in guiding and engendering the ethical use of digital technologies at school.

The students stated they believed the purpose of the "Agreements" was to protect the school when students "got into trouble". Once signed, students could not make excuses if they did the "wrong thing". However, two students, Michael and Julie did not subscribe to the view that signing a piece of paper would stop a student doing an action that contravened the school rules, (such as going on to Bebo or Facebook, or using mobile phones in class). These two students stated that the "Acceptable Use Agreement" in their school was not effective in stopping students doing the "wrong thing", but at the same time, they indicated they thought the "Agreement" was necessary so that those students who were caught doing the "wrong thing", could be held accountable for their actions, as a result of signing the form.

Another student suggested that the importance of signing forms had lost meaning for students and their parents because there are so many consent forms that students are asked to get signed, especially for excursions and other events. These students indicated they had stopped reading the forms, since they realised they had no choice if they wanted to use the computers at school. Kym made the following comment;

because we've gotten used to it we don't read it any more so we don't know what the guidelines are or what the acceptable use is because we read it so long ago and we've read it but we just kind of go 'yeah it's going to be the same thing' so we just sign it again but we don't really think about what it actually says.

Julie said that there were always people who would try and break the "Agreement" and only signed the form to access to the Internet. As such, the content of "Acceptable Use Agreements" was taken for granted by students when signing forms. They saw the signing of the form as merely a procedural hurdle put in front of them and their parents.

Other factors limiting the effectiveness of "Acceptable Use Policies" outlined by the students included the inconsistent and ineffective approaches taken by some teachers and schools to implementing their own policies. Various students reported that there were inconsistent approaches to the implementation of rules regulating the use of digital technologies. The students indicated that the policies themselves were not sufficiently rigorous and did not carry sanctions or penalties that were adequate as deterrents. For example Bruno reported that despite a rule about not using mobile phones in class, the implementation of this rule depended on what the student was doing with it and how frequently the student tried to use it in class. Bruno went on to say "Yeah it just depends on the teacher. Yeah some just ignore it some take it, some tell you to put it away". On the other hand one student reported instances of teachers turning off students' computers on the suspicion they were on "bad websites", with the consequence that the students lost their unsaved work.

Students also believed that rules designed to regulate the use of technologies at school should be tailored to cater for the particular age groups of the students. The interview data indicates that students in their senior years of secondary school (years 11 and 12) believed that most students of their age had developed a more conscientious and responsible approach to the use of digital technologies compared to junior high school and primary students. Nigel expressed the view that responsibility and maturity were key factors in allowing older high school students more freedoms from restrictions in their use of technologies. An example he gave was permitting senior students to use their mobile phones at school at recess, lunchtime and in their free periods.

Indeed, the students complained that as senior students in their respective schools, they were still subjected to the same rules and restrictions placed on the younger students. They suggested a calibrated and more developmental application of policy regulations based on the maturity and cooperation of students as they progress through school, would be a better approach. They suggested that for senior students the emphasis should be less on punishment and more on trust and rights and responsibilities.

Some students could see efficacy in rules related to not using mobile phones in classrooms because they considered it was a distraction, and showed disrespect to the teacher. Two male students viewed most of the rules in their school as fair, and believed the rules assisted in keeping students focused on their learning. The students realised that their use of technologies at school could be monitored to see who was breaching the rules, and that those who broke the rules could have restrictions placed on them, instead of being imposed on everyone from the outset. One student suggested that if such privileges were abused the teachers could confiscate students' mobile phones. The students considered that trust was very important, arguing that as adolescents they wanted to feel as though they were increasingly being trusted as they got older. Although some students acknowledged the validity of establishing controls and regulations to oversee the use of digital technologies in schools, they identified problems with the implementation and maintenance of such policy regulations.

Another student, Alison, pointed out that some students disobey the rules and use phones to text and send emails while in class and to play games on the computers when they were supposed to be doing their school work. Two students believed that students did this was because they could get away with it: even though there was a rule that states that phones will be confiscated if they are used in class, the teachers had to give back the phone to the student in a short space of time. As such, the punishment was not considered by the students in this study, as a very effective deterrent.

Other students thought the limit placed on download time was too small and counter-productive to their learning. They explained that once a student ran out of credit they could no longer undertake online research. At the same time, these students also recognised that viewing video clips on YouTube uses a considerable amount of the available Internet bandwidth, and such activities slowed down the speed available to other students. The students argued that although the YouTube site could be considered by some to be inappropriate for use in schools due to the content on it regarded as entertainment, and the inclusion of some sexual, violent and inflammatory content. It was also be argued by the students that YouTube has a lot of content that has educational relevance and merit. Some students indicated that as they could be caught doing the "wrong thing" on computers at school, and that they would rather do the "wrong thing" at home because there was less chance of being caught: there was none or little filtering at home, and they considered their parents' monitoring capacity was more limited than that of their school.

In summary, the students considered the implementation of "Acceptable Use Policies" and associated "Agreements" were not effective, but also indicated they understood there were a range of factors influencing their use. They observed that requirements of schools and the demands of the students were often overlooked when constructing policies. The students indicated they would prefer there was an easing of restrictions for senior students in relation to the guidelines for the use of technologies such as mobile phones in their schools, and that a system be introduced based on monitoring and trust, as opposed to the imposition of inflexible systems of rules and regulations. It would be wrong however, to position the students as merely passive recipients of the policy regulations. The interview conversations suggest the students are interested in the ethical consequences of their involvement with digital technologies and they have some insightful observations to make in regard to the functioning of policy regulations. Given these students' views, the way in which policies are interpreted and enacted by students becomes critical.

Students' Understandings of Meaning and Language in Digital Technologies Policies

Students acknowledged that the way a policy is interpreted is important to understanding its' intentions, particularly the language in which the policy was written, and the use of particular terminologies or "codes" of information (Groundwater-Smith et al., 2009). The students also thought that the language of the policies was or could be problematic in terms of intended meaning and creating multiple understandings. Students displayed considerable awareness of the importance to engage with policy regulations and interpret them, but the generality of language in the national and state policies was seen to generate a level of ambiguity about what is acceptable ethical behaviour. Further, some students expressed a degree of pessimism about being able to understand and comprehend digital technologies policies.

The place of language in digital technologies policies is observable in the student responses to the question asked of them about whether the policy documents such as the "Acceptable Use Agreements" are understandable by them. A male student, Abdul, observed that language in such documents can represent a barrier to being able to engage in critical analysis of the content. He stated, "I reckon that some people write these documents in such fancy words so the average Joe can't understand, won't understand, so they won't be able to argue the point".

The inaccessibility of the language can also lead to different understandings and interpretations of polices. In the words of one student, Michael

Well it [policies] could mean different things, what it means to people who write it and a completely different meaning to other people who don't, and that's why Kevin Rudd [Australia's immediate past Prime Minister] is trying to get everyone to a similar understanding of the whole concept together.

Michael thought that the technical words were a major cause of the difficulty in understanding the policies: "it all comes down to how you interpret it", he said. Another student commented, "not all the rules set by the government are all in black white, it comes down to how you interpret it and how you see what's written in between the lines".

It is noteworthy that in their responses regarding the ethical issues associated with digital technologies however, that the students rarely used words such as "unacceptable" and "inappropriate". More commonly students described unethical behaviour with words and phrases such as "something bad", "wrong" or not the "right thing". The language used by students in reference to accessing sites that host controversial material contrasts to the language used in policy documents related to the use of digital technologies, where terms such as "inappropriate" and "unacceptable" are applied[1].

There was a view put forward that people required extensive computer and legal knowledge to understand the specific digital technologies policies used in their schools. In addition, some students felt they lacked knowledge and information about how to access digital technologies policies. One student named Svetlana suggested that students who study information technology (IT) or computer-aided design (CAD) would be likely to have more knowledge to better understand these policies. Another student Dave stated that it is not enough just to have the "Agreement" in a contract form, but rather the "Agreement" should be explained to students in the classroom or at a school assembly. He argued for this approach as opposed to the current practice of "just saying, read this and agree with it".

In reference to the way the policies for the use of digital technologies in schools are written, Julie expressed the view that,

it's not there to be easily accessible, it's not there to be communicative to the general public. It is there to allow the Government to convey their message, to allow the Government to interpret it to what they want the public to think it means. It is there to allow the Government to cover their [rear ends].

This statement suggests a degree of suspicion and cynicism by this student regarding the intentions that lie behind the creation of the policies governing students' use of technologies, and a belief that that external bodies are writing the policies as opposed to schools developing their own.

In summary, the students in this study recognised the significance of policy documents to their use of technologies while at school. Their comments also suggest they recognise that such documents include code words and technical words that at times can be a barrier to understanding their intentions. Students also expressed a degree of cynicism about the purposes of "Acceptable Use Policies and Agreements", viewing them more as a way of protecting the school rather than the students.

Reactions to Blocking and Filtering of the Internet

Students were asked to comment on restrictions placed on their use of digital technologies particularly in the form of blocking and filtering of the Internet. This subject produced a considerable amount of interest amongst most of the students. They were asked if blocking and filtering was effective and reasonable at their own school, and whether it caused any problems. Students were also asked if they thought there were alternatives to the blocking and filtering approach currently used in Australian schools.

Abdul described the situation at his school where the social networking site "Facebook" is blocked from student access along with sites such as "MySpace" and "Bebo". He explained that in his opinion a small unrepresentative group of staff were set up to look into complaints that had been made by teachers regarding students' use of "Facebook" and that they had decided to have it blocked. He also reported in relation to social networking sites that there were "kids [who] were wasting their whole class time when they should have been on the computers doing their work and they were using computers that other students could be and also using the bandwidth".

Students at the Government school claimed that "YouTube" was too widely used for it to be blocked, and was accessed a lot by the teachers. A student also expressed the view that "YouTube" was a vital tool for school and he would not want to be in a school that did not allow access to "YouTube". Josh at the same school reported that some students were using "YouTube" just to look at videos not related to school, but he said "we can't block it for everyone just because a group of kids are using it for bad". This comment suggests that for this student, the overall benefit of "YouTube" outweighed any abuses of it that occurred. Two female students at the Catholic school made a suggestion "just block the over 18 stuff". Some students at the Government school commented that because "YouTube" was not blocked each student should be responsible for their own Internet usage. This comment supports an ethos of self-imposed responsibility as opposed to acting out of the fear of receiving a sanction or punishment.

Students were asked about whether their access to the Internet at school meant they were sometimes blocked from useful sites related to their school work. Josh acknowledged that the blocking of sites at school was problematic, and stated that the problem was even more pronounced in terms of the difficulties with accessing games and game design information, which he saw as necessary for the computer design subject he was studying. Two female students Alison and Francis stated that they were blocked from entering a number of educationally useful sites, which they had tried to access through Google searches. Ruby provided this example:

for my art class I had to look up Renaissance art and stuff and was trying to find some images but because a lot of that stuff did have nudity in it I wasn't allowed to like look at any of them or anything so that was kind of annoying.

Another example given by Nigel, who was doing a media assignment, reported that he had been trying to access something on the punk rock group the Sex Pistols but due to the word 'sex', the sites were blocked. A sense of frustration is evident in the comment of a student called Ben who stated "I mean I don't know why they've got heaps of blockings. I mean who wants to look at dodgy stuff at school anyway, like not on purpose". Another student stated, "I mean there is no point in blocking everything with like a certain word to stop everyone else from doing all their research stuff". A student commented in regard to his school's filtering and blocking of the Internet "more often than not it shoots you in the foot". The issue of access to educational material being compromised by blocking and filtering restrictions is acknowledged in some policy documents. For example a statement from the national statement, the "Digital Education Revolution Strategic Plan" indicates, "Cyber safety education policy at the local school level may not allow innovative use of ICT" (DEEWR, 2008, p. 7).

The concerns about electronic filtering and blocking of Internet sites have been raised in Australia for some time (Moyle & Owen, 2009; Neal 2005). Over five years researchers have listened to students communicate their frustrations with Internet sites being blocked by restrictive policies (Neal, 2005). In his study Neal (2005) argued that these restrictions represented an imposition on student learning, and led to students feeling more comfortable with accessing computers at home where they usually had more freedom to access Internet sites.

When asked about the effectiveness of the blocking and filtering which occurred in their schools, students responded that the system was not particularly successful in preventing student access.

One student, who was doing a traineeship in the area of technical support for digital technologies in his school, stated that students could find ways around the blocked sites using various methods.

Abdul stated that "whatever they do there's always a way around it". Students also reported that when school staff had discovered there were ways around the blocks, they blocked the gap, but that other students who knew how to get through the filters would keep quiet and continue to break the rules. Another student concurred: once teachers discover these transgressions, the students find other ways to circumvent the filtering systems. These students indicated though, that while such hacking was possible, students did not undertake such activities regularly. Alison for example, said that she knew ways to break into "Facebook" but by the next day the system would be blocked.

Although the students considered the blocking of sites and filtering of content frustrating, and curtailed their access to educational sites, not all students interviewed considered it would be easy to hack the filtering system. Anna Maria for example, reported it was difficult for students to access some blocked sites, and attempts to access them were usually unsuccessful. She explained that only students who were persistent and knowledgeable, succeeded in cracking the filtering system. Furthermore, the students in this study thought the approach that lay behind the blocking and filtering of content was based on the assumption that all the students were likely to do the "wrong thing", and considered this assumption an unfair generalisation. In relation to that point a student asked the rhetorical question "how many people would actually want to do that [access banned sites] at school?" Furthermore, the students recognised their teachers' authority, acknowledging they have the ability to monitor students in computer laboratories with cameras. One student suggested that if a student was caught looking at "nasty stuff" teachers could publicly shame the student contravening the rules. The student explained that it would be very demoralising for the student if a teacher took a screen shot and used it to highlight the student's poor behaviour by allowing the whole school community to discover what that student had been doing. Ben, also commented that although most students would not try to go on the wrong sites with "mature content" at school, a small percentage would do so. In the student's words "a small minority could ruin things for the rest of us".

Students could see the policy dilemmas facing their school concerning the use of blocking and filtering of content. Several students stated that the restrictions were not good because letting the Government set the restrictions on content, in effect meant the Government was filtering the information available to students, which they saw as a form of propaganda. They saw the aim of such propoganda approaches to influence students to think in certain ways. Andrew acknowledged the difficulties of establishing a balanced filtering and blocking system stating, "It's quite hard to get an in-between between what's fair for the students and what's acceptable to be blocked". He suggested that if each teacher was given a password to unblock certain sites for the students, at the end of the lesson the teacher could then re-block them: "that would be fair". Such an approach however, makes the assumption that teachers have the sufficient computing skills to action such a proposal.

Some students could see the benefits of electronic filtering of content. Dave, for example, claimed that blocking and filtering systems had some benefit, "in principle they're a good idea but in practice they go overboard". He suggested that blocking as a general tool could be modified to make allowances for certain classes that required specific access to certain sites. Dave expressed his view this way: "so unblock sites for students from human behaviour subjects who need access to sites about cases of social deviance or psychological experiments which are sometimes blocked". However, another student Ben said that this would be very problematic "if we start giving different access different restrictions it would get all muddled up".

When asked how the regulation of the access to sites could be improved, all the students agreed that it would be better to educate students from a young age about cyber-safety and acceptable use of the Internet, rather than rely on a system based on electronic blocking and filtering systems. When asked whether education to promote the ethical use of the Internet would be worthwhile, the students gave a range of answers. Bruno indicated that he was doing an assignment which was looking at "correct Internet usage". He believed that it was important to learn about such matters, because in his words "you've got to teach people about these things, what can happen on the Internet, what kinds of things you should be doing and what you shouldn't". Bruno also indicated there should be a balance between education and control measures.

Another student complained that efforts to educate students about correct Internet usage were not conducted very effectively. This student suggested that too many sheets were handed out which were not easily understandable. He said however, that at the start of the year the librarian had conducted a session for the students about what websites to look out for and which ones not to use, which this student reported he found useful. Indeed, from the interview responses all the students recognised that education could play a viable role in preparing students in schools to practice responsible social behaviours when using the Internet, combined with some type of reasonable framework of restrictions. Several students pointed out though, that such educational programs had to be meaningful, cohesive and appropriate for the age group of the students concerned. Students at the Government school believed that education about ethics and use of digital technologies would be good if it was taught at a younger age because they thought that school aged students (16 to 18 years old) would not really listen to it, because they had established many online habits already.

In summary, the students expressed frustration with not being able to access Internet sites at school, they considered have legitimate educational value and are useful for research purposes. They suggested a range of nuanced policy suggestions to balance the expectations of schools to protect students in their care, with the educational uses to which the Internet can be put. The interview data analysis suggests that it would be beneficial to their learning, if students had more opportunities to express their views about the ways in which they are permitted to use digital technologies in the school environment. It would seem that the rules and guidelines set out in policy documents and filtering and blocking of the Internet occurring in these students' schools, are not in themselves adequate to maintain compliance and ethically responsible behaviour. Policy positions in this field may be better served by positioning digital technologies in the social domain (Moyle, 2005), recognising that behaviours exhibited while using digital technologies involve a range of complex ethical, contextual and cultural factors that also involve social relationships.

FUTURE RESEARCH DIRECTIONS

As digital technologies become more widespread and embedded in Australian schools and society more generally, further research and debate is required to understand how pertinent social perceptions and attitudes are shaped as forms of discursive practices. Policies provide a framework for inculcating values in young people and directing them in determining what is right and wrong behaviour. There has been a lack of consultation and dialogue with students about desirable behaviours and values, and this deficit provides a reason for greater recognition of what school students are thinking in terms of their interaction with digital technologies and the ethical implications of their use.

Students' voices are not often listened to or acknowledged in education research, and there are also many other voices, social, political and educational that can be drawn into such conversations. Establishing authentic discursive spaces for the voices of students regarding their views and understandings of digital technologies policies, and fostering research involving more debate and dialogue between those in all levels of the education field, may attain a more informed and comprehensive understanding of how to build a robust ethical culture in relation to the use of digital technologies.

Further research and critical inquiry is required to gain a nuanced and contextual understanding of the dynamics of digital technologies policy implementation and understandings in Australian schools. Two specific areas identified in this chapter that were of the subject of ethical debate and concern to the students were access to the Internet, and the use of mobile phone functions in school. Consistent with The New Media Consortium, (2010), there is room for further study concerning the uses of both these technologies in schools. Research is also required to investigate how to develop young students skills of critical evaluation (Byron, 2008), so they can make informed judgements when using the range of technologies available to them. An essential dimension of such studies could involve investigating the ways in which policies are reinterpreted and reconstructed by students in school communities. Furthermore, parents as partners in the educational process could have more involvement in the processes of development of school policies by researching the ways in which they might take ownership and responsibility for nurturing ethical awareness and competencies amongst students.

The study informing this chapter shows that students believe they can make worthwhile contributions to building understandings of the use of digital technologies in schools, and the development of the policies influencing their use. Further research could investigate students' understandings of ethical issues and concerns in relation to the ever-changing technological environment in which they are situated.

CONCLUSION

It is the voices of students who currently are the recipients of digital technologies policies, that have been of primary interest in this chapter. Listening to student voices is important as they are directly effected by policy regulations created to control students' use of digital technologies in schools. This study explored how social and ethical issues are represented, understood and mediated as forms of educational discourse by school students. In doing so it has shed light on some of the complexities and subtleties involved in developing understandings of students' interpretations of digital technologies policies. As such, the chapter offers insights into the implications and challenges that students' perspectives represent for constructing relevant and viable school education digital technologies policies.

Students in this study indicated they want their views heard and to have more space to negotiate the ways they access and use technologies in their schools. They would prefer an ethos of trust and mutual responsibilities to prevail, and a more refined and calibrated approach to the implementation of policy regulations in this area. They reported they perceive digital technologies policies as largely perfunctory documents, written in a language difficult to understand and open to many interpretations. They indicated they would prefer policies that discriminated effectively between the needs and maturity levels of different age groups of students.

The policy document most students were aware of was the "Acceptable Use Policy" and its' associated "Agreement"; which only a few had read and others had soon forgotten about. Most students in this study were not convinced about the effectiveness or relevance of their schools' policies. For students, signing the "Agreement" was seen as a hurdle they have to traverse to gain access to digital technologies in their schools, such as the schools' intranet. Indeed, most students in this study were not convinced about the effectiveness or relevance of their schools' "Acceptable Use Agreements".

The students in this study were of the view they are unfairly penalised in their studies, due to rigid policy measures applied at the school level. The students saw filtering systems for example, as being designed to enforce mass compliance and control and were cynical of what constituted "inappropriate" actions. Filtering and blocking of the Internet in schools however, represents a uni-dimensional technical solution to the challenge of trying to keep students safe on the Internet. Internet safety is a multi-dimensional, culturally constructed and socially mediated through the use of technologies. In responding to the policy measures concerning the blocking and filtering of Internet sites available at school, the students reflectively and discursively advocated their own values and priorities to policy understandings and digital technologies ethics.

Finally, this research suggests that policy approaches to addressing the ethical dilemmas surrounding digital technologies in schools are unpinned with emotional resonances to political sensititivities, moral paternalism and shotgun approaches that contain the promise of a silver bullet. These attempts are problematic as they fail to take account of the complexity, diversity, dynamism and relative newness of what is occurring. The conclusions emerging from this study may assist in broadening and enriching the level of debate relating to digital technologies discourse in academic and educational contexts.

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KEY TERMS AND DEFINITIONS

An Acceptable Code of Practice/Acceptable Use Agreement: An official policy document which prescribes what is acceptable behaviour in regard to specific events e.g. a school camp or use of school facilities or equipment e.g. digital technologies. Students, staff and in some cases parents are usually required to consent to the content of these policy documents by signing them.

Digital Technologies Ethics: A discussion or examination based on ethical principles regarding the right and wrong uses of digital technologies. Digital technologies ethics is characterised by debates concerning issues such as privacy, anonymity, access to material on the Internet, and the use of social interactive sites.

Discourse of Compliance and Control: A form of discourse that can be located in policy documents which stresses mechanisms and rules designed to achieve conformity of behaviour and practice. This discourse is characterised by language that expresses sanctions, penalties and legal obligations.

Educational Stakeholders: People who have a vested interest in the educational outcomes for students in an educational institution (school, university or technical college). The principal educational stakeholders are teachers, school staff, parents and the students themselves.

Ethical Competence: A well developed level of understanding and awareness that allows a user of digital technologies to make informed and reflective decisions about the correct use of these technologies in various situations. Ethical competence can be developed and fostered by educating students at school and at home about the ethical implications of digital technologies use.

Student Voice: The expression of students' views and perspectives regarding issues and policies relevant to their educational context. The student voice can be expressed through interviews (individual or group), focus groups, surveys or in written form.

The Digital Education Revolution: An Australian policy and an educational strategy which was initiated by the Australian Labor Government in late 2007. The policy advocates greater integration and access to digital technologies in schools (particularly secondary schools). The policy has resulted in considerable investment in schools mainly in the form of providing roll out of computers to secondary schools.

ENDNOTE

1 See for example see the following policy documents; "The New South Wales Department of Education and Training's policy Online Communication Services: Acceptable Usage for Schools" (New South Wales Department of Education and Training NSWDET, 2006); "Acceptable Use of Information Technology (IT) Resources Statement" (Australian Capital Territory Department of Education and Training, 2007); "Computer Facilities and External Networks – Acceptable Use" (Archdiocese of Canberra and Goulburn Catholic Education Office, 2009).

Chapter 7
Learning with Technologies:
Perceptions and Outcomes in China

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ABSTRACT

This study explores the perceptions of undergraduate students and their teachers towards the current and future role of learning with technologies in university education in China. Data from a survey completed by 1,740 undergraduate students from 12 universities and colleges throughout a rural province in north-eastern China was supplemented by an analysis of student response to learning with technology in Chinese classroom contexts using visual ethnography. The analysis of the data indicated that the use of technologies in the undergraduate classrooms in this study has had little effect on the way the university lecturers teach, but that their undergraduate students made extensive use of mobile technologies for interpersonal communication and learning outside the classroom, albeit not necessarily in relation to their formal education. These changes raise questions about the key role of socio-cultural expectations regarding effective education in determining the uptake of learning with technologies.

INTRODUCTION

Learning with technologies is not a new phenomenon in China, but until recently, has generally been restricted to the use of audio-visual, and more recently, computer-assisted foreign language learning. The purpose of this study was to determine the extent to which learning with technologies is accepted general practice among teachers of undergraduate students in China, and to explore the attitudes of both teachers and students towards the role of technologies in Chinese education, now and in the future. The study is set in a typical rural province in China, and although it is obviously not possible to generalize about a population of students numbering in the millions,

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the findings from this study suggest that there are many challenges facing the more widespread adoption of learning with technologies in China. This chapter explores some of the challenges facing the widespread use of technologies for learning in undergraduate university education in a culture that traditionally regards effective education as teacher-centred, and where the entire education system is strongly examination-dominated (Campbell & Hu, 2010; Heffernan, Morrison, Basu, & Sweeney, 2010).

BACKGROUND

In the last decade the Internet has become a popular channel of communication in China, second only to the use of mobile telephones. Internet access has increased exponentially from 23 million connections in 2000 to 384 million connections in 2009, with higher saturation in cities than in rural areas (Liang & Wei, 2002). As a percentage of China's population this represents an increase from 1.7 percent of the population in 2000 to 28.9 percent of the population in 2010 (Internetworldstats, 2010). Despite this increase, access to the Internet is not as widespread in China as it is in most Western countries, although the aim is to provide every educational institution with Internet access.

The demographic distribution of Internet use is not spread equally among the Chinese population. As in other countries in Asia, the more affluent Chinese people living in urban areas have greater access to the Internet and other technologies than those in rural and remote areas (Dhanarajan, 2009). A recent survey of Internet users in China found that the highest proportion were young (37% between 18-24 years), single (59%), male (59.6%), students (33.2%), or 'white collar' professionals (44.8%) (China Internet Network Information Centre, 2005). This distribution and the fact that Internet users in China spend about one billion hours per day online (Boston Consulting Group, 2010) has attracted the attention of Western providers of e-commerce and elearning, who see the increasing Internet usage in China as the beginning of a huge financial boom. However, the Chinese government maintains a strong degree of control over information available in the Chinese mass media, including the Internet, limiting the resources available for education to those authorized for use by the Chinese government (Kalathil & Boas, 2001).

In terms of using technologies for learning, developments in China are relatively recent and have not been rapid. This is partly because of a strong tradition of teacher-centered, textbook based, teaching and learning (Biggs, 1996; Bond & Whang, 1996; Campbell, 2006; Chan, 1999; Nield, 2004; Niles, 1995; Tweed & Lehman, 2002). As other researchers have acknowledged, to effectively participate in technology-enhanced learning presupposes that learners are receptive to learning situations that require a high degree of student initiative, self-directed learning and independence. The Chinese education system is exam driven, teacher-centered and, as many researchers have pointed out, still based on Confucian values (Ballard and Clanchy 1997; Cooper, 2004; Pyvis and Chapman 2004; Radford, Mann, Ohta & Nakane, 1993; Triandis 1995; Tweed and Lehman 2002).

Although computer-assisted learning (CAL) has been used in China since the 1960s (Jin, Liu & Dai, 2005) the main use of CAL has been in foreign language learning programs, particularly in the late 1990s. It is only very recently that Government policies in China have strongly supported student-centered teaching and learning activities, including technology-enhanced teaching and learning, throughout the curriculum (Fang & Zhu, 2007; Yang, 2001; Zhang, 2005). However, senior educators and educational administrators in China were educated well before these reforms, and as senior managers, have personal assistants who have the technological skills that they lack. They therefore had little incentive to use the technologies themselves, or to encourage the academic staff to do so and the initial use of technologies in educational institutions in China was predominantly for administrative purposes. As a result, university and college students in China are far more familiar with technologies than many of their teachers. This situation is not unfamiliar in Western countries (Campbell & Scotellaro, 2009; Jukes & Dosaj, 2006; Oblinger, 2003; Prensky, 2005; Shazia, 2000; Zemke, 2001), but is exacerbated in China by the fact that many older teachers still believe in the efficacy of the Confucian teacher-centered approach to teaching and learning.

Another factor limiting the widespread use of the Internet for educational purposes is the strict Government control over the media and the Internet. This means that Chinese educators have only limited access to the wide range of online resources relevant to teaching and learning that teachers, students and parents in Western countries take for granted. The lack of access to online teaching and learning resources may limit the variety of teaching resources used in Chinese classrooms, but it enables Chinese teachers to maintain their role as the source of all knowledge relevant to passing examinations, both through their lectures and in using a set textbook as the basis of subject content.

It is also argued that the language and values of Western creators and users of technologies are reflected in the content and structure of Western websites, which are predominantly white, Western male artifacts (Chen & Collis, 1999; Chen, Mashadi, Ang & Harkrider, 1999; Joo, 1999; Li & Kirkup, 2007), and may therefore not be appropriate for Chinese learners. This argument raises questions of the relationships between cultures, technologies and beliefs about educational 'best practices' and the transferability of approaches used in learning with technology developed in Western countries to learning with technology in other cultural contexts (Chen & Collis, 1999; Friesner & Hart, 2004).

There is also a considerable body of research that argues, if not definitively, that culture influences both attitude to and use of computers and elearning (Barton, 2006; Brosnan & Lee, 1998; Friesner & Hart, 2004; Li & Kirkup, 2007; Omar, 1992). This literature suggests that the way in which technology-enhanced learning is designed for use in a specific culture has to match the preferred learning style of the students from that cultural context. According to this argument, technology-enhanced learning programs for Chinese learners should ideally be designed by people thoroughly familiar with the culture, rather than being translated versions of Western educational resources. Although in-country development of elearning resources is progressing in China, program development takes time, specific skills and financial resources and is therefore a slow process.

Despite these challenges, there is strong Chinese government support for the development of elearning at all educational levels (Ministry of Education, 2006), and in 2003 there were already 2.3 million Chinese students enrolled in elearning courses (Huang, 2004). The entry of learner management systems into the Chinese elearning market, (Newswire, 2006) and support from organizations such as the UK Higher Education Funding Council for the development of new elearning courses (McConnell & Zhao, 2006) has provided additional incentives for further development of technology-enhanced education and by 2008 there were 3.6 million undergraduates studying in web-based courses (Ministry of Education, 2009). The delivery of education by means of technologies to children whose schools were destroyed by the Qinghai earthquake in 2010 provided a unique opportunity for the Chinese Government to publically demonstrate the potential of technologies to deliver education any time, any place, any where.

It would therefore be fair to say that technology-enhanced education has reached China, and with the support of the Government and the financial incentives for hardware and software providers, is likely to become a major strategy in the delivery of education in China. A recent development in technology-enhanced learning, the concept of mobile learning (mLearning) - **using mobile technologies for educational purposes - may be particularly relevant in countries such as China, where mobile phone use is extremely widespread and costs of infrastructure development are a constraint (Motlik, Rashid & Elder, 2008; Valk et. al. 2010).

However, research focused on the impact of technology-enhanced education on student learning outcomes in China is extremely limited. Studies of Chinese students' responses to changes in educational practices, such as those by Heffernan, Morrison, Basu, & Sweeney (2010), Higgins & Li, (2005), Nieto and Zoller-Booth (2009), Wang & Moore, (2007), or Zhang, (2002), focus predominantly on differences in preferred learning styles between Chinese and Western students, rather than student response to technologies used to deliver the programs. With very few exceptions (Campbell, 2006; Gu, 2006; McConnell & Zhao, 2006; Prescott & Prescott, 2008) they ignore the fact that learning with technologies has been part of the delivery mode in educational institutions in China for almost a decade (Pan & Bonk, 2007; Yueguo, 2006), and that this presents educators with challenges, as well as opportunities, particularly in countries such as China, where the challenges to using technologies for educational purposes are financial, structural and ideological (McConnell& Zhao, 2006; Yong, Gaoming, & Ning, 2006).

Given the rapid increase in access to and use of technologies among young people in China (Hong, Li, Mao & Stanton, 2007), the growth in technology-enhanced learning in the last five years, and the Chinese government's strong support for technology-enhanced education, it is timely to investigate Chinese students' response to a way of learning that not only uses different technologies to enhance the learning process, but is also based on constructivist principles of learning that are diametrically opposed to the traditional Confucian approaches to teaching and learning still characteristic of most Chinese schools, colleges and universities. Student responses to learning with technologies therefore may also be affected by their teachers' responses to student-centered, constructivist approaches to learning, approaches currently supported by the Chinese government.

Implementing Government Policy on Educational Technologies

Rather than attempting to generalize about an education system that encompasses over 1.3 billion students (Ministry of Education, 2010) in educational institutions ranging from well-endowed universities funded by the National Government to provincial colleges struggling to survive, and rural schools desperate for adequately trained staff (Ministry of Education, People's Republic of China, 2007), this investigation focuses on a case study set in a medium-size, provincial city in North-eastern China. As is typical in the more remote Chinese provinces, most educational institutions within the city rely on provincial funding, competing for limited provincial funds with other community service providers such as health, energy and transport.

In this context the financial costs associated with the introduction of technology-enhanced learning, such as purchasing technological hardware and software, staff training, equipment maintenance and the provision of technical support, are major deterrents to its widespread use. The fact that the National Government supports technology-enhanced learning means little without access to the funding required for its effective implementation. This case study therefore identifies a specific situation in a specific context, and findings from this study should not be interpreted as necessarily applicable to China as a whole.

To identify student responses to learning with technologies, 58 Chinese university teachers studying in a post-graduate degree in education were asked to survey their own undergraduate students to identify the ways in which their students used technology for learning in **formal contexts (related to their university studies) and in non-formal contexts (related to their personal interests). The reason for making this distinction was based on literature demonstrating that the use of technologies in formal and non-formal learning contexts can be quite different and involve different learning styles (Dighe, Hakeem & Shaeffer, 2009; Moyle & Owen, 2009).

Questions in the survey were constructed in collaboration with the Chinese teachers in the post-graduate program and translated into English. The questions focused on:

- The types of technology used by undergraduate students;
- Frequency of use of the various technologies;
- Confidence in using the Internet for learning purposes;
- Perception of the reliability of information available on the Internet;
- The purpose in using technology in formal and non-formal contexts;
- Frequency of use of technology-enhanced learning in their classrooms.

Open-ended questions related to the students' perception of the benefits of technology-enhanced learning and the future of technology-enhanced learning in formal educational contexts. To ensure the accuracy of the translation the survey was prepared in Chinese, translated into English using the conceptual method of translation (Sperber, 2004) and back-translated into Chinese. This approach provided data from 1,740 undergraduate students from 12 universities and colleges throughout the province.

This data was supplemented by an analysis of student response to learning with technologies in a classroom context using visual ethnography (Clark-Ibanez, 2004; Harper, 2002; O'Reilly, 2009; Neyland, 2009). Mobile telephone saturation among the teachers was 100%, so they were asked to visually document an example of the way in which a technology was used for teaching and learning in their own classroom. The photos were accompanied by a short report discussing the responses of their students to the specific use of technology-enhanced learning depicted in the photo. As these photos and reports would be subjective and from the perspective of the teachers, not the students, the photos and reports provided by the teachers were compared to the students' responses to the survey questions and used to confirm or disconfirm the perceptions of the teachers as described in the reports.

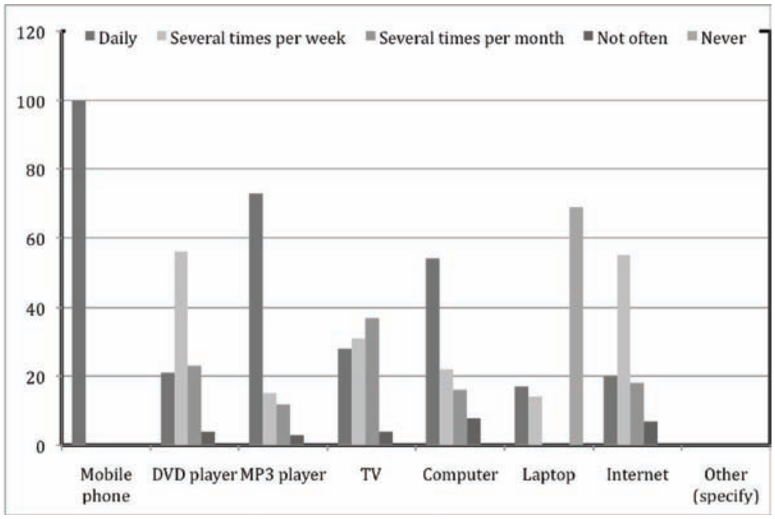
As a number of researchers have pointed out, visual images are a selected reflection of reality, not an actual reflection and the interpretation of visual data is subjective in the same way that any analysis of data is ultimately influenced by the perspective of the researcher (Ball & Smith, 2001; Grimshaw, 2001; Pink, 2001; Ruby, 2000). However, visual ethnography "allows spaces to negotiate meanings in a more dialogic, open way" (Martinez 1992 p. 134) and it is this aspect of the approach that made it an appropriate method of using visual data, particularly in a research context where the researcher and participants did not share a common language or culture (Kerstetter & Bricker, 2009; Ruby, 2000; Wang, Burris, & Ping, 1996).

EMERGING ISSUES

The students in this study made use of a wide range of technologies for learning, especially mobile technologies, with 100% saturation of mobile phone use on a daily basis and daily use of MP3 players by most students. (Figure 1)

The vast majority of students (83%) said they were confident about using the Internet and frequently used it to find information relevant to their studies, although it was somewhat disconcerting that many (35%) thought that the informa-

Figure 1. Frequency of use of technologies



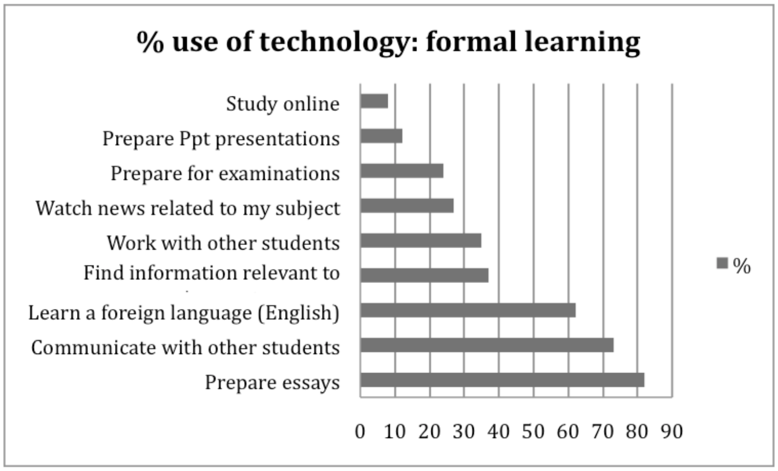
tion available on the Internet was always reliable. There were no students who said that information on the Internet was never reliable, while almost equal numbers of students said that that the information was usually or sometimes reliable (28% and 12% respectively), and the rest (12%) considered it rarely reliable.

In China both the Internet and the mass media are strictly controlled by the Chinese Government (Kalathil & Boas, 2001), so it is possible that undergraduate students in China have a greater belief in the veracity of the Internet than their peers in countries where media censorship is not as prevalent. Perceptions that the information on the Internet is reliable could also be the result of a lack of access to information presenting multiple perspectives of issues, not so much because access to Western websites is restricted, but because of linguistic constraints. Given the origins of the internet, 'It is not surprising that American/English makes up 80% of the language of Web sites on the Internet', as Li and Kirkup (2007, p. 302) point out, which makes it difficult for non-English speakers to access this English-dominated online environment. Access to websites using English was certainly a problem for most of the participants in this study, whose level of English proficiency was minimal.

In relation to their studies, trusting in the reliability of information available on the Internet may not yet be a major disadvantage. As Figure 2 demonstrates, there is relatively little use of technologies for learning within the formal learning context, suggesting that the major source of information related to the students' studies is still the teacher. This is confirmed by the photo analysis data, and is indicative of the ongoing reliance on the teacher as the source of all relevant knowledge, particularly knowledge relevant to passing examinations. The education system in China is still examination dominated (Campbell 2006; Heffernan et. al. 2010; Tweed & Lehman, 2002) and even though many of the students in this study thought that information on the Internet was reliable, they were clearly not inclined to trust this source when it came to knowledge required for passing university examinations.

In formal learning contexts the main source of information according to the students were the teacher (55%) and textbooks (36%). Very few (13%) used the Internet, television (4%) or magazines (2%) as sources of information related to their studies. This pattern was not reflected in

Figure 2. Use of technology in formal learning context



the sources of information used for learning in non-formal contexts, where the Internet was by far the source of information used by most students (66%). Television and books were also used as a source of information for learning in non-formal contexts, but not to the extent that students relied on information available on the Internet (television, 16%; books, 14%; magazines, 4%).

The discrepancy in accessing different sources of information in different learning contexts – teachers and text in the formal learning context and the Internet in non-formal learning contexts – may create an acceptance of two 'realities', one that is valid in the university context and the other in the 'real' world. Given the very different perspectives of events in China presented on Western websites to those available within China, wider access to the global Internet within China may present Chinese web users with multiple 'realities', a situation in which the development of information technology literacy would become essential. It was beyond the scope of this study to explore this issue, although it would be an interesting area for future research.

Purposes for using Technologies in Formal and Non-Formal Contexts

The purposes for using technologies were also different within the university context and outside this environment, although maintaining social networks was the dominant use of technologies in both contexts. Within the university environment 73% of the students said they used technologies to communicate with other students about matters related to their studies, compared with all students stating that they used technologies to communicate with friends on matters not related to their university studies. Given that almost all students live in close proximity to each other on campus, it seems that Chinese undergraduate students use technologies to communicate with friends even in situations where face-to-face communication was also possible, if perhaps not as convenient, as simply using a mobile phone.

The use of technologies for learning among these students was quite limited. The major use of technologies was to prepare essays, with 82% stating that they used technologies for this purpose. It should be noted, however, that in an examination-driven educational context such as China there is far less emphasis on formative assessment than in Western countries, and assessment in China is generally conducted under strict supervision. Alternative modes of assessing student learning such as student presentations, online quizzes, interactive whiteboard activities, take-home assignments, or in-class assessment of group work are relatively rare.

It seems that the combination of a teacher-centered, teacher-dependent classroom and teaching strategies that focus on the teacher as expert may discourage a wide use of technologies for learning among students. If teachers in an examination-driven education system do not design learning activities that encourage students to make use of technologies for learning in ways that relate to getting better grades in examinations, it seems unlikely that Chinese students would do so of their own accord.

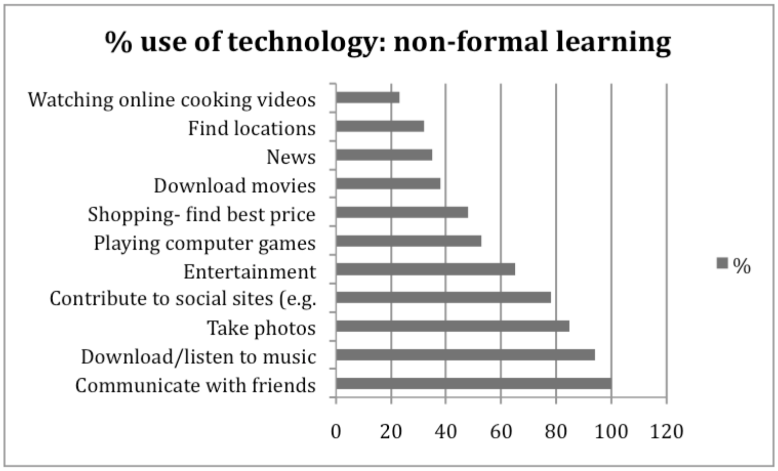
The exception was the use of technologies to learn English, where 62% of the students said that they used technologies to learn the language. The use of language laboratories, films, DVDs, computer assisted language-learning programs and more recently, the use of the Internet and multi-media resources has a relatively long history in English language education in China (Jin et.al., 2005). This may be because the subject content lends itself to the use of audio-visual resources, or because there are more online resources available for teaching English than for some other subjects. It is also possible that Chinese teachers involved in teaching English are more likely than those in other disciplines to have had experience of studying in Western countries and are therefore more aware of the technology-enhanced learning strategies used in Western universities.

Outside the classroom there was far wider range in the students' use of technologies, with all students reporting that their main use of technologies was communicating with friends. Downloading music was also very popular (94%), closely followed by taking photos (84%), contributing to blogs (73%) and using technologies for general entertainment (65%). Other uses by about half of the students included playing computer games and comparing product prices online. Downloading movies, watching the news, finding locations and watching online cooking videos were less common uses of technologies. The use of mobile technologies and the increasing number of applications available for mobile phones suggests that mLearning is far more prevalent among the informal learning of these students than eLearning using personal computers.

This pattern of undergraduate use of technologies not related to their studies confirmed that maintaining social networks was a high priority for this age group, both in relation to their studies and to a far greater extent in contexts not related to their studies. Blogging is a relatively recent phenomenon in China, but in the last five years has increased exponentially in popularity, particularly as mobile phone applications have expanded to include Internet access. The China Internet Network Information Center (CINIC) claims that the number of blog spaces in China in 2007 was 72.82 million, with 47 million blog writers, up from 30 million blog writers in 2006 (CINIC, 2007). According to CINIC, the main functions used on these blogs are uploading pictures, videos and music and most bloggers are female (57%), with the major content a record of daily activities and emotions (CINIC, 2007). Among the students in this study, blogging was also popular. (Figure 3)

Apart from downloading and listening to music, social networking and taking photos, there was relevantly little use of technologies purely for leisure purposes. It is possible that this was the result of living in an on-campus environment where leisure time is strictly controlled and access to computers and the Internet is limited. Internet cafes are plentiful in the vicinity of university campuses and elsewhere in Chinese cities, but finding employment after graduation is becoming a challenge and obtaining a well-paid, secure position is largely dependent on the applicant's results in their final university examinations (Campbell & Hu, 2010). Students are well aware

Figure 3. Use of technology in non-formal learning contexts



of this, and take getting a good grade in examinations very seriously.

The survey results suggest that these students used technology, particularly mobile technologies, such as mobile phones with Internet access, far more frequently and for a far wider range of purposes outside the formal learning context than within it. The analysis of the photos taken by their teachers depicting the use of technologies within the classroom provided some possibilities about why this might be so.

Teaching Style and Technology-Enhanced Learning

The photos taken by the teachers depicted a wide range of technologies used within classrooms, from fairly basic Powerpoint™ presentations used by the teacher and students working at individual terminals in huge computer laboratories, to multi-media presentations making extensive use of relevant resources available on the Internet and music lessons using electronic keyboards and music production software. With some exceptions – notably students in computer laboratories and music composition classes – the teacher was the person using the technology. This reinforces the slow pace of change in an educational context where Confucian values still permeate educational practices. The photos taken by the teachers depicted the teacher as the sage on the stage (McWilliam, 2005), albeit a sage with a more varied range of teaching resources than the traditional chalk and talk.

According to the teachers submitting the photos, the students responded positively to the use of technologies, a response probably predictable, given the subjective nature of the person submitting the photo. In some cases the visual evidence in the photo supported the claim, with students in the photos obviously actively engaged in the learning process and the teacher assisting the students, rather than instructing them. The more objective data from the student survey also generally supported the teachers' claims that technology-enhanced learning had a motivating effect, although the students' responses indicated that the use of technologies in the classroom was not perhaps as widespread as the teachers' photos might suggest. Most students agreed that their teachers rarely (32%) or never (28%) used technologies in their classrooms, while 13% agreed that their teachers sometimes used technologies in the classroom. The remainder said that their teachers regularly (23%) or always (4%) used technologies in the classroom.

According to the students, the use of technologies in the classroom did not in itself enhance learning. Responding to an open-ended question asking students to describe their perception of the impact of technology on their learning, many said that it depended on how the teacher used the technology, although some observed that it made lessons more interesting or 'colourful', as one student described it. The main theme emerging from the responses to this question was that when teachers did use technologies in the classroom, it was more of an additional and somewhat novel resource, rather than an integral aspect of the teaching approach.

It was also evident that most teachers and students in this study regarded the process of 'enhancing learning' as the sole responsibility of the teacher. While few would argue that this is not the case, Western theories of effective education, such as constructivism, or problem-based learning, emphasize that designing effective learning experiences is most effective when there is collaborative input by both students and teacher (Hanley, 1994; Jones, 1996; McWilliam, 2005). Although university teachers in China may be aware of these contemporary educational theories, in a Chinese context, putting them into practice when both students and teachers regard teaching as a one-way process, may present some challenges.

The students' comments supported the evidence in the teachers' photos that in most classrooms where technologies were used, it was the teacher who used the technology, not the students. The exceptions were music, foreign language and IT skills classrooms, where students themselves were using the technology. However, even in these photos it was clear that it was the teacher who was directing the learning, not the students. There were no photos that depicted students using technologies and working in small groups without teacher supervision, or using an interactive whiteboard, or giving presentations using technologies.

It is of course possible that collaborative learning among the Chinese students took place outside the classroom. As indicated in figure three, 73% of the students stated that they used technologies to communicate with others in relation to their studies. Some of this communication may have consisted of collaborative learning, although not necessarily a group activity set by the teacher. If this was the case, 'natural' learning outside the Chinese classroom might be occurring in line with constructivist learning theory, in contrast to learning within the classroom. The phenomenal increase in blogging in China in recent years would certainly offer opportunities for doing so.

Student Learning Styles in Non-Formal Contexts

As indicated in this study, Chinese undergraduate students, like their Western counterparts, are confident users of technologies. They are capable of using technologies to find information and are independently developing IT skills relevant to their use of the technology. While some of these skills and this knowledge may be relevant to their formal studies, in an examination-driven education system it is unlikely that non-formal learning outside the classroom would be specific enough to be useful in passing examinations based on lecture content and a set text.

What the students themselves realize is that technologies, particularly access to the Internet, enables them to learn independently. This view was expressed in various ways in responses to the open-ended question related to the benefits of technology-enhanced learning as:

- I can find out whatever I need to know;
- I can learn how to sing a song the same way as a famous singer;
- I can get information about Chinese calligraphy;
- I can hear my own mistakes in pronunciation and correct them.

The use of the phrase 'I can' in these responses about learning with technologies in non-formal contexts suggests that Chinese undergraduate students are quite capable of independent learning, and in fact are already learning independently in non-formal learning contexts. The main constraints to doing so within formal learning contexts were the teacher, the textbook, the examination-driven curriculum and the belief of many teachers and students that this is the most effective way of teaching at university level.

Another theme to emerge from the student responses to the open-ended question was that they regarded themselves more competent users of technologies than their teachers. There were many comments such as:

Teachers should make more use of technology in the classroom, but are afraid that we know more about IT than our teachers;

Teachers don't use technology very much because they're afraid the data projector or the computer might not work and they would not know how to find the problem;

If something is wrong with the technology, and the assistant cannot come, the teacher would have to ask students to help fix it and this would be embarrassing for the teacher.

These comments raise several issues relevant to constraints faced by the Chinese teachers who do use technologies for teaching: loss of face if anything goes wrong, a lack of adequate IT support for academic staff, a lack of staff training in the use of technology for learning and inadequate IT equipment maintenance.

These are similar constraints to those faced by teachers in Western countries in the early days of learning with technologies, where teachers unfamiliar with the new technologies were also afraid of failure, and students were generally more knowledgeable about the technologies than their teachers (Prensky, 2005; Shazia, 2000). But for teachers in Western countries, these experiences were set in a context where the constructivist approach to education was already practiced, staff development was readily available and where the teacher's lack of technological expertise was not likely to result in a loss of face. In an education system where the teacher is expected to be the expert and where loss of face is to be avoided at all costs, it is easy to understand why academics might prefer the reliability of chalk and talk, rather than risk losing face by using unreliable technologies, or admitting publically that the learners have greater technological skills than their teachers.

Student Visions of the Future of Technology Enhanced Education

The students in this study had already discovered that it is possible to learn almost anything by searching the Internet and they had high expectations of the role of technologies in future education, although a somewhat limited vision of the ways in which technologies would be used differently to encourage different ways of learning. For example, there were very few ideas related to collaborative learning using social networking sites, or problem-based learning using authentic case studies and information available on the Internet, or classrooms where students had input in determining the focus of the learning and choice in selecting the most appropriate learning process to achieve a learning goal.

In response to the open-ended question, 'what will the role of technology be for education in your institution in the future?', the dominant theme was an anticipation of change from face-to-face education to online delivery of content. Most students regarded sitting in lectures as boring and would prefer to have the lectures videotaped and available on a subject blog. Comments included:

We can easily watch the lecturer online and listen better by ourselves;

I think in the future the lectures will be on the Internet. Maybe they will be by very famous experts, and all university students in China could watch and listen to these lectures;

The lectures could be online and would be more interesting because teachers could have video clips and photos and hyperlinks in their lectures, *because the lectures could be well prepared with the help of IT staff.*

Already accustomed to using technologies for both communication and learning in non-formal contexts, the students expected to have wireless Internet access everywhere on campus, including in the dormitories, although they did not appear to differentiate between an intranet and the Internet. As the Chinese government tightly controls the Internet in China, and this appears to be accepted by most Chinese citizens, it is unlikely that a tightly controlled university intranet would be a deterrent to students envisaging an online education environment in the future.

They did anticipate more widespread distribution of online resources in classrooms and there were a number of comments related to a future in which all classrooms would have data projectors, computers and Internet access, and more technological support to maintain this equipment in working condition. Some of the comments related to this theme were a little wistful:

In future the IT equipment would work all the time and if it did not, the teacher could phone the person who can solve the problem and they would come immediately and fix it;

I think in the future all the computers in the computer lab would be working all of the time. Or maybe the Government would give us all laptops for free, and free wireless access. That would be my dream.

Other comments related to the need for staff development. It seemed that students were very aware of the necessity for staff development before their teachers would feel confident enough to use technologies for teaching. They clearly identified with their teachers in terms of loss of face occurring when teachers attempted to use technologies in their teaching and were embarrassed either by equipment failure or inadequate technological knowledge:

In future the university will teach our teachers how to use the technology so that they will know very well how to use it in the classroom;

I think in the future all people teaching in my university will know how to use the technology equipment very well. Then it will not be a problem to use technology in the classroom because the teachers will never be embarrassed.

Some students, however, commented that they did not think there would be much change in the way technologies were used for learning in Chinese universities:

I don't think anything will change very much in the future. The teachers like being important and respected. It is our way. In the classroom it is clear that they are the teacher, the expert. They must control our learning;

Many teachers are not confident about using technologies in the classroom and if they do not know how to use them now, they will not learn. There is no need for them to do so. They are the teachers.

Such responses demonstrated that the students were very aware of the cultural, psychological and technical constraints facing the increased use of learning with technology in Chinese universities.

The students' vision of the future of technology-enhanced learning in their institution did not consider the financial constraints in any detail, beyond the desire for free laptops and free Internet access. As these are the costs directly affecting students, it is not surprising that institutional costs were not mentioned in relation to their vision of the future of technology-enhanced learning. However, the cost of designing, developing and implementing educational programs that focus on technology-enhanced learning are considerable and many aspects of the future role of technologies in Chinese learning environments envisaged by the students have cost implications that universities may not be able to afford.

SOLUTIONS AND RECOMMENDATIONS

There is very little evidence from the data in this study that the use of technologies in these Chinese undergraduate classrooms has affected teaching and learning in ways that make the learning process more personalized, learner-centered, situated, authentic, or collaborative, so that it is a process of construction, rather than instruction (de la Pena-Bandalaria, 2007). It is generally assumed by Western researchers that these alternative teaching and learning approaches are more effective for the learner and that technologies facilitate this type of learning (Hanley, 1994; Huang, 2004; Valk et. al., 2010). In the examination-driven Chinese educational context, this may not be the case, particularly as both the students and teachers in this study expected education to be teacher-centric.

It may be possible that mLearning using mobile technologies has the potential of overcoming some of the constraints currently facing the widespread adoption of eLearning in China, particularly in terms of possibly prohibitive costs of eLearning hardware and infrastructure. The high levels of mobile phone saturation among these university students and teachers and the increasing range of applications available for mobile phones suggests that this mode of delivery has the potential of providing increased access for lifelong learning, although not perhaps within formal university classrooms.

Whether the costs and benefits of doing so make this a productive or culturally appropriate development is open to question. As Valk and his co-researchers point out, there is a lack of rigorous studies that evaluate the comparative value of technological investments in the educational sector (Valk et. al., 2010). There is also very little evidence that constructivist, student-centered learning theory is appropriate for learners in China, and such research is necessary to ensure that governments have the information required to make informed decisions about adopting educational practices and technologies developed in different cultural and educational contexts.

FUTURE RESEARCH DIRECTIONS

As most research produced within China is written in Chinese and published within China, there is relatively little research readily available to Western researchers regarding the use of technologies for learning in China. It is therefore possible – in fact, highly likely – that the use of technologies for learning in Chinese universities is more widespread than the findings from this study indicate. However, as the education system in China is highly centralized and both curricula and key student assessments are centrally controlled, variations among universities is likely to be less than in a Western context, so it is also likely that the findings from this study could be replicated in other provincial locations. Further research with a wider cross-section of university students would be useful to assess recent developments in learning with technologies in China on a national basis, which was well beyond the scope of this study.

The students in this study used technologies in non-formal learning contexts in ways very similar to those identified in nation-wide studies of Internet use in China, and it is highly likely that the use of mobile technologies for learning in non-formal contexts among undergraduate students is likely to continue. Whether this will transfer to learning in a classroom context is open to question.

CONCLUSION

As this study demonstrates, there are major constraints facing the use of technologies for learning in China. They include the cost of the hardware, software, staff training and IT support, Internet access and equipment maintenance. These pragmatic constraints could be overcome with the provision of adequate financial support, something more likely to be provided for universities funded directly by the Chinese Government than for universities funded by provincial Governments. Strong Government support for learning with technologies would also provide an incentive for Chinese universities to use technologies for learning, albeit in ways that do not undermine the central role of the teacher.

More difficult to change is the strong belief among Chinese students, teachers and the general community that teacher-centered education with a centrally designed curriculum, followed by regular examinations, is the most effective way of learning. It is therefore highly likely that the gap between the ways in which technologies are used for learning in non-formal and formal contexts in China will increase. When the next generation of students becomes university teachers, this could well change. Or perhaps not.

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KEY TERMS AND DEFINITIONS

Confucian Approaches to Learning: Based on the belief that learning is most effective if the learner acquires the knowledge passed on by an expert.

Constructivist Learning Principles: Based on the belief that learning is most effective if the learners help to construct a learning task that is relevant to the learners.

eLearning: Learning using electronic resources.

Formal Learning Contexts: Contexts where learning is structured, has prescribed goals and is usually delivered and assessed by trained teachers in educational institutions such as schools, colleges and universities.

mLearning: Learning using mobile electronic technologies.

Mobile Technologies: Electronic technologies that are easily carried, such as mobile phones, mp3 players, electronic dictionaries.

Non-Formal Learning Contexts: Contexts outside formal learning contexts where the learner determines the purpose, the desired outcomes, the duration and place of the learning.

Visual Ethnography: A data gathering method using visual images as a basis for studying specific aspects of a culture and as a means of eliciting focused discussion of the visual image.

Section 4
Europe

Chapter 8
Views of Students on Learning with Technologies in Dutch Education and Training

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ABSTRACT

The integrated use of technologies in learning in formal education and training in The Netherlands is far from realized, and there is still a long way to go to reach that goal. But what are the views of students and early career teachers about learning with technologies? This chapter focuses on Dutch research into the expectations and experiences of students and early career teachers as to their views of learning with technologies in education and training. A survey was conducted online, followed by focus group interviews among all groups studied. The most important findings of the research are being presented here. Special attention is given to the use of mobile technologies and the Internet, social networking sites and gaming, bullying, spam and plagiarism, homework and learning, technologies in schools and in learning, motivation of students and the role of teachers.

INTRODUCTION

This chapter describes findings collected from listening to and analyzing the views and hopes of students within education and training institutions in The Netherlands about learning with information and communication technologies (ICT). The main question for this research was: "What are the views of students and early career teachers about learning with technologies in Dutch education and training?" In 2008 and 2009, students in primary and secondary schools, vocational education and training institutions, teacher training students and early career teachers participated in research into their current experiences and ideas of learning

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with technologies, with the support of Kennisnet, the Dutch national agency for stimulating the use of ICT in education. Early career teachers were included in this research as they were conceptualized as being able to provide perspectives from their recent experiences as both university students and subsequently teachers. Simultaneously similar research was carried out in Australia (Moyle & Owen, 2009). A literature review of students' expectations about learning with technologies informing both sets of research, was conducted in Australia (Moyle & Owen, 2008).

The purposes of the research in The Netherlands were threefold:

- To gain a clear understanding of how students and early career teachers experience and view the use of ICT when doing homework,
- What their expectations are regarding the use of technologies in schools or training institutions; and
- To develop a good understanding of students' and young teachers' requirements regarding their use of ICT in education and training.

This chapter describes the general trends and developments that emerged from this research, focusing on several experiences emerging from the research and presents ideas worthy of further research. It also describes some causes and consequences of research findings and suggests possible solutions.

BACKGROUND

In recent years several publications have been dedicated to the views of the present generation of young people (Haan, de & Hof, van 't, 2006; Oblinger & Oblinger, 2005; Wijngaards, Fransen & Swager, 2006; Fransen, Swager & Wijngaards, 2008). These studies attribute all kinds of skills and qualities to young people, such as social skills, strategic insight and their interest in visual and kinaesthetic things. These studies also show that technologies are an integral part of students' lives: they are online much of the time; like new challenges and experiences; expect immediate answers to their questions; they dislike texts but do like visualisations, and they prefer to keep in touch with their peers online. Furthermore students are fascinated with socially important subjects (Oblinger & Oblinger, 2005). As far as learning and teaching are concerned these characteristics could mean, that amongst other things, there could be more focus on cooperative learning (peer-to-peer learning, interaction and engagement), on learning that is visual and dynamic (images, movement, and spatial relationships), and on meaningful matters (socially relevant, problem-solving contexts for learning). It therefore seemed important to compare these ideas with the ideas of young people themselves.

The tempestuous, ceaseless developments in ICT make it possible to personalise learning. Young people however, cannot all be "lumped together", and like the individuals of all previous generations, they differ one from another (which is a good thing). New technologies now allow for custom-made education and learning processes, adapted to the individual. This possibility to tailor learning to a student's individual needs and aspirations provides young people with a perfect opportunity to see that their role in education is taken seriously and that they are no longer treated as "subjects" but rather as "citizens", as described in the UK's National College for School Leadership "Leadership for personalising learning", which states:

It is not unreasonable to argue that personalising learning moves students from being subjects to citizens. As citizens they have an entitlement to be direct participants rather than have token consultation. If personalising learning is to go beyond paying lip-service to a greater focus on *the individual then students have to become active protagonists in the design and delivery of their learning (West-Burnham, n.d., p. 20).*

It is striking that researchers nearly always give their opinions about the IT skills and qualities of young people and about the possibilities that new technologies offer to tailor learning to individual student needs and aspirations, without consulting young people themselves. In The Netherlands little is known about the students' views regarding how they receive new technologies and which possibilities they see to use them for teaching and learning. Against this background this study gives a voice to the main stakeholders in Dutch education: the students.

RESEARCH METHOD

This "Students' Voices" research in the Netherlands was carried out by the Inholland eLearning Centre[1]. It was decided to gather research data using both qualitative and quantitative methods[2]. The quantitative data into the experiences of students and young people were gathered using online questionnaires, adapted to the various target groups in the study. The questionnaires were published and filled out on the Zoomerang™ [3] website. A total of over 2,000 questionnaires were filled out, divided amongst the target groups as follows:

- Primary education: 230;
- Secondary education: 465;
- Vocational education: 998;
- Teacher training students: 308;
- Early career teachers: 117.

The qualitative research through focus groups, used the Zing® system to collected data (Moyle, 2007). A Zing® session requires special hardware and software. The software used is called "ZingThing" and runs on a computer (both Windows® and Mac®, via Java®). The hardware consists of a number of wireless keyboards that form a small network and are connected to the computer with USB dongles. A beamer projects the input of the participants on a screen or wall. Each participant can pass his or her own answers to the computer, which in turn makes all contributions visible on the projected screen. This functionality enables the participants to contribute their ideas anonymously and enable them to discuss each other's answers. All input is stored electronically. Six focus group interviews were executed: two in primary education, two in secondary education and two in vocational education. Together 56 students were involved in the focus group interviews.

It was explained to the participants in advance that the term ICT should be interpreted as broadly as possible: computers, the Internet, games, social networking sites and multimedia such as cell phones, digital cameras, camcorders and interactive blackboards.

FINDINGS

This section describes findings of the online survey and the focus group interviews. Further reports can be found on the Students' Voices website[4] of the Inholland University eLearning Centre.

Findings from the Online Survey

The findings from the surveys are presented below according to the following categories of technologies:

- Cell phones
- Internet
- Social software
- Games

The survey findings are also presented concerning the following factors influencing the use ICT in educational practices:

- Learning with ICT;
- Motivation;
- Bullying, spam and plagiarism;
- Homework and learning; and
- ICT expectations.

Cell Phone

The participating students and early career teachers all indicated they use ICT extensively. The foci of their reported use being cell phones and the Internet. Almost all participants reported they have their own cell phone, except for the students in primary education, where just over half of these students indicated they have their own cell phone. Remarkably, 18% of the primary students indicated they use their phone for all kinds of things, such as taking pictures and films and sending text messages, everything except for making phone calls. It remains unclear however, whether this is the result of a lack of money for this form of communication or a conscious choice.

The most popular functions on cell phones, apart from calling, were text messaging (mainly the secondary and vocational education students); playing games (almost three quarters of primary students and over half of secondary students); and taking pictures, listening to music and making videos. In all target groups a minority of participants also reported they use their phone for e-mailing, downloading music, listening to the radio, watching TV, for navigation purposes (e.g. the Global Positioning System functionality), and storing data and files. Early career teachers and teacher-training students indicated that they mainly use their phones for text messaging, taking pictures and listening to music, besides making phone calls.

From this data it was concluded that nearly all people over twelve years of age in The Netherlands have a cell phone; that mobile technologies offer an increasing number of functions and that those functions are being used extensively by all target groups. These findings suggest there are opportunities for the use of mobile technologies in education in the near future, provided education is properly prepared and adapted for it.

Internet

The Internet was also reported as being used extensively in almost all target groups, mainly for finding information and all sorts of activities on a personal level, such as e-mailing, surfing the net, reading news, shopping, finding and reading show business news, finding information on hobbies and chatting (*instant messaging)*. Students also indicated they are very active on social networking sites, with a clear peak among the students in secondary education. The days when the Internet was mainly used as a source of information are clearly over, and interaction has become a key aspect. Teachers in training and the new teachers also indicated they are active on the Internet. Both groups indicated they use the Internet to find information, but when it comes to other activities, such as gaming, watching movies and reading books, there were clear distinctions between young, starting teachers and teachers in training. Teachers in training play more online games, use social networking sites more, work with media sites more, chat more with friends and family and download more music. Young, starting teachers, on the other hand, download more media like movies and books and use Google Earth™ more.

The findings from this data suggests that the Internet is playing an ever more important part in the lives of students, and that the possibilities the Internet has to offer for information sharing and interaction are growing. It would be a shame if these possibilities were used insufficiently in education, especially since it is becoming clear that the present generation of teachers in training, who are on the verge of entering their profession, use the Internet extensively. These findings demand a reconsideration of the possibilities for the redesign of learning practices, and it also requires that we research what conditions have to be met in education, in order to allow for optimal use of the educational possibilities of the Internet, in the future.

Social Software

Remarkably, a vast majority of all target groups indicated they are interested or even very interested in using social networking sites like Hyves®. They also indicated they are even more interested in photo and movie sites like YouTube™ and Flickr®. The most popular chat sites used were reported as MSN®, Hyves® and Windows Live™. MSN® was the most popular site for chatting, but Hyves® and Windows Live™ also scored well too. About three quarters of all students indicated they feel that sites like Hyves® and chatting are mainly intended for fun, and not for learning. But it should be noted, however, that a considerable number of secondary and vocational education and training students indicated they feel these sites are not only intended for use at home, but are equally useful in school. Regarding media sites like Flickr® and YouTube™, a clear majority of secondary and vocational education and training students thought they can learn things from these sites, and that they should therefore also be used in schools. Teachers in training and the starting teachers also saw possibilities for the use of media websites in education. As far as the use of social networking sites is concerned, opinions about whether such sites should be used in education and training varied among the various members of each of the target groups.

From this data, it is impossible to paint an unambiguous picture of the possibilities of the Internet in education from the points of view of students, and in particular of the role and use social networking sites in education. Opinions varied widely among the respective target groups. School students especially, indicated that they feel that personal online environments should not be mixed with their learning in schools. These findings could be explained from two perspectives regarding from where the locus of control of the site is located: in the personal environment the locus of control is with the owner of that environment, whereas in education, students tend to put the locus of control with the teaching institute and the teachers. As long as educators are insufficiently capable of designing education in such a way that students feel they are co-owners of their own learning process, chances remain small that personal environments will be used in learning at school. Presently there is still a clear distinction between the formal learning environment and the personal environment, and only if educators succeed in building a bridge between these two worlds when redesigning education, a successful link can be realised between the online environments that are part of those worlds.

Games

Students in primary and secondary education reported they play a lot of online games, and in the future those numbers will probably keep growing, considering the economic growth in this sector, as leaders in measuring the digital word, such as Comscore, Inc. ® regularly communicate. It cannot be denied that students spend a lot of time playing games and develop numerous different skills while doing so. Games require strategic insight, quick decision making under time pressure and being able to analyze systems. Games also require multi-tasking. One has to be able to concentrate! And it no longer holds true that it is mainly boys who play online games (Mheen, van de, Eijnden, van den, Meerkerk, & Rooij, van, 2008), for this research showed that there is an almost equally large group of girls who play games. Students indicated in this study that online gaming primarily appeals to them because of the fun and social interaction they get from it, but these students also said they learn the skills mentioned before from it. Teachers in training and starting teachers indicated that they play less online games than their younger counterparts, but it can be expected those numbers will increase when the next generation enters higher education. Teachers were divided about the learning benefits of online games, but they did think that games may make learning more appealing.

To find out what sorts of games are most popular amongst the various target groups, a number of genres of games were distinguished in the surveys: action, sports, racing, role playing, strategy and flight simulation games. Participants could also name any other type of games they played. Action games appealed to the vast majority of students in primary and secondary education, and to just under half the students in vocational education. Sports and racing games were mainly popular with students in primary education, and were considerably less so for students in secondary education and for the vocational education and training students. Role playing games, on the other hand, were appreciated more amongst students in secondary education than any other group of participants. In relation to strategy games such as Age of Empires™, there was little reported difference between the target groups. Flight simulation games were clearly one of the less popular genres, but appealed most to students in primary education.

When respondents were asked if they are interested in other types of games, besides the ones already mentioned, or in specific games, a deluge of game titles resulted. Some of the commonly reported titles were Call of Duty™, World of Warcraft™, The Sims™, Need for Speed™ and Ages of Empires™.

When asked "What do you learn from online gaming?" students in secondary education gave the following answers: "hand-eye coordination" (56%), "learning to make decisions" (40%), "learning to concentrate" (35%), "learning to cooperate" (43%), "learning to solve problems" (32%) and "learning to deal with other people" (34%). The participants also indicated they firmly believe that schools should make more use of games in education. The students in secondary education especially thought this to be so, indicating that games make learning more fun for students. There was, however, some criticism that games can distract from the learning processes.

The data concerning online gaming suggest that opinions regarding the possible value of online games in education still vary. Many of the new teachers considered the simple assumption that "learning becomes more appealing with the help of games" was an insufficient reason to use games in education. Furthermore, many students feel that "fun" and "learning" should not be mixed. It became apparent in this study that games are currently mainly used for drill & practice applications, particularly in primary education, where it is a simple way to offer some fun learning to students, while at the same time the demand for personalisation can be met. Other types of games however, could have some added value in education, but apparently teachers lack knowledge about the existence of such games, as well as insight and experience regarding the way those games could be integrated into pedagogical designs. There might be ample room for improvement in this respect.

Learning with ICT

This research showed once again that traditional "frontal" (chalk ´n talk) lecturing is still the main form of education at all levels in The Netherlands, but particularly in secondary education. This didactic way of designing learning practices, with the accompanying division of roles between the teacher and learner, does not combine well with the many new possibilities ICT has to offer for the design of learning activities, nor the emerging ways technologies can be used to support learning processes. These findings became apparent from the results of this part of the research, as the majority of the participating students indicated they use ICT mainly at home, for self-study, doing assignments and homework.

On the other hand, students did indicate they "work with computers quite often": with 49% of primary students; 40% of secondary students; and 48% of vocational education and training students, reporting this to be the case. In secondary education, however, over a third of the students indicated they never use a computer in the classroom; only in special computer rooms. In primary education though, the reverse is true. The research suggests that as the students grow older, they use the Internet more often when in school, especially in the computer rooms of secondary schools with 71% of the school students indicating they use the computers at school every day or once or twice a week and 74% of the vocational education and training student using computers at their training institute every day or once or twice a week. In primary schools, the Internet was reported to be used in the classroom by 39% (every day or once or twice a week) of the respondents and in a computer room by 16% (every day or once or twice a week) of the respondents. Over half the teachers in training indicated that they consider there is sufficient time to work with computers and the Internet while in school, and that the Internet connection available to them was fast enough. From this it would appear that the present infrastructure is not a bottleneck limiting the use of ICT in learning practices in schools. There was, however, some concern about the ICT-skills of teachers, especially amongst the students, and this concern would appear to be a far more important reason why ICT is still playing a comparatively minor role in the pedagogical design of learning practices.

It would seem from this data that there is still a long way to go before an integrated use of ICT in learning practices in 'regular' education in The Netherlands will be realised. This integration might be sped up by enhancing the ICT-skills of teachers and the arrival of young teachers with good ICT-skills. But the experiences of teachers in training during their teaching practice indicates chances remain that those new skills will remain unused, as many schools are not yet equipped for utilizing them. This lack of use of skills developed while at university can lead to regression to the tradition of "frontal" lecturing; apparently still the prevailing practice in current education.

Motivation

About half the school students indicated that learning usually or always becomes more fun when ICT is involved, but that far too little time and space was allocated to ICT at school. Things are different for vocational education and training students where it was reported there is more than enough time to use ICT, but that ICT was still insufficiently integrated into the pedagogical approaches used. Furthermore the teachers in training indicated that in their experience, children in their practicum schools appreciated the use of ICT, but that their good intentions often floundered due to the lack of time and technical support necessary to make the use of ICT successful within these schools. The trainee teachers also noted that most of their mentors had insufficient ICT-skills, and as such, they did not expect much support from them as far as a vision on the use of ICT with learning was concerned. As such, there was little external motivation provided to the trainee teachers in this study, to include ICT into their teaching and learning. Rather, where the trainee teachers included ICT when on teaching practice, the motivation to do so was internally generated.

The problem of the manners of use of ICT in education and training, for the greater part, can be explained from the conditions that presently still apply within formal education. These conditions may be summarised as a lack of vision and knowledge among teachers and educational leaders about the added value of the use of ICT in learning processes. In addition there is a lack of ICT-skills among most teachers currently working in school education, and there is a pedagogical tradition throughout all levels of education based mainly on frontal lecturing. Young, starting teachers with the ambition to use ICT optimally in their learning practices must be very sure of themselves under those conditions, and to maintain their motivation to do so.

Bullying, Spam and Plagiarism

The findings concerning cyber bullying cannot be ignored. In primary education 11% (sometimes), 2% (usually) and 4% (always) experienced cyber bullying. For secondary education students 20%, 3% and 5% respectively, experienced cyber bullying. Of the vocational education and training students 5% (sometimes), 2% (usually) and 1% (always) reported they were bullied. On the other side of the coin, although cyber bullying is still a matter of concern, it should also be noted that the majority of students indicated they feel safe when they are online in school. The students also reported they are generally satisfied with the software provided in their school as it usually works fine. These students however, did indicate that they are often not allowed to use the Internet in school for finding information, mainly because teachers were concerned about plagiarism, and the fact that it is hard to check the authenticity of the information found.

Given these findings, there appears to be ample room for improvement when it comes to "making arrangements for the use of ICT in schools" particularly in teaching students how to stay safe on the Internet. The research also shows however, that the knowledge and skills of teachers concerning the use of the Internet with learning and how to fight plagiarism require improvement. More attention is also required by teachers and students about learning how to deal with the problematic issues the Internet and the information found there raise. These findings also justify asking the question about whether teachers are capable of achieving ICT skills on their own, especially given the fact that students think the teachers' ICT-skills are insufficient.

Homework and Learning

The survey findings indicate that the students in this study use ICT predominantly for doing their homework and completing assignments, with a majority of them convinced that ICT offers added value for those purposes. They reported that they use the computer more at home than in school, and that students are ahead of their teachers in this respect. The students acknowledged that under such circumstances it is hard for these teachers to help their students in school and to instruct and support them.

Students indicated they use the communication possibilities of the Internet to work on assignments and homework together, but also to make presentations and other products they have to prepare. It might be concluded that students use the communication possibilities of the Internet far better than their teachers. The main advantages of using ICT in teaching and learning that were seen by the participants were to support instruction and personalize the learning processes, with an emphasis on offering learning content, rather than supervising the learning processes.

A considerable number of the early career teachers indicated they support their students online outside regular classes, and that the same goes for classmates, fellow students, friends and acquaintances. The question remains whether it is just individual teachers putting their own ideas into practice, or if this is the result of a pedagogical vision of the school. It appears doubtful that it is the latter, but this remains to be proven by further research.

ICT Expectations

In general students state that they are quite concerned about the restricted ICT-skills of teachers, and this might be the main reason why ICT is still only used moderately within the learning processes in school. A majority of the respondents in this study indicated that a lot has to be done when it comes to including the use of ICT in learning processes, and that too little is actually being done.

Furthermore, it should be noted that the respondents were generally satisfied with the hardware and software available in their respective educational setting, but at the same time there was only very little mention of the pedagogical vision on the use of ICT in learning processes. A majority of the participants in this study indicated that computers and the Internet should be widely available including in the library, computer rooms and other study locations. Half of the respondents indicated that they would like to be able to use active boards in the classroom. Almost all the participants agreed that they should have access from home to their school, institute or university's digital learning environment, but that in practice this was not yet the case.

As previously concluded, this data suggests, there are good reasons to integrate ICT into learning processes in formal education, but these practices are still far from being realised. Limiting factors identified included the generally traditional pedagogical design of learning practices, the lack of knowledge by teachers concerning the pedagogical implementation of ICT and a lack of skills and expertise by teachers to realise that pedagogical implementation.

Findings from the Focus Groups

The data collected with the online questionnaires were complemented by answers, examples and suggestions, collected from participants through focus groups. In these groups the Zing system was used. The number of participants per Zing®session varied from six up to ten. The aim of each group was to have two focus group sessions per target group of participants. From January to April 2009 a total of eight focus group sessions with Zing®systems were carried out, divided equally amongst the four target groups: primary and secondary education students; vocational education and training students; and trainee teachers.

All participants were very positive about their experience with the Zing®system. Common responses to its use were that it is innovative, "not boring" and therefore fun to do. The participants found it interesting to see the opinions of the other participants projected onto the screen, during the session. The school students saw it as a sort of synchronous chat: a traditional method with a modern tool. All participants would recommend Zing for further use. The results from the various focus groups confirmed the data and the general picture that was gathered from an analysis of the survey data. The focus group discussions contained examples of practices and ideas favoured by the participants. The results of the most important topics discussed are presented below.

The participants in the focus groups were asked to "describe one of the most interesting examples of ICT use you have ever come across". All sorts of answers were given: "iPhone®*"* (secondary student 2), "controlling technology with your mind, waterslide simulation, laptops in the classroom, EEE PC (a type of netbook), downloading music, wireless internet on your mobile, physics simulations*"* (secondary student 4), "Wii®, Nintendo® DS, iPod®, robot soccer, a tank for your car that makes dirty air clean again, editing photos and movies" (primary student), "how they create a 3D world on TMF, cell phone in your watch, ordering a meal with a touch screen, calling via satellite" (vocational education and training student) and "smartboard, simulations in science class, games" (trainee teacher).

When asked what forms of ICT they use at home for their study, various tools and software were mentioned, such as: school mail, cell phone, Internet, Blackboard®, Google®, iPhone®, telephone, YouTube™ and Wikipedia®. A secondary student mentioned an MP3 player "for recording sounds and listening to audio books". Others mentioned special "quiz programmes on the Internet" and a "site with simulations for biology". Remarkably, social networking sites like Hyves® and Facebook®

were not mentioned at all. Most participants hardly get beyond finding information on the Internet.

When asked whether technology can help people with learning, all participants agreed that technology can play a positive role in learning. “It makes learning more interesting” and “that motivates you”. The things that were of benefit that were mentioned regularly were “practicing on a computer” and “finding information”. Other examples of learning with technologies mentioned, included the following statements from one of the secondary students:

It is easier to concentrate while learning vocabulary when you use an MP3 player or computer…. By speaking English with others, over the computer, you can improve your English. ... On the Internet you can find information faster than in books. ... With simulations it helps you to visualise things.

A primary student indicated that she enjoyed drill and practice software: “BrainTraining™ is fun”.

But ICT is not always considered the best tool for learning. Sometimes it is, but sometimes it is not. Some participants indicated that using technologies in school can also be distraction, as the following statement from one of the secondary students indicates: “Because it’s much more fun than learning, you often end up doing something else…”

When asked how they prefer to study, in general, many students indicated that they like to listen to music when they are studying. Students from primary education also mentioned that they like to collaborate with others. The various answers from the students show that they use a range of learning styles: using computers, reading online, working at home with a webcam, consulting others and finding information. Some of the secondary students also showed a clear diversity in opinions: “summarising, reading, quizzing and cramming” work best for some, but others prefer to do assignments and would “rather not cram, but just learn by trying things and watching what happens when you push a button”.

Then the participants in each of the focus groups were also asked in what ways their educational institution expects them to use ICT. In primary education almost all students answered: “using Word for essays or projects, PowerPoint® for presentations, and the Internet for finding information and pictures”. But other primary students said: “RekenWeb.nl (an arithmetic site) and School TV, putting things on the active board, using the calculator on the computer”. Furthermore, the dictionary is used for Dutch classes, Ambrasoft® software for arithmetic and Dutch and a CD-ROM for English. The secondary students mentioned working online on their schools’ digital learning environments. These students also use their schools’ intranets to fill out their timetables and find their scores for tests there. The secondary students also indicated that in Art and Culture classes digital cameras are used. In laptop classes the secondary students indicated they find information for projects on the Internet, do assignments and study for tests. Students from vocational education and training mentioned using the institute’s intranet and email, the Internet, beamer and laptops. But these students, also indicated that their institutes did not, or did not sufficiently, prepare them for the use of ICT in their future professions: “We only learn some basic skills in our first year, like working with Excel, but apart from that we don’t really do anything new with computers.” In addition to the educational uses of technologies mentioned above, the trainee teachers indicated they use ICT for their studies in many different ways including working with digital video and an electronic portfolio.

Asked “how would you, ideally, use ICT for your school work?” many of the participants answered that “all students should get their own laptop”. Other suggestions for the educational use of technologies included, *"an entire afternoon for educational games, a built-in DS in your desk, so you can do Brain-Training™ when you've finished your work" (primary student);*

"iPhones® for everybody" (secondary student);

"a chip in your head, food that provides knowledge, educational games, and being able to learn everything online" (secondary student).

The ideas of the teachers in training stayed a bit closer to their daily practice suggesting the "handing in assignments online, using PowerPoint®, [using] your own blog, magnifying experiments on a screen, movies on active board".

The teacher's role in using ICT was also discussed. The students from primary education felt that their "teachers know far less than we do" and thought they could manage fine without the teacher's help. They also indicated that they would help their teacher to use the electronic whiteboard. According to the students from secondary education in their schools, the situation with regard to the help of teachers was just as bad. But there are exceptions: one teacher who knows everything about Excel®, and teachers who "refer to great sites with lots of useful information, that can help when studying or doing assignments". Conversely, teachers are often helped by students, especially when they need to connect hardware (computer, TV, sound system and DVD-player). And students inform their teachers of "useful facts and sites" too.

When asked about "the use of games or simulations in learning" most students in primary education were positive about the use of computer games. They mentioned for example, "BrainTraining™" on the "Nintento® DS", and games to learn typing, arithmetic and topography. One student mentioned "The Sims®, if you want to be an architect", or "Emergency 3®, if you wanted to be a firefighter". Another student mentioned the benefits of simulations: "Sometimes games 'happen' in the real world, and then you will know what to do". Some students thought that educational games could make classes more interesting. Others felt that games belonged to their spare time. Simulations, however, were considered useful and should be used more often. The students indicated that they thought they should, involve "real events". A student explained that "practical skills can also be simulated easily. So that you can experience things beforehand, as it were." Most teachers in training agreed with this view. Simulations and virtual worlds, like Second Life, "allow students to be fully immersed in what they are doing, both at home and in class…".

The question, "what about the use of "Hyves®" for schoolwork?" however, resulted in clear hesitation amongst the students, particularly amongst the older ones, almost all of whom indicated that they have their own profile on "Hyves®", and are excited about the site. Generally, the students indicated that they find it a pleasant activity to fill out their profile, react to others and exchange photos. But they indicated that it is also a world in which they can try out things and play: "I have several avatars on the web. One of those I use to present myself as I really am, and the others (in games or chats) are somewhat more anonymous…". Another student concurred, stating: "I've got "Hyves®", with a called "Buddypoke®", which is a sort of virtual me that I can dress up and change to look like me…" Some students like the idea of having a Hyves® profile of their class, but the majority do not think they would like to use such a social networking site in the classroom. "Hyves® should be used for your private life, and not for communication between the school and its students…"

The trainee teachers were asked what the ICT situation in their practice schools was like. The picture painted by their reactions was largely negative. These students indicated that while on practicum they used little ICT, although sometimes educational games, language and arithmetic software and interactive whiteboards were reported as being used. Most of the trainee teachers complained of malfunctions and faulty hardware in their practice schools. On a positive side, only a couple of these students mentioned cyber bullying. It seems then, that the use of ICT with learning *is* promoted by their teacher training schools, but hardly by the practice schools themselves. It seems the main reason for this lack of training in how to include technologies in teaching and learning was that the teachers in those schools did not use technologies themselves. Even though the students would love to make more use of ICT.

Finally, the students were clear about their expectations concerning how ICT should be used with learning, and offered recommendations to their own schools and schools in general: “Make lessons more varied, more fun and more challenging. Communicate and organise more clearly (theme books, assignments, et cetera). Provide more computer rooms, more computers, provide faster computers and faster networks!”

SOME ISSUES FOR DISCUSSION

In general the outcomes from this research suggest there is still a long way to go before an integrated use of ICT in learning practices in formal education will be realized. This integration might be sped up by enhancing the ICT-skills of teachers and the arrival of young teachers with good ICT-skills. But the experiences of teachers in training during their teaching practice indicated that the chances remain that those new skills will still be unused, as many schools are not yet ready to bring them into action. This will lead to regression to the tradition of “frontal lecturing”, and apparently this is still the prevailing practice in current education in The Netherlands. The only way out seems to be the formulation and the implementation of policy documents at institutional levels that tackle the lack of knowledge concerning the pedagogical implementation of ICT and the lack of skills and expertise to actually fully profit from the technologies.

The survey findings indicate that almost all students over twelve years of age in The Netherlands have a cell phone. Mobile technologies offer an increasing number of functions and those functions are actually being used extensively. In response to the popularity of cell phones all over the world, companies are fueling smarter, more innovative approaches to education. One of the advantages of using cell phones to communicate information is that the students could spend less time in the classroom and more time actively building their educational skills. Students can read and email documents, do research on the Internet and manage their school assignments from their cell phones. Teachers can send podcasts and hyperlinks within a document to encourage students to read further on topics that might interest them. But schools and teachers have to be ready and willing to set out a policy with regard to the use of cell phones inside schools and for educational purposes. For most of the educational institutions it will be quite a step, from an official ban to a well-regulated use.

FUTURE RESEARCH DIRECTIONS

The research findings trigger off future research possibilities. How can we organise the redesign of education in such a way that students feel they are co-owners of their own learning process? Presently there is still a clear distinction between the formal learning environment, controlled by the educational institute and the teachers, and the personal environment, controlled by the owner of that environment. How can we be successful in building bridges between these two worlds?

The findings of this survey make clear that also the Internet is playing an ever more important part in the lives of students of all ages, and that the possibilities the Internet has to offer for information sharing and interaction are growing. This research suggests that the present generation of teachers in training in The Netherlands, who are on the verge of entering their profession, use the possibilities the Internet has to offer extensively. Educational institutions will have to reconsider the possibilities these skills and competences of new teachers offer for the redesign of learning practices. At the same time research is required into what conditions have to be met in education, in order to allow for optimal use of technologies in the future.

The growth in all Web 2.0 applications, seen as a privileged development, yet a perception of effective implementation within formal learning processes is still in an initial stage. Especially for students, but up to a certain extent also for novice teachers, this initial stage gives reason for concern in correlating between formal learning environments and their own personal learning environment in emerging ICT. Essential in this environment is self esteem and being in control in the new technologies and yet these aspects enhance the necessity for innovative learning practices in which the control is shared in such a way that students on the one hand, and the educational institute on the other hand have joined responsibility for contents and processes in order to develop intrinsic and fundamental connections between formal and informal learning environments.

The Inholland University Centre for eLearning has suggested to set up and carry out new research in this area, with as main research question: “Which characteristics in successful learning practices implementing the Web 2.0 technologies may serve as a role module for redesigning learning environments in similar contexts?” This sequel to the first stage of Student Voices is expected to lead to a centre of knowledge that can be implemented in a productive way in education. It is anticipated that the description of successful practices will provide insights into the aspects of learning practices that contribute to successful results. Other than motivation and ownership of all parties involved; characteristics of the context, contents of the learning practices, teaching strategies, choices with respect to media and communication, features of target groups and other parties involved, available learning environments and supplementary conditions which may have been part of creating a successful environment will be taken into consideration.

Such future research could show which factors may be considered context specific and hence are not expected to appear in other types of educational factors. Subsequently, the factors which transcend or may be transformed into conditions applicable to multiple situations can be identified. The aforementioned conditions, including any aspect which may be specific for a given learning practice, could be described, after which its essence could be recorded in a brief video footage. Video coverage enhances the transferability of information as it may serve as inspiration for others in education. Furthermore, it offers the possibility to question the professional field in education in a wider range, based upon selected footage, in innovative ways on recognition, acknowledgement and appreciation of the visualized learning practices.

A considerable number of teachers support their students online outside regular classes, and the same goes for classmates, fellow students, friends and acquaintances. The question remains whether it is just individual teachers putting their own ideas into practice, or if this is the result of a pedagogical vision of the school. Further research is necessary here.

CONCLUSION

We may conclude that there are reasons to suppose that the integrated use of ICT in learning in formal education is far from realized, and that there is still a long way to go to reach that goal. Impeding factors are the generally traditional educational teaching practices, lack of knowledge about the educational use of ICT, and lack of skills and expertise to implement the adequate use of ICT in education.

Opinions regarding the possible value of games in learning and teaching still vary across the various groups of participants. Many early career teachers considered the simple assumption that learning becomes more appealing with the help of games, an insufficient reason to use games in education. But we know that games provide an environment in which learning takes place as a result of tasks following from the content of the games, that knowledge is developed through the content of the game, and that skills are developed as a result of playing the game. Real obstacles to use games in education seem to be the lack of knowledge about the existence of an increasing variety of games, the absence of recognition of the educational value of games and subsequently of opportunities to support skill development in this area at school level and to make use of games within the school curriculum.

On the basis of the varying outcomes of this project regarding the use of social networking sites, it is not possible to paint an unambiguous picture of the possibilities of using specific social networking sites in education. Quite a few students felt that these personal environments should not be mixed with their learning in school. Their views had to do with the locus of control, as the personal environment is controlled by the owner of that environment, whereas in education, students tend to put the locus of control with the teaching institute and the teachers. As long as we are insufficiently capable of designing education in such a way that students feel they are co-owners of their own learning process, chances remain slim that personal environments will be used in formal learning. Presently there is still a clear distinction between the formal learning environment and the personal environment, and only if we succeed in building a bridge between these two worlds when redesigning educational learning practices, a successful link can be realised between the digital environments that are part of both these worlds.

We finish by repeating a conclusion from the focus group interviews. The students are clear about their expectations concerning how ICT should be used with learning, and offer recommendations to their own schools and schools in general: "Make lessons more varied, more fun and more challenging. Communicate and organize more clearly (theme books, assignments, et cetera). Provide more computer rooms and more computers, provide faster computers and faster networks!" (Wijngaards et. al, 2009, p. 11).

Many questions have been answered, many more will have to be asked. We hope that also in the future the Students' Voices will be heard.

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KEY TERMS AND DEFINITIONS

Computer Game: A game played on a personal computer, rather than on a video game console or arcade machine.

Computer Simulation: Representation of a real-life situation in a computer program.

Cooperative Learning: A teaching strategy in which small groups of learners use a variety of learning activities to improve their understanding of a subject. Learners must work together to go through both an academic and a social experience to complete as a group the assignment.

Formal Learning/Education: learning in an educational institute or training centre. It has a specific structure with objectives, a timeframe and support. This type of learning offers diplomas and certificates.

Game: A structured activity, usually undertaken for enjoyment and sometimes used as an educational tool.

ICT Skills: The essential knowledge and skills that one needs to be an active learner in a technology intensive environment.

Informal Learning: A non-structured form of learning that occurs from daily activities at home, work and/or school, and through daily interactions with friends, family, colleagues.

(Inter)Active (White)Board (Smart Board): A large interactive display that connects to a computer and projector. A projector projects the computer's desktop onto the board's surface where users control the computer using a pen, finger or other device. The board is typically mounted to a wall or floor stand.

Personalized Learning: Learning tailored to a student's individual needs and aspirations.

Teaching Institute: Administrative unit dedicated to and designed to impart skills and knowledge to students.

Virtual World: A computer-based simulated environment intended for its users to inhabit and interact via avatars.

ENDNOTES

[1] See http://www.inholland.nl/elearning.

[2] Although not reported in this chapter, data was collected in Australia and The Netherlands in a similar manner, in order to facilitate comparisons between the Australian and the Dutch situation.

[3] See http://www.zoomerang.com

[4] See http://studentsvoices.org

Chapter 9
Perceptions of Marginalized Youth on Learning through Technologies

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ABSTRACT

This chapter examines students' views of learning with technologies through four related case studies that utilized online learning with marginalized young people. The studies were carried out in the UK, Austria, Ireland, Sweden and the USA with young people aged 14-21 who had dropped out of formal education. Ethnographic research was used but quantitative data was also gathered to contextualize the qualitative approach. The views and opinions of these young people were used to aid the development of online learning platforms and their content for use both with static computers and mobile devices. The results suggested that the young people embrace new technologies in such a way that they evidence deep thinking and deep learning. However, use of technologies in this way is not possible on a large scale within the existing school system. Further research should examine how the school system can better embrace the way that young people use Information and Communication Technologies (ICT) tools into their learning.

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INTRODUCTION

This Chapter looks at views and perceptions of learning with technologies amongst the most marginalized of young people in the 14-21 age range in four European countries and the USA. It does not concern itself with those who succeed in the existing school system in these countries, but rather takes note of the opinions of those whom the education system appears to have failed. By listening to the opinions of those young people who are disengaged from learning, recognizing how they use technologies and implementing their views, it is conceivable that disaffection from formal education could be reduced.

One of the difficulties faced is the perception of learning by both adults and young people where technologies are concerned differs widely. Fisher, Harrison, Haw, Lewin, Lunzer, Mavers, McFlarlane, Scrimshaw and Somehk (2002) found that children used computers and the Internet more extensively at home than in the school environment where they experienced restricted access and filtering. The children did not always perceive their use of the Internet at home for research as learning even when used to do homework. Buckingham (2005) viewed the use of the Internet outside school as likely to involve a wide range of activities including chat, text messaging, online gaming, shopping, downloading music and film and researching data about hobbies and interests. In his opinion, "[w]hat they are doing to a significant degree is engaging in the purposeful pursuit of education" (p. 10). Nevertheless there is a climate in UK schools that bans access to social networking sites and Web 2.0 tools used by young people, ostensibly because of the risk of cyber bullying (Kernaghan, 2009). However, research indicates that young people extensively use these tools outside schools (Rudd & Walker, 2010). Thus a divide is created in the use and perception of learning with technologies both inside and outside school by both teachers and learners.

This Chapter considers research from four different projects that involved the development of online learning for marginalized young people; Notschool.net, ComeIn, In2ition and the Way Program pilot. In all cases, the views of the learners were instrumental in the design and ongoing development of the virtual learning communities. The use of new technologies, social networking, online communities and Web 2.0 tools have been integral parts of these successful online systems, reflecting how young people learn with new technologies and how they think they should be designed.

BACKGROUND

It could be argued that the concept of "Learner Voice" is already prevalent in schools (Hargreaves, 2004) with students taking part in Governors' meetings, teacher recruitment and controversially, observing teachers and giving them feedback about lessons, potentially influencing how technology is used. What is not clear from research is where the line is drawn between student voice being genuinely influential or tokenism. Nevertheless, this level of participation by learners in school organisations excludes by definition the views of those who are disengaged and do not attend. Although "disengagement from education by young people is of both political and economic concern as low educational attainment and absence from school or formal education is associated with unemployment, increased crime and poverty" (Johnson, Dyer & Lockyer, 2010a, p.1), the voice of marginalized youth is rarely heard in this context. Not only are they potentially a valuable asset to the economy, yet to be exploited, but also on the brink of becoming influential voters in the electoral system. Education continues to be at the heart of the political agenda, but the group most at risk of dropping out of formal education have little say in Government Policy.

The concept of personalization and personalized learning has also been the focus of educational rhetoric (Ruddock, Brown & Hendy, 2006) implying that the young person has some influence in their learning, but this frequently appears to have little to do with students' views. For the most part, the transformation from policy to practice sees a system of personalization developed around what professionals believe young people want or require rather than what they themselves believe is important, yet young people are often prolific users of ICT. Young people, described by Prensky (2004) as "digital natives", have adopted new technologies with remarkable alacrity. The development of the iPod mp3 player in 2004 was revolutionary in many ways. Not only was it an item which became an essential piece of equipment for a great number of young people in the UK, it contributed to the blurring between informal and formal learning, since it could be used to store data received by using the Internet to broadcast radio plays, language lessons, news and other information.

The Organisation for Economic and Co-operative Development (OECD) (2007) suggested that many schools in OECD countries were not encouraging deep learning which could be achieved through appropriate use of ICT. According to Taylor, Sharples, O'Malley, Vavoula and Waycott (2006), many schools did not recognize the ICT related skills frequently demonstrated by young people, as legitimate learning. This deficiency in the effective use of ICT may be further exacerbated now that the existing UK Government no longer appears to have a clear policy on the use of ICT in schools. Fisher et al. (2002) painted a picture of young people who felt their learning restricted by the ICT related pedagogical practices in schools. Indeed, Buckingham (2005) suggested that schools could even be responsible for widening the digital divide. If children spent 85% of their time outside school, what they learnt there is critical (Leadbetter, 2006) and much of that learning, particularly informal, involves new technologies.

As the numbers of young people who are classified as NEET (Not in Education, Employment or Training) is increasing in many countries (Eurostat, 2010), changes in the European and USA labor markets, influenced by the growth of technology, economic migration and a recession in many countries mean that there is less unskilled work available, whilst the number of jobs requiring ICT skills is increasing (Mansell, 2010). The Learning Skills Foundation (2009) commented that "...while the world and technology in particular have developed at a bewildering pace over the past thirty years, our education system, curriculum, methods of assessment and response to pupils' needs have not" (p. 1).

Although at-risk youth are less likely to have Internet access at home (Hashe & Cullen, 2009; Dekelver & Van de Bosch, 2009), widespread access to broadband in public spaces in some countries provides new opportunities to develop innovative pedagogical approaches to engage the hard to reach. Research suggested (Johnson, Dyer, Chapman, Hebenton & Lockyer, 2009a) that typically these young people were frequent users of social networking sites and visitors to video sharing sites such as YouTube. Recent studies in the UK indicated that 54% of all Internet users visited Facebook for an average of 6 hours per month and 47% visited YouTube for almost one hour per month although some evidence suggests that those on the margins of society use social networking and video sharing sites less than average (Hashe & Cullen, 2009; Davies & Cranston, 2008).

The development of Web 2.0 tools has meant that the way in which young people share, create, obtain and organize information has changed, providing further opportunities for informal learning (Jokisalo & Riu, 2010). While video sharing and social networking sites are banned in many European and US schools (Thomas, 2010) it could be argued that young people use such sites to develop friendship communities which might potentially replace the social aspects of their physical attendance at school (Beale, 2004). Social networking sites have been transformative in that they change the way individuals relate to each other, potentially building a sense of collaboration, confidence, self esteem and other soft skills. Use of these sites can involve not only significant ICT skill development but also a progressive understanding of Internet security (Emery, 2010). Nevertheless, the use of social networking sites is not usually recognized as learning. Looking at the rapid development of e-learning, (Williams & Goldberg, 2005) the concepts of formal and informal learning and the resultant emerging pedagogies ought to be revisited alongside the concept of school and the real purpose off 21st century education systems. In doing this, the views of young people and their perceptions of how they use technologies must be at the core of the decision making process.

Learner Voice potentially has profound implications for the way ICT is managed in schools and the pedagogical approaches used in the traditional classroom. Listening to the views of young people about their experiences of learning with technologies potentially equips teachers and learning providers with an understanding of the interests, concerns and demands of the young people. This information can support the development of educational systems (Rudd, Colligan & Naik, 2006; Seitz, 2007) and can be translated to help reform teaching methods, educational decision-making, policy, research and educational evaluation. In fact, Hargreaves, Baron-Cohen, Hopkins and Wolf (2009) suggested that education would shift towards a convergence of both student voice and student leadership. They considered that deep learning occurs where the learning conditions are transformed through student voice, which could then help to develop autonomous and articulate learners with varieties of skills. It should be recognized that there is some resistance to student voice: the National Association of Schoolmasters Union of Women Teachers (2008) stated that in England, student voice is extending beyond the classroom empowering students in a manner that de-professionalizes and disempowers teachers.

Higgins, Sebba, Robinson and Mackrill (2008) suggested that a greater choice of learning opportunities and variety requires an effective "student voice" and an appropriate delivery model suitable to the students. Their suggestion is consistent with a constructivist approach (Vygotsky, 1934) although Gulati (2004) summarized the difficulties arising from new pedagogies and online learning by challenging online collaboration as constructivist. Constructivism is an active process of knowledge construction where facilitators act as aids to develop learner's understanding of their experiences (Lefoe, 1998). The learner constructs knowledge through their personal experiences rather than instructional teaching (Bruner, 1960). Student voice can aid the facilitation process within a constructivist learning environment (Lander and Reid, 2008) through peer mentoring systems and the generation of user defined content. Johnson and Dyer (2005b) stated that new pedagogies should reflect the collaborative, reflective and iterative nature of the digital age. Mason (2005) shared this opinion stating that a social constructivist approach to teaching online could be employed to encourage participation. Interaction becomes meaningful when the learner can interpret significance from experience. Strommen and Lincoln (1990) saw constructivism as central to the future of education in an increasingly technological world. The challenge for teachers is providing meaningful facilitation to students through their distinctive perspectives and actions (Aggabao, 2010).

Student voice can aid the facilitation process within a constructivist learning environment (Lander & Reid, 2008) both through peer mentoring systems and the generation of user defined content. The perspective taken by Gulati (2004) was that more focus has to be placed on informal learning in online environments to embed a truly constructivist approach and that there has to be recognition that some individuals learn informally and even silently. The use of ICT as a pedagogical approach thus blurs the boundaries between formal and informal learning in the broadest sense. Salmon (2005) developed a five-stage framework of learning online, which offered a paradigm incorporating the community learning process into contemporary theory and practice. The notions of personalization and student voice are implicit in that framework.

It is useful to consider the kind of Internet based activity undertaken by young people outside a formal learning environment. Internet activity by teenagers aged between 12 and 17 was mapped in research by Lenhart, Kahne, Middaugh, Macgill, Evans and Vitak (2007). Although this research was not specifically targeted at marginalized or disaffected teenagers, it nevertheless gives strong indicators about how an online environment might engage young people through both Web 2.0 tools and content, finding that teen users of social networking sites were more likely to create a variety of different content. About 73% posted their own pictures, whilst 53% shared artwork and 42% maintained a web page with a similar percentage blogging or sharing web pages. These participative activities suggested that a sense of purpose, a sense of audience and the ability to collaborate, were important ingredients in online environments aimed at teenagers. These three ingredients represent the relationship that the young people have with online communities and their understanding of how technology facilitates their relationship.

Some of the difficulties related to the use of ICT as a pedagogical tool arise because they represent a powerful tool for learning, often unrecognized and undervalued. This is possibly because of the degree to which technologies are integral to our daily lives. Whilst education policy has focused on what it has determined children should be taught, it has paid scant attention to learning in its variety of forms. Meanwhile young people have embraced new technologies changing the way that they learn by using a range of ICT tools for innovation and creativity. Much of this learning through and about technologies has taken place by young people at home because many schools do not recognize the value of these new ICT tools. Here, young people can learn at their own pace in a comfortable environment and a time of their choosing. Activities that are fun and enjoyable such as the use of computer games are often considered to be leisure and not learning by both educationalists and the learners (de Freitas, 2007). Although many young people who are excluded from conventional education have low textual literacy they often exhibit creativity in an ICT led community of practice in a variety of ways unrecognized by our traditional education systems at present (Lockyer, Johnson & Dyer, 2009).

METHODOLOGY

All the case studies cited below were developed from projects initiated by the same core research team. Inevitably the use of the same team has advantages and disadvantages. On the one hand bias could occur but on the other hand, detailed understanding of this marginalized group of young people is possible through working closely with a wide range of disaffected youth over a long period of time. Data can be gathered longitudinally from young people and unlike some shorter-term research, the opinions that young people expressed with regard to learning and technology can be acted upon. Commonalities across the projects centered upon the young people's marginalization from society and conventional learning. Recruitment of marginalized young people was often difficult; not only because their marginalized status determines that they are inaccessible, but also because there is little agreement on the definition of marginalization.

An inductive paradigm, which is open and exploratory in its early stages was used for the research in each of these studies. Thus these studies principally used Qualitative research which is increasingly used in education (Genzuk, 2009).

Ethnography is a qualitative approach and was adopted because of the way that researchers were able to work closely with the young people. "[Ethnography]…relies heavily on up-close, personal experience and possible participation, not just observation" (Genzuk, 2003, p. 1). Ethnographic action research is a branch of ethnography (Slater, Tacchi & Hearn, 2003) which has been successfully applied in educational contexts with new technologies and was the principal method in all the projects cited.

Some data collection tools had to be adapted for use with this particular group of young people who often had literacy and numeracy skills which were less developed than their peers (Johnson, Dyer, Chapman & Lockyer, 2009b). Qualitative data was collected using a range of tools such as text messages, emails, contributions to online communities and from researcher diaries, observation, interviews and in some cases, focus group sessions. The main purpose of the focus groups was to gain information from about the attitudes, beliefs, feelings, experiences and reactions of the respondents (Gibb, 1997). In this instance, focus groups were adapted to the specific challenges presented by these young people. As far as possible, text-based materials were limited. Instead, simple discussion and use of ICT tools were employed.

In the ComeIn project, it had been hoped that individuals would be prepared to self-record video about their learning and about their opinion of the online site, however all but one declined, refusing to have their faces seen on screen. Although the individuals were given the opportunity to be recorded anonymously, they still lacked confidence to communicate to camera, but were comfortable to discuss issues in small groups with a camera running in the background. A range of portable ICT devices were presented to the users who were encouraged to play with the tools and give their opinions. Sessions were filmed and notes taken in diaries. Contributing to discussion online using ICT did not present problems. A significant number of telephone calls with scripted discussion points were made to young people and the conversations were logged. Researchers involved in all case studies kept detailed diaries. It is recognized that soft data can be difficult to analyze and that there is no common understanding about how this should be done (Howitt, 2010; Dewson, Eccles, Tackey & Jackson, 2000). Events and themes regarded as significant by the research team were identified, annotated and revisited by them. Keywords and concepts were identified and the researchers were given guidelines and key phrases and words to support the analysis of data. In the In2ition study, documents such as pupil timetables were also studied to gain an in depth understanding of the learning experience of each pupil.

Quantitative data was also collected where it potentially added understanding or could validate qualitative data analysis. Both quantitative and qualitative data about learning with ICT was collected through questionnaires specifically developed using multimedia and simple Web 2.0 tools to mitigate the potential literacy issues of the client group. Using a multimedia approach enabled questionnaires to be used in several countries with individual or groups of young people where computer access was possible. Other hard data was collected directly from the web site log files.

CASE STUDY 1: NOTSCHOOL.NET (UK)

Founded in 2000 as a research project, Notschool.net was originally managed through a University with Government funding. The research brief was to devise an ICT based curriculum for young people who were serially disengaged from learning. Since 2005 Notschool.net has become an established alternative provision and has worked with over 6,000 young people over the past 10 years, providing a unique opportunity for gathering longitudinal data about the use of ICT and learning with disengaged young people. Socio-economic factors are relevant to the research, since over 75%

of the Notschool.net population were drawn from the bottom two socio-economic groups. These two socio-economic groups represent the poorest 10% of the UK population and are considered to be part of the digital divide with little if any access to new technologies or broadband from home. Since its inception, 95% of participants in Notschool.net have engaged with the education provision and have achieved qualifications and awards accredited on the National Qualifications Framework (NQF), although the main aim of Notschool.net is to re-engage young people in learning as opposed to primarily achieving exam success. The emphasis on re-engagement appears to be somewhat at odds with UK Government targets and policy and the standards driven movement (Department for Education, 2010). However, experience in this case study has shown that rebuilding self-esteem and confidence through engagement is a precursor to exam success.

Evidence suggests (Clarke, 2010) that despite policy measures to improve attendance in schools, increasing percentages of young people are absenting themselves from school. Eligibility for Notschool.net is restricted to those who are long term non-attenders through illness, phobia, exclusion or disaffection. Certain cultural groups such as travellers often fit the criteria because of their lifestyle. This then precipitates the question as to why this group of young people succeed in this ICT based provision where they have failed to engage with a conventional school. Superficially, Notschool.net has shed the physical presence that a school has, but as an online community of practice it is very different conceptually from a school on a number of significant levels; time, space, curriculum and ethos are examples. Young people learn from home or a venue where they feel comfortable at a time, which suits them. They choose their own curriculum and participation is governed by the use of ICT as a tool. A computer system and broadband are provided as an enabler, not as an end in themselves. Young people access learning, both formal and informal, through the online community. Web 2.0 tools provide extensive opportunities for social networking where few opportunities for face-to-face interactions with teachers generally exist. Connections and physical meetings between young people were often evidenced, with them using the online environment as a vehicle to build friendships. Daily use of digital technologies in Notschool.net without the kind of restrictions often imposed by schools meant that ICT was used "as a tool to empower rather than an implement to impede so that learning and technology were [are] dealt with simultaneously and with equal regard" (Johnson & Dyer, 2005a, p. 598). A system of peer mentoring encouraged learners to "ask difficult questions, test assumptions, and try out new ideas in the company of other learners" (Bauman, 1997). The evidence from the use of peer mentoring is consistent with the findings of Holt (1969) who determined that "…children are often the best teachers of other children".

Young people used the Notschool.net learning environment to develop their technical skills, using technology to elucidate information from their peers, rather than asking a teacher or using a reference manual thus building social relationships with peers and building confidence and self-esteem.

"ermm... can sum 1 plz tell me wer my save disk has gone i went to dragg fings in da trash and my save disk wasnt on my desktop" (sic).

"hiya, does ne1 know how to get rid off the red flags without reading any of them, just wondering if there was anything u could do" (sic).

This social interaction helped to improve confidence and self-esteem, especially where adult users asked the young people for help. In the example below an adult makes a general enquiry about the use of a specific model of modem.

"hi sorry to interrupt

Is there anybody that knows anything about a Netopia Modem?" (sic).

One young person replied:

"maybe:P however since you are a NS admin officer i shall require a call out fee (me asking you whats wrong and then telling you its broken) of £75 and then a fixed fee of £600 to fix it:P ok, now being serious...

yes i do, e-mail moi n i shall help:)" (sic).

Young people took their role as helpers seriously, using strap lines at the end of emails to convey their message.

"If you need help please e-mail me, If you want to learn Animation e-mail me!"

When asked how they perceived their participation in the online environment, one commented:

"Well ican help ppl if there looking 4 certain things. I could help ppl if they wanted to learn a certain thing maby. I can watch ppl makeing sure theres no swearing and racial coments. I could help certain comunitys posserbly. I could even help some mentors [teachers] if they want to know something i know." (sic).

This quotation supported the theory that young people use ICT for online learning through peer mentoring and that adult mentors, all qualified teachers, had something to learn from the young people themselves. Thus learning with technologies conveys an expectation of an egalitarian environment and a community of learners as opposed to an instructional approach where the teachers are the experts (Hargreaves et al., 2009). The quotation also conveys a sense of ethos where the young people expect certain standards of behavior devised by themselves, using ICT to reinforce social skills and to demonstrate certain cultural expectations, including their reaction to incidents of cyber bullying, such as racism should they occur (Rudd & Walker, 2010).

Young people taking part in Notschool.net also felt able to use the technology to comment and speak up if they felt they or their friendship group had been treated unfairly. They used the online environment to convey their concerns, which in a face-to-face situation in school might have been considered to be challenging behaviour or even a reaction to cyber bullying whether by young people or adults.

"I think we deserve a little more respect and I think you should listen to our side of the story"

One young person decided to develop guidelines about how they should treat each other, behave and help each other online. The guidelines were accompanied by detailed help guides using a range of multimedia to explain technical aspects of the guide.

"When talking to someone its kinda best to in a round about way to try and get them involved in things to do around the communities, talk to them nicely and try and spend some time chatting about anything and everything to them. Try not to council them though, you are attempting to engage them in learning and the social aspect of Notschool.net.

Try and talk to them about whats going on in communities and what sort of things they could get up to, and do make sure they know that they can get certificates for what they do.

Try and get them to check out or post bits of work in the communities but make sure you let them know that there is no pressure what so ever, they can do it in they're own time. Maybe point them to some work that you have found that they may enjoy also.

if they don't know how to do somthing like add an attachment then help them, if your not sure how to do something that they need help with, see if you know anyone that you can tell the researcher to contact and if that person is not online please reasure them that..

In chats you have the right to stay silent if you wish. You can let the chat room know who you are, and if you wish, ask around to see if anyone needs any help at all." (sic).

Young people expected to use technology to learn in a way that empowered them to work collaboratively and have their views and opinions listened to and respected. When asked how they felt the online environment should look, users said that they wanted the platform to have a "games like look and feel" with clear signposting so that they could find their way around with ease. They wanted areas to change frequently rather than logging on to an environment where the interface always looked the same.

Creation of content by adults was influenced by having to address readability limitations because failure at school meant that the majority of these young people had levels of literacy below that of their peers. As a result, adults used a range of multimedia and Web 2.0 tools, which encouraged participation. Young people were free to create their own areas of user-defined content which reflected their areas of interest and expertise, demonstrating though practical application their views about learning with technologies.

A young person in the Notschool.net learning community created a group task and invited other young people to become involved.

"This is a idea i had to make a games and involve anyone who would like to have a go at making a game too.

We will be using Macromedia Flash.

We will need

Writers

Programmers

Flash animators and drawers

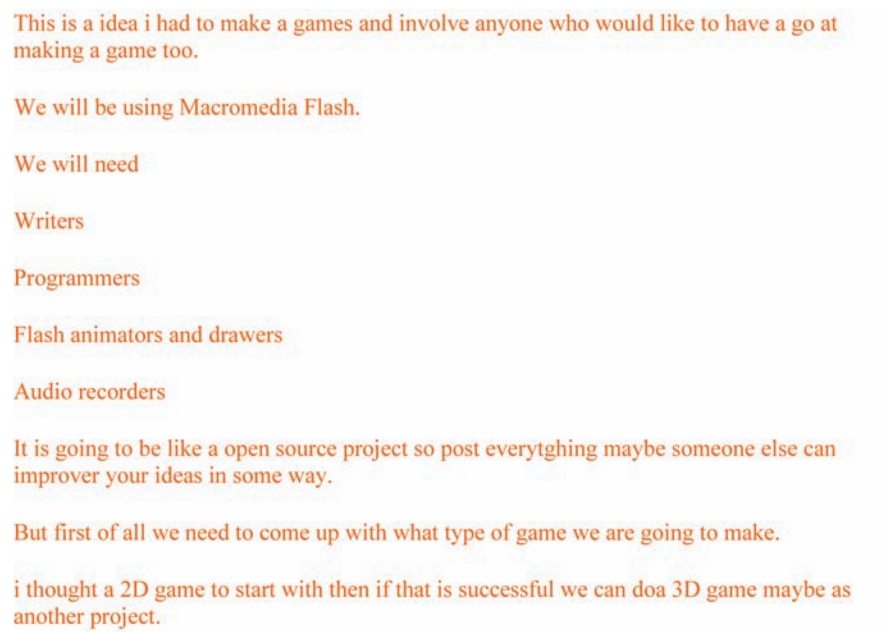
Audio recorders

It is going to be like a open source project so post everytghing maybe someone else can improver your ideas in some way.

But first of all we need to come up with what type of game we are going to make." [sic]

Although online, the task was collaborative and invited participation from other young people who might have skills to offer. It encouraged constructive criticism. The use of ICT tools by young people enabled their learning through a sense of ownership, such as creating and amending web pages, transferring and sharing files, managing discussion areas and engaging in synchronous chat. The flexibility of the environment allowed users to define and amend the existing structures, icons and backgrounds, changing their interface to the environment. Social discourse encouraged the blending of formal and informal learning leading to the creation of a comfortable virtual learning space, which directly reflected the young people's interests, and perceptions of learning. Discussion areas, backgrounds, archiving and other features were owned and developed by participants rather than defined by programmers, systems managers or teachers. Thus learners' opinions and views were embedded in the very fabric of the community itself, governing ethos, structure and content. As individuals, they were able to construct their own curriculum from a range of ideas and possibilities reflecting a breadth of learning styles (Meighan, 2001) and also to work in a medium which best suited them.

Figure 1. An example of digital content lead by a young person


This is a idea i had to make a games and involve anyone who would like to have a go at making a game too.

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It is going to be like a open source project so post everytghing maybe someone else can improver your ideas in some way.

But first of all we need to come up with what type of game we are going to make.

i thought a 2D game to start with then if that is successful we can doa 3D game maybe as another project.

Rovai (2002) found that a strong social environment encouraged sustained participation in online communities and that success is related to engendering a sense of community, belonging, membership and engagement. A strong sense of community not only increases the persistence of students in online programs, but also enhances information flow, learning support, group commitment, collaboration, and learning satisfaction (Na Ubon & Kimble, 2004). Where communities engage learners, their shared vision, support and co-operation leads to internalized thinking and a sense of empowerment. In many ways this appears to be the antithesis of the way young people learn in those schools which encourage a culture of dependency, discourage sharing and use a linear approach to learning which does not reflect the way learners think, or the skills they require in the 21st century for employment.

CASE STUDY 2: COMEIN (EUROPE)

The previous case study considered how the thoughts and opinions of a group of young people helped to shape a successful virtual learning environment for the hard-to-reach. The ComeIn project developed the idea further by working with 98 young people aged 14-21 to build a bespoke online community accessible using a mobile (cell) phone. The high level of mobile phone ownership by young people (Ofcom, 2010); coupled with the new capability of these devices for advanced Internet access, has created an opportunity to utilize mobile online communities for the most marginalized of young people and for it to potentially serve as a vehicle to facilitate social inclusion.

Young people were involved in the design of the platform and content from the inception of this pilot project. All were considered to be marginalized and belonged to the NET (not in education or training) and NEET (not in education, employment or training) groups (Unterfrauner, Marshalek, Fabian & Hochgerner, 2009). Those who had not reached school leaving age were either non attenders or had a very poor attendance record of less than 20% in educational provision other than school. The older age group had been out of education or had not been in a full time job for at least 2 years. Their views about the platform and the content were sought and media developed to reflect these views. The project was funded under the European FP7 grant scheme and data was gathered from young people in Austria, Ireland, Sweden and UK. Groups from Austria and UK took part in a 13 week pilot during which time they were issued with mobile phones and a limited amount of credit to allow them to participate in the study. Textual literacy was not found to be a barrier and ICT skills in this group were already well developed (see Table 1).

A questionnaire was designed to find out what knowledge or skills marginalized young people considered they required for their future employment. The online platform was then designed to include opportunities to develop those skills and to present them in an engaging way as well as providing for literacy and numeracy development, considered to be essential by employers, government and the young people themselves (Tierney & van Krieken, 2009). Results from the questionnaires indicated that young people felt that they already had basic ICT skills and did not require more training. Subsequent observation supported this assertion, not only because the questionnaire was online, but also through discussion and watching the young people work with their mobile ICT devices at focus groups. Results suggest that ICT is a medium in which marginalized young people are sufficiently skilled for it to be used to develop other aspects of learning. This finding has implications for content and course delivery, as well as for more formal exams and indeed employers since most jobs include an element of ICT skills.

Data from focus groups and individual discussion indicated that all the young people were users of social networking sites and all owned mobile (cell) phones although in most cases, neither their handsets nor service contracts were capable of supporting Web 2.0 access. Young people were given mobile phones to ensure parity and the ability to access social networking sites and to give their opinion on functionality and design. Participant feedback suggested that that whilst they found access and navigation easy they also experienced difficulty in some technical aspects, particularly switching from 3G to wireless where they did not easily understand the technological differences.

Table 1. Frequency of ICT skills of marginalized youth. Adapted from Johnson et al. (2009b)

Frequency Results of ICT skills of marginalized youth	
Can you do these things already?	**Percentage that can (%)**
Surf the Internet	99.4
Search the web	98.1
Use social networking sites	84.2
Use email	98.7
Watch videos e.g. Youtube	97.5
Word process	96.8
Make presentations	87.3
Print papers	97.5
Add digital images to work	94.3
Use spreadsheets to calculate numbers	75.9
Use database to search information	82.9

One participant remarked on the good quality of video on mobile phones when accessing YouTube. Another remarked on the resizing function, stating "I like the way you can make it easy to see". Participants were generally critical of hand held gaming devices when used for Internet access, highlighting difficulties with Internet browsers. Although many schools use class sets of these gaming devices for fieldwork and other outside activities, the research participants considered that the functions for entering information such as an address bar, were not user friendly and did not compare favorably to the mobile phone handsets.

There is evidence that access to social networking sites are influenced by both culture and ethos (Shim, 2008). Participants agreed that a profile page was important when deciding whether to accept friendship requests. They considered that they should be able to represent themselves to a community through a picture or series of pictures of themselves in contrast to UK national child safety guidance (Byron, 2008) where this is actively discouraged. They suggested that a chat facility was essential.

The focus groups highlighted the importance of asynchronous and synchronous communication tools. The young people outlined various forms of communication techniques they used to interact with others. Many of them used instant messaging and blogging features to communicate with friends. One young person believed instant messaging was better because "it's more instant and you can see that your friends are online". The discussions indicated that a sense of community was integral to user experience, with an inherent desire to socialize amongst one another. The focus groups suggested that the iteration of the primary user-interface was critical as it could dissuade users from participating if not presented in a stimulating manner. Participants commented that a social networking site had to be simple to use and navigate to maintain regular participation. They generally preferred Facebook ahead of other major social networking sites because it was more straightforward although some of the younger participants liked Bebo's option of "skinning" (editing and personalizing the background of the profile page).

The young people were also asked to evaluate a selection of learning materials currently available online. They considered that the examples chosen were unsuitable for their purposes and in the majority of cases the participants referred to them as "boring". They suggested that content should not be too adult but should not seem childish. They found video to be the most stimulating media used to present information providing that it was not comprised of "long boring videos". This would seem to be reinforced by the significant use of YouTube by young people.

CASE STUDY 3: IN2ITION (UK)

The In2ition project was conceived as a response to a demand from schools in the UK who wanted help in reengaging pupils with low attendance and whom they considered to be at risk of dropping out. UK truancy levels are high with 67,290 cases of unauthorized absenteeism per day reported during the 2008/2009 academic year (Clarke, 2010). The premise behind the In2ition project was to develop and pilot a scaleable model to re-engage disaffected young people. It used a blended learning approach and whilst schools retained their traditional classroom environment, the young people as individuals took control of their online learning for part of the week.

The In2ition model was founded on the principle that if young people attended school for a small period of time, there would be reasons which drew them to school that could be capitalized upon. If a child could be identified as attending even one or two lessons which they enjoyed, then the building of a timetable around these chosen subjects for a larger proportion of their school time could theoretically improve attendance and allow the young people to progress more rapidly in a smaller range of subjects albeit without the usual breadth and balance of curriculum. Five young people aged 15-16 from each of ten schools across the UK were targeted. This was a pragmatic approach since it was envisaged that these individuals would make for larger class sizes, potentially on an ad hoc basis. Although some of their time was to be spent working with younger year groups in the school, there was concern this could be perceived as impositional by teachers. If a child for example excelled at football or art, then an opportunity presented itself for them to build self-esteem by helping out in these subject classes. It was hoped that the idea would extend to the world of work, e.g. young people spending a few hours at a local nursery developing literacy skills or helping with sports coaching at a feeder primary school.

Attendance at a school building was not expected to be full time, so an online community was built where young people could communicate or share ideas and access curriculum materials. Access to a computer and the Internet was an essential component of the project. It is this part of the project with which this case study is concerned. In most cases young people were drawn from the bottom two socio-economic groups and did not have access to up to date technology. In these cases, technology and Internet access were provided using multiple platforms and generic software. The bottom two socio-economic groups generally comprise of the low skilled and unemployed, frequently multigenerational.

While discussions and data collection from schools was taking place, the task of building the online environment was given to a small group of marginalized young people who had previously taken part in Notschool.net. They were given administrator level access to community software and the electronic equivalent of a blank sheet of paper. They designed the background, the icons and the overall structure of the user interface, deciding which areas of interest should be available as scaffolding to start the new online environment. Where subject specialism was not necessary, they built areas of content. Thus the server and online environment for In2ition was built entirely by a group who had not been regular attenders in schools. Once the environment was built and functional, administrator privileges were withdrawn and these young people remained in the online community to act as peer mentors and role models to the In2ition students. Their presence also meant that there were sufficient numbers of young people accessing the community for it to function (Doolan, 2006).

The work of the young people who built the server is a good indicator of how young people perceive an online learning environment should look and operate. When compared to many virtual learning environments that proliferate within education systems in general, the different interpretations of content, access and community are marked. Although many learning environments purport to be online communities, they are often little more than information and content dissemination systems with little opportunity for collaboration or ownership, (Johnson & Dyer, 2005). Community tools appear to exist to facilitate and support the concept of "content transmission" and map against the existing hierarchical structures within the school. By contrast, the pupil led design of the In2ition environment encouraged users to engage with any content available and to interact with one another in a broadly egalitarian way. Pupils were able to design personal profiles adding background, pictures and information. These are considered to be an integral aspect of online communities because they create a sense of ownership and motivation (Schwier & Daniel, 2007). The findings from this case study reflect the research of Lampe, Ellison and Steinfield (2007), which determined the profile elements that encourage participation. Peer mentors supported the young people in their learning online through the community using Web 2.0 tools.

"Ive got on really well, xxx has been helping me a lot up there and helping me with stuff I get stuck on." (sic)

The teachers were all experienced with online learning and constructivist methodologies and had previously worked with disaffected young people, ensuring that they had a good understanding of how to work online with this particular group of young people. Digital content was designed not only by teachers but also by the disaffected teenagers. This learner-centered approach (Johnson & Dyer, 2005a) helped to engage the young people who continually provided regular feedback and were considered partners in their learning. The students provided information and opinions, which allowed project facilitators to tailor learning specifically to the individual, with around 92% of participants having a more positive attitude to education after their experience with In2ition.

Working in the online environment also allowed young people to develop soft skills and the overall improvement in self esteem and confidence was could be seen in subsequent face to face sessions.

"The best part of the day was learning how to animate. The day made me feel better and I really felt that I achieved a lot."

"I enjoyed working on the computers b,coz I have learnd somethink new and it madme feel better." (sic)

The improvement in soft skills helped them to achieve qualifications they would have not previously achieved with 88% of participants achieving points carrying accreditation on the NQF. Although In2ition was a multifaceted project, there is no doubt that active pupil involvement in their learning through ICT was a key component in its success.

CASE STUDY 4: THE WAY PROGRAM (USA)

The State of Michigan's economy is significantly dependent upon the car industry, which has suffered in the recent world recession. Michigan has one of the highest school drop out and unemployment rates in the USA that has provided a catalyst for policy makers to rethink education policy and to address the problems of poverty, unemployment and economic decline. The UK Notschool.net provision was seen as a successful model that had been externally evaluated and had the potential to be imported to the USA. Because Notschool.net was a virtual provision, law had to be changed at the State level to enable the pilot programme to happen.

From their research into the UK model, Michigan developed two pilot programs where the students were interchangeable between a virtual and blended learning model. These pilots began in 2009 and expanded to over 1500 young people over a six month period. The first pilot was a replica of Notschool.net and was fully online. The second was used a blended learning approach where young people were required to attend face-to-face sessions (which did not take place in school) weekly in addition to developing learning through an online community. Both groups of young people used the same online environment and were given equipment and Internet access at home. Unlike the UK these young people were slightly older and in the 17-19 age range. USA students exercised choice and applied to join the provision in contrast with the UK program where young people were placed on it as an alternative provision by educational professionals. The eligibility criteria in the USA were the same as the UK and young people had to have failed in school or have dropped out altogether. The other key differential in the USA was the focus on achievement of accreditation as a success indicator as opposed to engagement as the key criteria for success.

Lessons learned from Notschool.net about student input into an online learning environment were applied to the USA model and a small group of young people from the UK were involved throughout the development. The young people from the UK worked with USA adult team, advised in building curriculum areas and provided online help as the community evolved. They remained active participants for the duration of the pilot. Learning was based on a constructivist methodology and was project based. The young people from the USA were able to define their own learning depending on their interests and aspirations. They had the opportunity to contribute to the continuous improvement of their environment by providing feedback on their learning through email and voicemail.

During the project, students completed a questionnaire to determine their opinions of the online system. The questions focused on their views on project based learning, mentor involvement, personalized learning plans and general satisfaction. 85% of students stated that they thought that project based learning was a suitable learning approach. Students remained neutral regarding additional face-to-face contact with teachers and 88% believed that they had adequate online help and assistance with their project work. Finally, 78% of the students felt that they were on target to achieve the expected credits on the Michigan Merit Framework, the recognized state-wide assessment system. Michigan students are required to complete 22 credits of project-based work with 16 being the minimum required to graduate (Michigan Department of Education, 2008). About 70% of the current Way program cohort are expected to achieve this aim. There is currently a 90% retention rate in the program and to date, the model is achieving on average 1.3 credits per student more than any other alternative learning provider.

Familial relationships and opinions of this USA cohort are also relevant since most young people were from families considered to be dysfunctional. Families generally considered that learning objectives and educational goals were clear. Most families surveyed said that their family relationship had strengthened and most said that they would recommend the program to other families. Teachers also expressed satisfaction in their use of pedagogical approaches and technology, with 89% stating that their technology skills and 21st century skills have been further developed.

A recent report submitted by their Superintendent stated:

"By utilizing a constructivist project based learning approach, supporting a strong student voice has substantially outperformed traditional course based online models as illustrated in the diagram below. The numbers indicate the top three performing online programs in the state with the Notschool model clearly standing out as the top program in the state at moving students forward toward earning their high school diploma."

Where accreditation is used as a success indicator, the Michigan model is seen to outperform other online programs.

The Superintendent went on to say:

Table 2. Accreditation results of three Michigan alternative education models

Program	School to Work Students	Courses Taken	Credits Earned	Michigan Merit Exam Taken
Genesee Intermediate School District (ISD)	582 (25% High School /10% ISD)	2,877 (Average 4.9)	937 (Average 1.6)	N/A
Not School Model	520 (700)	N/A	2,205 (Average 4.2)	73
St. Clair Regional Educational Service Agency	144 (N/A)	574 (Average 4.0)	412 (Average 2.9)	11

"A case can be made that because students are given a strong voice in choosing their learning path and focus that they are more engaged in authentic learning. They are not receiving information but are instead participants in the development and construction of projects that are then aligned to state standards. Students also have a strong voice in molding the community that they want to see within the physical lab as well as the virtual environment. Students are able to decide when they want to come into the lab and for what reason they are coming in. It may be to participate in a group activity or project or to receive individual support on a specific learning objective that they have set."

Evidence from this case study suggests that where student voice is a powerful factor in developing learning with ICT, familial relationships are potentially improved and teachers become more motivated with improved job satisfaction.

FUTURE RESEARCH DIRECTIONS

When considering future research regarding learner voice and technology, a problem arises because technology is developing faster than either pedagogical approaches or research methodologies. If we are to successfully address these issues, then more research is required in these two areas when concerned with education and learning. Whilst young people as consumers demand the latest technology tools and are avid users, schools often tend to object to their use in classrooms. Young people can work in groups in class, but are discouraged from using mobile phones, social networks or chat in class to achieve the same end but potentially with a wider audience who might include teachers, educators and peers. There is a demand to look further at how young people engage with these tools and how their use might be embedded in the classroom.

Ongoing teacher training is requisite for effective use of ICT in the classroom but recognizing the speed of change of technology, this training must focus on pedagogies and the ways in which teaching can be enhanced by technology. This can only happen when we better understand the way that young people use and apply technology. We also have to understand more about marginalized youth as a specific group and their use of technology, particularly the potential for the use of mobile technologies in learning.

The Way Program (Way Program, 2010) in the USA is of particular interest since it has expanded from a small pilot to statewide initiative in a very short period of time. We have to understand more about why young people exercise choice to work remotely using ICT and how they exercise choice when they negotiate face-to-face sessions with teachers, especially since the successes of these disaffected young people are greater than in any other online provision statewide. This model potentially suggests a roadmap for 21st century learning.

CONCLUSION

Developing learning with marginalized young people through ICT presents some different challenges from research with motivated young people participating in traditional education systems. In the first instance the target group have to be tracked down and be willing participants in any research. Research tools have to be adapted to their requirements and skill set in order to collect meaningful data. Thus there is a prerequisite to adapt methodologies and tools in order to work with this group. The concept of marginalization also must be more clearly defined by policy makers. In the studies to which we refer, all the young people have been out of formal education or work in the long term and although we know that the majority are from the bottom two socio-economic groups there is no national or international consensus on marginalization or its sub categories.

Being marginalized can mean an inherent sense of failure and low self-esteem, so that listening and understanding the views of these young people about learning with ICT is in some ways interpretative. Validation perhaps lies in developing their ideas and opinions into useable systems and then testing those systems not only with those young people but with others in the same category. The case studies have done just this and draw together a picture of how young people learn with ICT and what they think is important. Four online learning platforms have been developed taking notice of student voice and the resultant successes in engagement, qualifications and soft skills suggest that this approach may be an effective way forward for traditional education as opposed to a content driven approach of deliverable courseware in systems developed to mirror existing school structures. These case studies challenge the concept of school since most of the learning took place from home, or where and when the young people felt comfortable, negating the requirement to travel to a specified building or site at a specific time. They further challenge what schools understand by formal and informal learning and highlight a requisite for young people to understand that they are learning with ICT tools when it might seem that the are simply having fun.

The concept of social networking in such sites offers opportunities for further exploitation as research indicates that this, together with short messaging services (SMS) and chat is important to young people. This leads to the dichotomy between what young people learn and how they learn and which is the more important for 21st century skills. We know that young people are adept with gaming devices with Internet use and are judgmental about bandwidth speed and usability of interfaces without necessarily understanding the technical aspects. They are often highly skilled in the use of ICT tools without the necessity of a taught course or training, but less skilled at those tools that they do not necessarily see as valuable. Evidence (Johnson & Dyer, 2010b) suggested that they consider themselves to be less adept at using databases, but their behavior contradicts this in their use of search engines, often driven by powerful databases. They use YouTube significantly without understanding that it is a database and without understanding how the size of movies relates to speed or file format. If the tools work well, young people are willing users. If they are not considered to be responsive enough, they are regarded as sub standard.

Much of the same applies to the user-interface. Whether it is the screen or the design which makes it user-friendly is not seen as relevant. It is the usability which is the most important. Connected with that usability is the notion of being able to navigate easily and access content developed by themselves and others. Who has developed that content is less important than whether it is of interest to them. Content has to be readable to cope with lower literacy, but not childish and readily swapped or posted in online areas to be shared.

Teaching methods in schools do not readily support this approach to learning with ICT by these young people and if schools are to engage them in learning, then different pedagogical approaches should be considered. Constructivist methodologies and project based learning appear to work well, but do not always sit comfortably with the culture and rigor of school for young people approaching school leaving age in particular, partly because examination systems are geared to a content delivery and absorption methodology rather than the independent learner and deep thinker

These case studies evidence young people learning with technology in a way that develops deep thinking and deep learning. They are able to learn quickly and adapt technologies to suit their purpose and work collaboratively online to share their thoughts and opinions. They are intuitive users questioning the power of technology and adapting it to their requirements. They are strong communicators through technology, able to multitask with a range of tools able to use technology to develop learning gains not always recognized by the existing school system. The challenge for educators thus lies in their own ability to redesign 20th century systems to meet the demands of society, whilst paying heed to the opinions and abilities of the 21st century learner.

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KEY TERMS AND DEFINITIONS

3G: Third generation mobile services delivering high speed data transmission and web access.

Community of Practice: A group of people with a shared interest, where they can discuss and exchange ideas.

Constructivism: The active process of knowledge construction through experiential learning.

Deep Thinking and Deep Learning: Making sense of facts and experience, while integrating them with prior knowledge, to form a greater understanding and meaning.

Digital Divide: Refers to the disparity between the abilities of those able to access information through digital technologies.

E-Learning: Learning through electronic media, most commonly the Internet.

Formal Learning: Structured learning experience in terms of curriculum, objectives, time and support with the intention of achieving accreditation.

ICT: Information and communication technology.

Informal Learning: Unstructured learning that may be intentional or incidental that does not result in formal qualifications.

Learner/Student Voice: The perspectives of the young people influencing learning, policy, contexts and principles.

National Qualification Framework: A credit system developed for UK national qualifications covering all levels of learning in secondary education, further education, vocational and higher education.

NET: Not in education or training.

NEET: Not in education, employment or training.

Peer Mentoring Systems: Instruction through a learning environment between students, usually between a more experienced student and a newer student.

Serially Disengaged: Individuals who develop a pattern of non-attendance and non-participation that is both significant and long term.

Social Networking Sites: A website that provides a virtual community for people with shared interests.

Soft Skills: The skills needed to engage and interact with others.

Student Voice (Learner Voice): Giving students opportunity to influence policy, learning and standards; through their opinions and actions.

Web 2.0: Second generation Internet applications facilitating collaboration and interaction.

Chapter 10
Students' Views of E-Learning:
The Impact of Technologies on Learning in Higher Education in Ireland

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ABSTRACT

Students are the end users of the Information Systems that educators use to enhance students' learning experiences. The use of technologies in education has altered the ways in which lecturers and students can interact and has expanded the volume of information that students can access. This study was undertaken to obtain students perspectives on the uses of technologies in higher education to assist educators in improving the pedagogical design of e-learning platforms, known as learning management systems. This chapter provides students' perspectives on the academic use of technologies in two higher education institutions in Ireland. Analysis of the responses received from three hundred and twenty students indicates that students are of the opinion that the use of technologies in higher education can beneficially transform learning; however, technologies will never replace lecturers.

INTRODUCTION

In April 2009 a survey was conducted in the Faculty of Business, Dublin Institute of Technology and the findings were presented in a chapter of a book. "Critical Design and Effective Tools for E-Learning in Higher Education: Theory into Practice" was the title of the book, edited by Donnelly, Harvey, & O' Rourke (2010). The title of the chapter was "The Student Perspective: Can the use of technologies transform learning?" This book was published in June 2010 by IGI Global (IGI, 1988). In March 2010 the same survey was conducted in the School of Computer Science &

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Statistics, Trinity College Dublin. The findings of both studies are discussed in this chapter.

Networked technologies have been called transformational due to their wide ranging impact (Salmon, 2000; 2003, p. vii). As part of this wide-ranging impact, technologies are increasingly pervading all areas of education. This study particularly concentrated on the higher educational sector of education in Ireland. Nonetheless, a number of the findings and comments are relevant to the use of technologies with respect to learning in general.

The use of technologies has modified the ways lecturers distribute course materials to students; rarely do university students transcribe notes from blackboards/whiteboards. Course materials are disseminated online through files of course notes, PowerPoint (Microsoft, 2009) presentations, podcasts, video casts and web links, with e-dissemination enabling access to electronic learning resources (Littlejohn, 2009). The use of technologies has also brought alterations to students' ability to communicate with lecturers and fellow students, through the use of e-mail, discussion boards, wikis, online chat rooms and video conferencing. In addition, technologies have changed the ease with which students can access further information to read outside of the course material and conduct research through the use of online journals and databases.

In general, academics are very often encouraged to create an online presence without ever having studied online themselves or even considered the pedagogical impact that technology can have on the students' learning experience (Ambrose, 2001). Salmon (2000) stated that the use of the world wide web for learning and teaching was set to dramatically increase, and the onus was on all academics using technology to ensure that they familiarised themselves with the pedagogical skills necessary to ensure that the technologies used effectively enhanced the learning experience of students.

Broad, Matthews, and Mc Donald (2004) proposed that despite students prolific use of new technology, there is no need for academics to presume that students are disposed towards academic use of the Internet in the higher education sector. Furthermore, they question whether the use of technology in education is supported by sound educational rationales and that the benefits to be achieved from using the Internet in higher education have not yet been pedagogically proven (Broad, et al., 2004). All the time and effort that lecturers put into creating suitable teaching resources for use with technology is wasted, unless students actively engage with and gain some benefits from using the material provided.

As a result of a study conducted by Lofstrom and Nevgi (2007) at the University of Helsinki, Finland, the authors suggest that the relevance and meaningfulness of learning activities are crucial to the transferability of knowledge Educators should keep this in mind when designing material for use with technological devices.

McLoughlin's (2000) experiences from working in the Teaching and Learning Centre at the University of New England in Australia, lead her to suggest that despite the prolific availability of online teaching tools there is no established approach on how to develop quality learning programs that make the best use of these tools, which can only be achieved by educators forming a deeper understanding of how technologies can affirm and extend the principles of good teaching. Slevin (2008) from Roskilde University in Denmark, states that concentration upon practical problems associated with the opportunities afforded by modern technologies draw attention away from the theoretical concerns posed by e-learning. Apart from reading books and articles on the use of technologies in higher education, educators who attend e-learning and teaching Summer schools, conferences and seminars, afford themselves the opportunity to form a deeper understanding of how technology can affirm and extend the principles of good teaching through shared experiences.

The objective of this study was to provide educators with a summary of students' general analysis of the impact that technology has on learning in higher education to provide academics with feedback from over three hundred students. Insights gleaned from student feedback could be incorporated into academics' pedagogical considerations when designing and developing learning activities which involve the use of technologies.

BACKGROUND

As part of the Dublin Institute of Technology's Strategic Plan, a Learning Technology Team was established in 2003 to roll out the institutional virtual learning environment (Learning Technology Team, 2009). In January 2009, the Learning Technology Team was combined with the Learning & Teaching Centre to form the Learning, Teaching & Technology Centre for the Dublin Institute of Technology (Learning, Teaching & Technology Centre, 2009). Similarly, the Centre for Academic Practice and Student Learning was established in 2003 in Trinity College Dublin to assist in supporting best academic practice and student learning in line with the Strategic Plan (CAPSL, 2003). The principle objective of this study was to obtain students' views on the impact the technologies promoted by the respective strategic plans had on their learning experience so necessary strategic changes could be implemented to create a more student centred environment.

One of the most important contributory factors to the success of strategic plans is to get all persons involved in the process engaged in the process. Studies like this will get the students involved in the strategic plan by incorporating their views in implementation/change strategies. But it is also important in an educational environment to get the academics involved in implementing changes. The provision of training to use virtual learning environments is not enough, because when one commences an introductory course to using an electronic learning platform, the extent of the task can seem quite daunting; even to educators who are literate with technologies. Connolly, Jones, and Jones (2007) state that a range of skills are required to develop an effective e-learning course. It takes time for lecturers to familiarise themselves with the use of an electronic learning platform, to compile learning material in a suitable format to use the technologies with students and to realise the pedagogical benefits that can be achieved by using technologies in different ways. However, in order to make e-learning courses successful students' perspectives and views on the use of technologies in higher education must be heeded and taken into consideration by e-learning development officers and educators.

The use of technologies in higher education has increased the modes of delivery of information to students by making information more readily available and ubiquitous. The association between classrooms and lecture halls as primary places of learning has ceased to exist (Slevin, 2008). Learning is now perceived as ubiquitous, occurring any time regardless of location, which makes further education more accessible to people who previously would not have had the opportunity, for example, people who work shifts and are unable to attend structured classes on a regular basis.

James, Bexley, and Devlin (2007) conducted a national survey of Australian university student finances and found that over one third of part-time undergraduate students, one quarter of all postgraduate students and over one fifth of full-time undergraduate students missed classes to attend work to support survival and expenses related to their studies. Light, Nesbitt, Light, and Burns (2000) noted that technology theoretically enables students to organise their study practices to suit their individual lifestyles. Students can also learn from online learning activities in ways not previously envisioned by the lecturers. Shank (2008) observed that online learning occurs which is not directly related to specific learning activities.

Student Perspectives and Learning Experiences

Rogers (2004) sought students' opinions on the use of online learning and how it had impacted on their learning, his findings on students' perceptions of online learning were positive, with 79% responding that online learning positively impacted on their study.

Churchill (2005) an Educational Developer in the United Kingdom recommended that in order for the use of technologies to effectively enhance the students' learning experience, minimum requirements should be clearly outlined for the students by the lecturers, thus informing students of the lecturers expectations of their participation with e-learning, for example setting a minimum requirement for student engagement with the e-learning resources. Students should be given clear guidance on how the lecturer expects them to use technologies in the form of blended learning. Blended learning is where a suitable combination of traditional teaching and e-learning are combined to enhance students' level of attainment from a particular course of study.

Condie and Livingston (2007) while conducting a study of one particular online programme designed for students in the post-compulsory years of secondary schooling in Scotland found that while online learning did appear to have a positive influence on attainment, the evidence suggested that attainment might have been greater had the teachers modified their methods by combining online learning with more traditional methods (blended learning).

Gilbert, Morton, and Rowley (2007) conducted a study of nineteen students across the globe participating in an online course of study leading to MSc Information Technologies and Management (e-Learning) to obtain an insight into the students perspective on the experience and concluded that more in-depth studies would enhance understanding of how e-learning can contribute to enhancing the quality of learning. More in-depth studies of the use of technologies in higher education, the dissemination of findings, successes, and failures, will assist in establishing facts in response to Gilbert et al., concerns regarding how e-learning can contribute to enhancing the quality of student learning.

Podcasts and video casts are used by teachers to provide alternative ways of delivering course material to the student population. Students involved in a debating class were able to use technologies to record and review their debating techniques, which enabled them to compare changes in their attitudes after exposure to multiple perspectives on a controversial topic. Video casts can be used to record student activity from which they can learn, for example, students participating in a civil discourse public speaking class at a private comprehensive university in the Pacific Northwest, North America, through the use of technology i.e. recording their presentation on video tapes, were able to judge previous presentations that they had made in order to reflect upon their changing stance on various controversial topics under discussion (Gayle, 2004). As students reflected on their presentations they got the chance to identify shortcomings and confront their own assumptions, which enabled them to improve their delivery and open their minds to the thoughts and opinions of others.

Web teaching can effectively enhance the learning experience of students through the use of bulletin boards; resources and databases; online quizzes; student portal pages; e-journals; assignment submission; sharing of files, graphics, and so forth, to augment course material (McLoughlin, 2000).

Several times over the last few years at various seminars and courses, lecturers have expressed concerns that using e-learning platforms will effectively lead to the demise of the teaching profession and ultimately their redundancy. Donnelly and O' Rourke (2007) also noted that some academic staff in Irish higher education institutions believed that the introduction of an online learning environment could lead to their own redundancy.

Teacher: Student and Student: Student Relationships

Professors/lecturers will not be replaced any time soon according to Wilson and Christopher (2008) two educators based in Colorado, United States of America, who also suggest that e-learning depends on lecturers in order for the whole system to run effectively, from planning and design to management and delivery, as well as being role models and providing guidance for students.

Computer mediated communication is increasingly being used in higher education, along with other technological enabling opportunities to supplement face to face interaction with lecturers and fellow students. Lecturers have to shift the level of control from that of the lecturer to that of the student to enable students become self-regulated, reflective learners who have developed independent study habits (Jelfs & Colbourn, 2002). This is a very interesting area, and further investigation is needed to establish whether or not beneficial learning can take place as a result of students using computer mediated communication. Light, Nesbitt, Light, and Burns (2000) recognised that the atmosphere between students within the computer mediated communication area must be supportive, rather than hostile or competitive in order for successful learning to be achieved.

When designing online interactive communication tools for students it is paramount for the success of the learning activity that educators advise their students that the rules of netiquette should be observed when working online, for example, no discriminatory remarks to be included in students' postings to discussion boards. This is possibly significantly more important than the way that etiquette should be observed during discourse with lecturers and fellow students in a classroom situation. Body language, a nudge and a wink can convey a joke is intended in a real life situation, but in an online environment, the written word or recorded electronic data can have a more lasting effect on an individual, than a quick murmured comment. Because of the nature of stored electronic data, the data can be revisited again by the victim and the hurt occasioned repeatedly, also, more people may be privy to the exchange. Video conferences, etc. are stored electronically and can be viewed later by others.

Mason and Rennie (2006) suggest that enabling learners some control over their pace and learning style can provide a richly stimulating learning experience for the student. Students' satisfaction can be influenced by quality instruction, instruction that accommodates various learner/student characteristics/learning orientations (Overbaugh & ShinYi, 2006). When designing content suitable for electronic delivery, the designer must consider contemporary student characteristics and identify the tools most appropriate for each learning orientations and create a range of course activities that will encompass as many of the preferred learning orientations as possible.

Park (2005) noted that the Felder and Silverman theory can be used to identify individual students learning styles and preferences. Course material that has been purposely developed to suit the learning abilities and learning styles of a wide range of students should be instrumental in keeping the attention of a broader range of students. Mainemelis, Boyatzis, and Kolb (2002) conducted research on student learning preferences and suggested that web based learning as a pedagogical approach poses an interesting research question.

One of the dilemmas for lecturers in trying to accommodate various learning preferences is whether to give out all course material at the start of the academic year or to enable student access to each topic prior to or subsequent to each individual lecture. One student from Trinity College Dublin observed that "not providing physical handouts means student notes and lecture notes become separated". This was an interesting point to make and one that the author also found had a certain nuisance value i.e. when a lecturer conducts a class using PowerPoint (Microsoft, 2009) slides and informs the class at the end of the session that the slides will be made available online at a later date. One lecturer in particular could take over a week to post the slides and by this time the impetus to collate the notes taken in class with the handouts provided online had passed. Revising lecture notes which have become separated from the notes taken by students in class, can be a frustrating process, the whole process of revision can become disjointed and confusing. Not many students would have the time to collate notes taken in class with the printed copy of the online handout subsequent to the lecture.

Access to Information, Learning Outcomes and Skills Development

The speed of access to information realisable through the use of technology and the increased means of collaboration were previously unachievable. Hartman, Moskal, and Dziuban (2005) found that 80% of students were of the opinion that the Internet had a positive influence on their education and 75% claimed they used the Internet more than the library for research purposes.

Learning outcomes must be realized, developed and fine tuned over time, and interventions made based on the findings. Broad et al (2004) tentatively concluded that the use of an Integrated Virtual Learning Environment (IVLE) can facilitate student learning but their measurements of improved student performance were less conclusive. Assessment of critical thinking is one of the most difficult to quantity as per the experience of Peach, Mukherjee, and Hornyak (2007). Sullivan and Thomas (2007) observed that increased interest in learning outcomes was unreasonable when at the same time higher education authorities and accreditation agencies have still not agreed any standardised ways of measuring student learning outcomes. This may be so, but it is paramount to the success of the educational system to establish a recognised process to identify the best ways to improve students' critical thinking skills and how to measure student learning outcomes. Rogers (2004) researched the ability to measure improvement in critical thinking skills in history students and how this ability would be influenced by students' pre-conceived ideas and the nature of the assessments used, and referred to the fact that it would be audacious to claim that his study had found solutions to the difficult questions encountered.

Trees and Jackson (2007) stated that students take notes, listen to the lecturer and observe the proceedings in traditional teaching methods. In Technology Enhanced Learning (TEL) notes are usually made available online for the students to read online or printout to read at a convenient time. McKinney, Dyck, and Luber (2009) stated that students who personally created their own set of notes achieved higher educational outcomes than students who had been given a full set of notes by lecturers.

Ambrose (2001) an e-learning officer based in Brisbane concluded from personal experience as an online learner that in order for lecturers to be successful in their delivery of e-learning they must possess organisational, intellectual and social facilitation skills in order to provoke intelligent responses from students and create group harmony.

METHODOLOGY

This study was initially conducted in the Faculty of Business, Dublin Institute of Technology (Dublin Institute of Technology), and subsequently in the School of Computer Science & Statistics, Faculty of Engineering, Mathematics and Science, Trinity College Dublin. An evaluation of current literature was performed to identify key attributes to be explored and from these attributes statements were devised to seek student perspectives regarding the issues identified. A survey was compiled to ascertain students' perspectives on the concept that the use of technologies in higher education has the ability to transform learning.

The survey was designed with three sections:

1. A list of 27 statements was created for students to evaluate using a five point Likert scale i.e. strongly agree, agree, neutral, disagree, strongly disagree.
2. Very basic personal information was sought such as level of study.
3. Students had the opportunity to share perspectives on statements such as "can the use of technologies transform learning" and "what use of technology has the most beneficial impact on student learning".

Research Ethical Clearance

Permission was sought and granted from the Dublin Institute of Technology's Research Ethics Committee (2009) to conduct this study. One hundred and sixty full-time business students in the Faculty of Business, Dublin Institute of Technology, completed a paper based survey to establish their perspectives on "Can the use of technologies transform learning" in April, 2009. Likewise, permission was sought and granted from the School of Computer Science & Statistics Research Ethics Committee (2011), Trinity College Dublin in March 2010. One hundred and sixty full-time students in the School of Computer Science and Statistics, Trinity College Dublin completed the same survey.

SUMMARY OF STATISTICAL ANALYSIS

Following on from the themes addressed in the literature review for this research, the statistical analysis is presented below under the headings: Student perspectives; learning experiences; Attendance at lectures; Teacher: student and student: student relationships; Access to information; and Learning outcomes and skills development. The Likert scale options of "strongly agree" and "agree" were merged to form the statistics presented as findings in this chapter, as were the Likert scale options of "strongly disagree" and "disagree" merged.

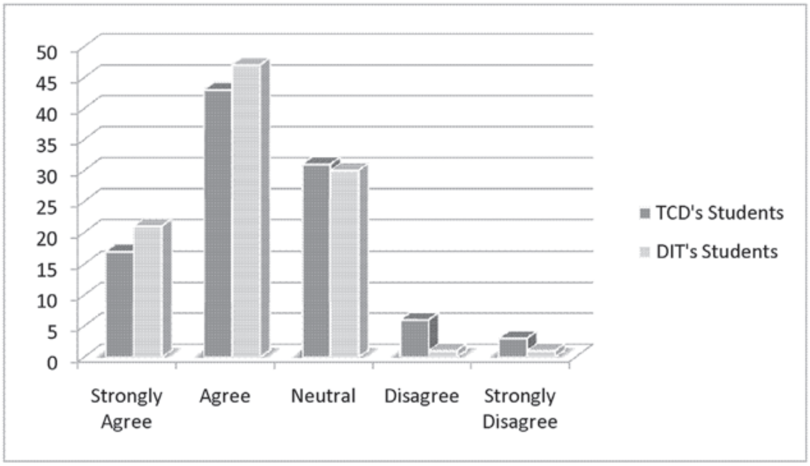
Student Perspectives

Overall the outcome of this research was that students' perspectives on the use of technologies in higher education were quite positive. The students' perspectives when analysed showed while they clearly realised the benefits to be achieved from using technologies in their education they still appreciated the benefits of having face to face tutorials with lecturers, and face to face interaction with peers. One student commented "the use of technology should be used in parallel to lectures as the best way of learning is through human interaction". Increased use of technologies in education could empower the user by enriching the learning experience (Dagger, 2006).

Of the students participating in this study, 92% respectively, from both Trinity College Dublin and Dublin Institute of Technology, agreed that the use of technologies in higher education makes a positive difference to studying, these findings are consistent with those found by Rogers (2004).

One student from Trinity College Dublin remarked that "technology has to be properly integrated with an approach to teaching. Not just technology for the sake of technology". Taking heed of the advice offered in this statement is crucial to the continued successful use of technologies in higher education. A clear definition of the pedagogic rationale and learning outcomes expected from each unit of learning should be realized by the educator prior to the integration of technology into the learning experience. Another student from Trinity College Dublin suggested that "It's not the technologies we should be focusing

Figure 1. Technology facilitates a student centred environment that was not possible before



on - rather the pedagogy - supported through the technology. (That is, it's not what you use, rather how it's used). New technologies to support new pedagogies!". The pedagogical approach which enhances the students learning experience should be the driving force behind the technologies integrated into the classroom not the integration of technology prior to pedagogical considerations. Technology should not be integrated into the students learning experience unless there are sound pedagogical benefits to be achieved by doing so.

Sixty percent of students at Trinity College Dublin and 68% of students at Dublin Institute of Technology agreed that technologies can facilitate student centred environments that were not possible previously (Figure 1). The effective creation of student centred environments depends on the design skills and implementation methods employed.

As part of the survey, students were asked for their agreement or disagreement on the ability of discussion boards to force students to open their minds to the thoughts and opinions of others. This study found that 51% of Trinity College Dublin's students and 55% of Dublin Institute of Technology's students agreed that online discussion boards force students to open their minds to the thoughts and opinions of others. 30% of Trinity College Dublin's and Dublin Institute of Technology's students had no opinion on this statement. The high number of students who contributed no opinion on this statement could be that they had no personal experience of using discussion boards. In a previous study conducted in the Dublin Institute of Technology, only 20% of students had used an e-learning platform to participate in discussion boards (O' Donnell, 2008).

Learning Experiences

In this research 80% of Trinity College Dublin's students and 68% of Dublin Institute of Technology's students agreed that the quality of students' learning is enhanced by using technologies to augment lectures, this would be in the form of blended learning, these findings are consistent with those found by Condie and Livingston (2007).

One student from Trinity College Dublin commented "I think that learning essentially remains the same, technology just makes it an easier means to the same end", this view is similar to the views of Gilbert et al (2007) learning essentially remain the same.

This study found that 53% of Trinity College Dublin's students and 54% of Dublin Institute of Technology's students agreed that podcasts and video casts of lectures would facilitate student learning more so than handouts. One student from Trinity College Dublin responded "I think, in general, technology can only add value to existing teaching methods. I don't see it replacing existing teaching methods. Podcasts and screen casts would be a great addition". Another student from Trinity College Dublin remarked "I think podcasts and videos of lectures should be used more to help students". McKinney, Dyck, and Luber (2009) on examining student attitudes about using podcasts found that students were of the opinion that revising from podcasts was more effective than revising from textbooks.

This study also found that 56% of Trinity College Dublin's students and 59% of Dublin Institute of Technology's students agreed that using podcasts or video casts for revision purposes improves recall more so than revising course notes, 30% of Trinity College Dublin's students and 26% of Dublin Institute of Technology's students were neutral, and 14% of Trinity College Dublin's students and 15% of Dublin Institute of Technology's students disagreed with this statement. One student from the Dublin Institute of Technology commented that "Yes, it makes things quicker, more entertaining and easier to revise" in response to "Can the use of technologies transform learning?"

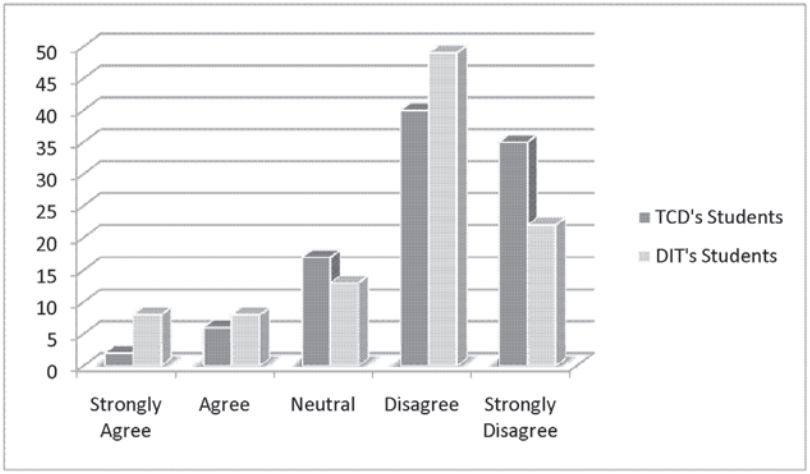
Results from the student survey showed that 82% of students agreed that using technology in higher education effectively enhances the learning experience of students, these findings are consistent with those found by McLoughlin (2000). O' Donnell (2008) also came to the same conclusion in a study for a master's theses, 77% of students and 61% of lecturers agreed that using an e-learning platform as a form of blended learning improves the learning experience of students more than using traditional teaching methods. In addition 68% of students and 59% of lecturers agreed that using an e-learning platform as a form of blended learning is better for preparing students for work than traditional teaching methods (O' Donnell, 2008).

In this study, 78% of Trinity College Dublin's students and 66% of Dublin Institute of Technology's students disagreed that the use of technology in higher education would make lecturers disposable. In excess of two thirds of students disagreeing with the statement that "the use of technology in higher education will make lecturers disposable" should be reassuring to lecturers who believe that the use of technology in education is a threat to their employment, Donnelly and O' Rourke (2007) noted that some academic staff were of the opinion that engaging with online learning environments would make them disposable. One of the Dublin Institute of Technology's students commented that "Yes, technology can transform learning, but only as an aid, not as a replacement".

The third section of the survey afforded students the opportunity to share any other perspectives on "Can the use of technology transform learning" over 50% of the thirty-two students from the Dublin Institute of Technology that completed this section of the survey commented that technology could never replace lectures/lecturers/class discussions/debates and interaction. O' Neill, Singh, and O'Donoghue (2004) came to the same conclusion that technology can be used to enhance the learning experience of students, but not replace the lecturer. A student from Trinity College Dublin commented "It should be used along with the current methods. Neither should stand alone, i.e. lectures or technology". Another student from Trinity College Dublin mentioned that "Technology should be used as an additional resource, it should not replace any existing methods altogether".

In addition, 63% of Trinity College Dublin's students and 58% of Dublin Institute of Technology's students disagreed with the statement that the use of technology in education could successfully replace the learning achieved through interaction

Figure 2. There is no longer any need to attend lectures because course notes available online are a good substitution.



with lecturers. One student from Trinity College Dublin commented that "It helps but does not replace attending lectures". Another student from Trinity College Dublin remarked that "Technology can help with learning, but it is no substitute for being able to listen to a lecturer and ask questions whenever you need to".

Another comment from a student in Trinity College Dublin was that "The use of technologies cannot transform learning, or leave in-person lectures defunct, but it can be very helpful. Technology allows for organisation on both student and lecturer's behalf". These comments are all very positive about the use of technology in higher education. The following statement by a student from Trinity College Dublin sums up the observations of many "It is a useful tool not a substitute".

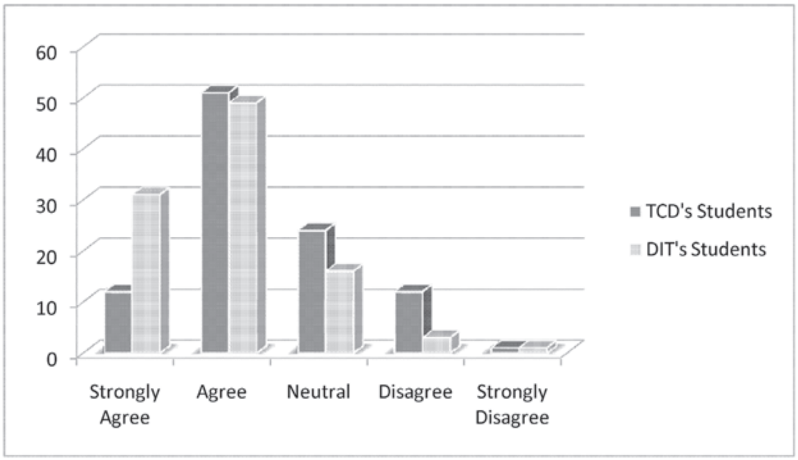
Attendance at Lectures

75% of Trinity College Dublin's students and 72% of Dublin Institute of Technology's students surveyed disagreed with the statement that there is no longer any need to attend lectures because course notes available online are a good substitution (Figure 2). These findings are consistent with those found by Wilson and Christopher (2008). A student from Trinity College Dublin remarked that "Depends on the lecturer. If the lecturer is not as good, would need better notes online". This is a very true observation, and one that most would have experienced at some time during their education, some lecturers are not as engaging as other lecturers. In addition, some lecturers apply themselves more diligently to the creation of engaging course content than others.

Another interesting opinion of a student from Trinity College Dublin was that "The comprehensive use of sharing in-depth lecture notes online, I think would make the pass-rate of practically all courses improve", this would be an interesting concept to explore as an hypothesis in future research i.e. the sharing of in-depth lecture notes online would make the pass-rate of practically all courses improve.

This may be the case, but still 51% of Trinity College Dublin's students and 52% of Dublin Institute of Technology's students agreed that having course notes available online makes them more likely to skip the occasional lecture. One

Figure 3. Attending formal lectures facilitates a deeper understanding of course content than online access.



student from Trinity College Dublin admitted that "In College, I got the notes before term and then attended no lectures". Another student from Trinity College Dublin commented that "Technology should be used to augment the lectures and as a revision aid rather than replacing them, if students use this as an opportunity to skip lectures that is their prerogative". Several different opinions on this statement have been made by various students, some realize the benefits to be achieved and others use the opportunity of having notes available online to avoid attending lectures. Some students are highly motivated and have the ability to study independently and can succeed without attending lectures. Others need the guidance of a lecturer, alternatively referred to as the: guide on the side; host on the post; or sage on the stage.

Yet again, 80% of students agreed that attending formal lectures facilitates a deeper understanding of course content than online access (Figure 3). One student from the Dublin Institute of Technology commented that "Yes, I think technologies can transform learning but also that lectures and class interaction increase further learning".

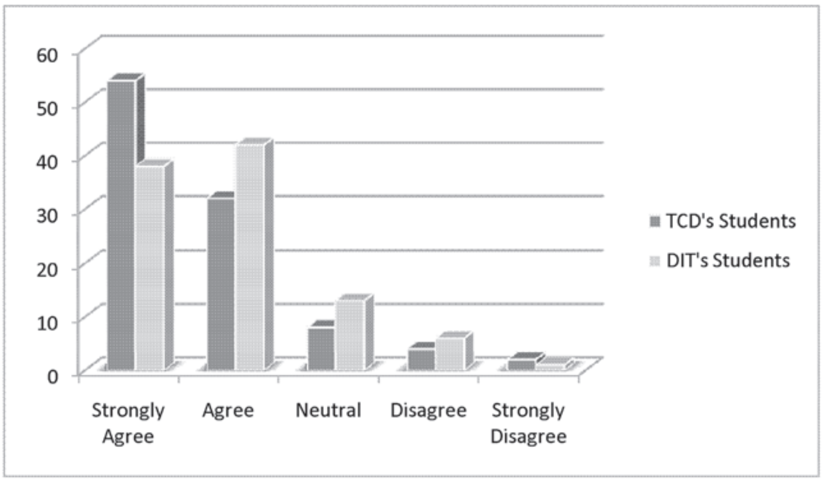
So, even though just slightly over half of the student population in both Trinity College Dublin and Dublin Institute of Technology who participated in this study agreed that having course notes available online makes them more likely to skip the occasional lecture, they still appreciate the fact that attending formal lectures facilitates a deeper understanding of course content.

This study found that 45% of Trinity College Dublin's students and 52% of Dublin Institute of Technology's students disagreed that watching a video cast of a lecture would be as educationally beneficial as attending the lecture in person. Similar to the findings of this study McKinney et al (2009) found that although 60% of undergraduate general psychology students felt that computer-based lectures were appealing, they still preferred the traditional lecture.

Teacher: Student and Student: Student Relationships

An interesting comment on this issue made by one student in the Dublin Institute of Technology was "Yes, technology can transform learning, it enables people to work to their own pace, e.g. if they are a night time student. However, attending lectures allows students to engage in debates and

Figure 4. If course material was available online at the commencement of term it would markedly change students' ability to learn at their own pace.



discussions which are fundamental to social skills because online discussions mean people don't have to think on their feet". This students' perspective is very intuitive, because in life there is a need to know when to respond immediately and when to pause and think before making a contribution, and of course, students need the ability to do both.

This research found that 86% of Trinity College Dublin's students and 80% of Dublin Institute of Technology's students agreed that if course material was available online at the commencement of term it would markedly change students' ability to learn at their own pace (Figure 4).

A student from Trinity College Dublin commented "technology used in an effective way can largely help education, although slides available online can lower attendance it can also improve learning". Once the material provided by lecturers is sufficiently absorbing, students should be suitably engaged to ensure satisfaction with the course, therefore, improving student attrition rates. This research found that 80% of Trinity College Dublin's students and Dublin Institute of Technology's students agreed that the use of technology in higher education increased their satisfaction with their course of study. These findings are consistent with those found by Overbaugh and Shin Yi (2006). Obviously other contributory factors such as personal circumstances, change of course preference, etc. will also influence student attrition rates and satisfaction with courses in all disciplines.

One student from Trinity College Dublin remarked "Technology helps by making course notes more accessible and engaging attention in class (i.e. Slides presentations)". Accessibility to course material and engagement in class can increase students' satisfaction with their course of study.

In this study 66% of Trinity College Dublin's students and 46% of Dublin Institute of Technology's students agreed that the use of video casts would be superior to podcasts for enhancing students' understanding of course material. One student from Trinity College Dublin mentioned "To have traditional lecture or seminar enhanced by modern technologies such as online paper searching, wiki, or some videos. But, technology can hardly replace conventional face to face learning style as current technology does not allow such a high level of interaction, especially gesture, eye contact, etc". Video casts enable students to observe the body language of the lecturer which is an important factor of communication, in addition, to see any supporting blackboard/whiteboard or PowerPoint (Microsoft, 2009) presentations displayed, or even any demonstrations that are taking place, while also benefiting from responses to any questions posed by students attending the class.

Access to Information

Fifty two percent of Trinity College Dublin's students and 55% of Dublin Institute of Technology's students disagreed with the statement that they prefer accessing journal articles from hardcopies in the library to accessing journals online, therefore technologies facilitate fast and efficient access to required information which was not previously possible. Online journals make access to peer reviewed work much more easily obtainable and less time consuming than visiting libraries and trawling through hardbound copies of journals, which subsequently have to be photocopied. Numerous files and articles from electronic journals can be magnetically stored by academics and students conducting research on a technological device called a memory key. Printing from the electronic version is more user friendly than photocopying page by page. The time that is saved by using technology when conducting research can be better spent critically evaluating the relevance of the identified work.

Eighty seven percent of Trinity College Dublin's students and 64% of Dublin Institute of Technology's students disagreed with the statement that when they come across an acronym or new concept with which they are unfamiliar, they seek clarification in the library first and then online. These findings are consistent with those found by Hartman, Moskal and Dziuban (2005). These findings suggests that students' first port of call to seek information is to use technologies, rather than the traditional visit to the library, therefore, the impact of technologies on learning in higher education in Ireland is positive. One student from Trinity College Dublin contributed the following thought "Depends on what you mean by 'transform'. Certainly, it can be a help in finding resources more efficiently and improving collaboration".

A wiki is a web-based document which enables users to add and edit content using only their web browser (Bayne, 2008). In this study 61% of Trinity College Dublin's students and 40% of Dublin Institute of Technology's students agreed that using wiki interfaces increases the value of the students' learning experience. Jelfs and Colbourn (2002) concluded that there were positive correlations between how comfortable students felt while taking part in virtual seminars and the value of the learning experience.

Gilbert et al (2007) conducted a student evaluation of an e-learning module for the Master of Science in Information Technology and Management course, and found that the use of discussion boards and support from other students (peers) were the most frequently cited aspects of the learning process, and in general students felt that they learnt from their peers. One student from Trinity College Dublin commented "I know that the University of Catalonia is a virtual one, however, I still feel that regular interaction with other students is an integral part of the learning experience". In this study 70% of Trinity College Dublin's students and 55% of Dublin Institute of Technology's students disagreed that the use of technology in education could successfully replace the learning achieved through face to face interaction with fellow students (peers). Lea (2001) suggested that computer conferencing can enable students to reflect upon subject-based knowledge in ways that were not possible in more traditional teaching environments and emphasized the importance of students learning from each other in a collaborative learning environment.

Learning Outcomes and Skills Development

When the question regarding critical thinking skills was put to the student participants 41% of Trinity College Dublin's students and 54% of Dublin Institute of Technology's students agreed that the use of technology in higher education improves students' critical thinking skills. 50% of Trinity College Dublin's students and 36% of Dublin Institute of Technology's students were neutral on this statement, maybe the students would need more time to reflect on this statement before making a commitment to agree or disagree.

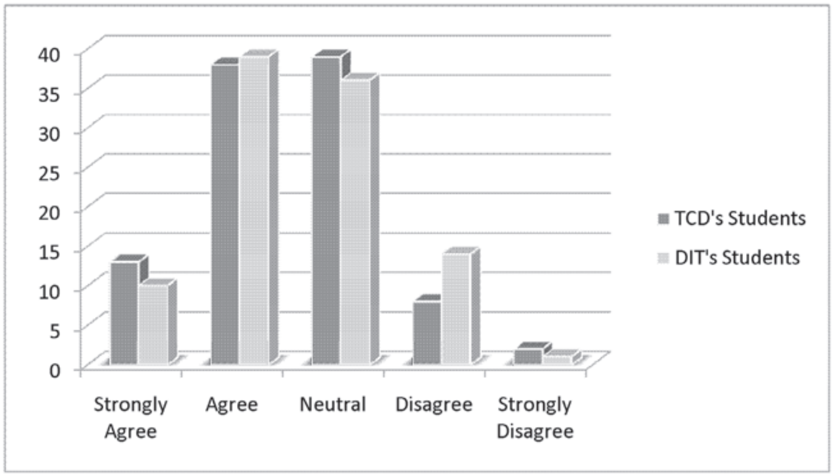
In this study 33% of Trinity College Dublin's students and 44% of Dublin Institute of Technology's students agreed that the learning experience of students would be altered for the better if lecturers discussed topics in class prior to making the notes available online. As previously mentioned one student from Trinity College Dublin observed that "not providing physical handouts means student notes and lecture notes become separated". This is a very relevant point but still some students prefer lecturers to discuss topics in class prior to making the notes available online or providing handouts, this could be attributed to the different learning styles and preferences of students. Students' views on this statement could also have been influenced by their motivational levels. Students who are motivated to do well will often prepare in advance for a lecture by printing off and reading the appropriate notes providing they are available online. Some students prefer to study the topic to be discussed prior to the lecture to enable them to put questions to the lecturer to facilitate their understanding of the topic and to ensure that they achieve the most benefit from the classroom experience.

Students' views on the above statement are clearly very evenly divided. This could be an indication of the difference in learning styles and preference of individuals, which leaves the educator in a quandary: whether to reveal the notes prior to class to suit the learning requirements of students who like to be prepared and engaged with the topic prior to entering the lecture theatre; or to discuss topics in class prior to making the notes available to students online. A student from Trinity College Dublin remarked that "Some students learn best by taking their own notes, others by being able to fully concentrate on what the lecturer is saying and having notes provided for them. It seems to me (possibly due to a fear of low lecture attendances) that lecturers will accommodate the former student but not the latter".

This research found that 37% of Trinity College Dublin's students and 49% of Dublin Institute of Technology's students agreed that they would be forced to learn more in lectures if they had to make their own notes as opposed to having the notes available online, these views on note taking are similar to McKinney, Dyck, and Luber (2009) observations that students who created their own notes during lectures achieved higher scores.

These findings are interesting and perhaps may lead lecturers towards enabling students' access to lecture notes subsequent to the lecture taking place to encourage students to make their own set of notes during the lecture. As lecturers can speak faster than students can write, students have to summarise what lecturers say in order to keep up with the class. This process of summarising content forces students to consciously think about what the lecturer is saying in order to select the most salient points to note. The mere process of writing engages brain activity which will also improve retention. Although, one student from the Dublin Institute of Technology commented that "Being able to add your own notes to the notes available online, learning is decreased if you're concentrating on taking lots of notes instead of listening to the lecturer" this comment was supported by a similar comment made by a student from Trinity College Dublin "Can listen in lectures and try to understand the concepts as they are being discussed, rather than transcribing notes".

Figure 5. Collaborative online research affords the lecturer the opportunity to identify the students that are making the most worthwhile contributions.



In the above discussion about taking notes in class, different viewpoints were expressed; this could be attributed to the acknowledged existence of different learning preferences and styles.

The fact that 77% of Trinity College Dublin's students and 80% of Dublin Institute of Technology's students agreed that the use of technology in higher education improves student engagement with course material indicates that the lecturers that do use technologies as part of their pedagogical approach with students are obviously using the right approach and gaining student recognition for their efforts.

Treleaven and Cecez (2001) from the University of Western Sydney, New South Wales, found that approaching assessment and submission dates had the effect of rapidly increasing the number of postings students made to the bulletin board. Lecturers can monitor students' engagement and participation in online discussion boards, quizzes, and multiple choice attempts, to identify the students who are actively getting involved with the course material and engaging with fellow students, and those who are not. Salmon (2003) recommends that "effective e-moderation underpins the delivery of quality education in the online environment." (p. 10) and "part of the e-moderator's role is to try and orchestrate appropriate participation for the purpose" (p. 59). Lecturers engaging in the use of e-learning platforms with their students should investigate the pedagogical skills recommended for use by e-moderators to improve the quality of the online learning environment that they are providing to enhance their students' learning experience. In addition, through understanding the pedagogical rationale of e-moderators, lecturers could improve their approach to engaging students by employing appropriate online learning activities, in order to achieve the intended learning objectives.

This research found that 51% of Trinity College Dublin's students and 49% of Dublin Institute of Technology's students agreed that collaborative online research affords the lecturer the opportunity to identify the students that are making the most worthwhile contributions (Figure 5).

FUTURE RESEARCH DIRECTIONS

The findings of this research have identified several areas suggesting further investigation would provide valuable insights:

- The sharing of in-depth lecture notes online would make the pass-rate of practically all courses improve. One suggestion for effectively testing this hypothesis is to select a course and split the class into two groups, preferably divided on the basis of equal ability, one group to be allowed share in-depth lecture notes online and the other denied access to this resource, to test if the pass-rate improves. Then conduct the same experiment on other courses to see if this hypothesis holds true.
- Can beneficial learning take place as a result of students using computer mediated communication? Similarly to the suggestion above, learning outcomes of some students would have to be gauged in comparison to the learning outcomes achieved by other students who do not have access to the computer mediated communication resource.
- Studying class notes prior to a lecture facilitates deeper understanding. Again, this hypothesis could be tested to see how it impacted on the learning outcomes achieved by two separate groups of students of similar ability pursuing the same course of study and sitting the same examination.

Another area that could be explored; will the current economic climate in Ireland impact on the volume of households subscribing to broadband access? This could be considered as a luxury, not a necessity to some, and could impact on students' ability to engage with learning technologies from their homes or rented accommodations.

CONCLUSION

In excess of 90% of the students involved in this study agreed that the use of technologies in higher education makes a positive difference to studying. More than 80% of students agreed that the use of technology effectively enhances the learning experience and increases satisfaction with their course of study. Over 75% agreed that technology improved student engagement with course material.

The statistics outlined in this chapter indicate that even though students expect technologies to be used in higher education, they realise that lecturers form the backbone of third level education, and while technologies can effectively be used to enhance students learning experience, the use of technologies in higher education will never replace the lecturers, these findings are consistent with those found by Wilson and Christopher (2008).

There is no indication at all to suggest that students wish to see academic staff removed from their educational experience. Over 70% of students disagreed that the use of technology will make lecturers disposable. Students realise the benefits to be achieved from face to face interaction with lecturers and peers. 80% of students agreed that attending formal lectures facilitates a deeper understanding of course content than online access. Even though students identified some beneficial uses of technologies in their learning experience, the human aspect is missing, as one student from the Dublin Institute of Technology commented that "Technologies major fault is that you cannot easily ask a question. Lecturers will be able to answer immediately, while searching through computer data may lead the answer seeker astray." Hence, the use of technologies can enhance the learning experience of students, but lecturers are required for guidance and support.

The use of technologies in higher education has certainly made information more readily available to students than before, but providing adequate guidance and instruction, basically educating students on how to effectively turn this information into knowledge is still the responsibility of lecturers. One student from the Dublin Institute of Technology commented that "Lecturers will always be needed. Technology cannot always be trusted."

In order for e-learning to be a success university management and staff must take ownership of e-learning and satisfy themselves that pedagogy can be maintained, even though the medium of delivery is changing. The use of technological devices as enabling tools in higher education appears to bring some advantages, but to quote one student from the Dublin Institute of Technology "It helps definitely, but I do not think it can, or ever will, replace lecturers, interaction in class is how I feel I learn best." I think this comments nicely sums up the findings of this study.

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KEY TERMS AND DEFINITIONS

Attributes: An evaluation of current literature was performed to identify key attributes to be explored and; from these attributes statements were devised to seek student perspectives regarding the issues identified.

E-Learning: The skill of acquiring information through the use of technological devices which is subsequently turned into knowledge.

Higher Education: Educational establishments which students may attend at some period in their life, predominantly after leaving secondary/ post primary education in order to engage with further education.

Learning: The skill of acquiring information that is subsequently turned into knowledge.

Memory Keys or USB (Universal Serial Bus) Keys: Are small portable electronic storage devices which are compatible with most desktops and laptops.

Podcasting: Subject matter in audio format that can be downloaded to technological devices.

Student Perspective: Student opinions.

Technology Enhanced Learning: The use of technology to enhance the learning experience.

Video Casting: Subject matter in multi-media format that can be downloaded to technological devices.

Virtual Learning Environment (VLE): Technologically facilitated educational resources which provide ubiquitous access with the objective of enhancing the learning experience.

Chapter 11
Study and Non-Study Related Technologies use of Flemish Students in Higher Education

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ABSTRACT

"Living technologies", such as social networking sites and mobile phones are, nowadays, the subject of educational research. In this chapter we attempt to shed light on the relationship between the reasons for the use of living technologies and learning technologies from students' perspectives. In this exploratory research project, 15 students were interviewed several times throughout the academic year and 143 students, from various bachelor programs at a Flemish university (Flanders/Belgium) completed an online survey. Results demonstrate that these students make a clear distinction with regard to the frequency and reasons for use of living technologies and learning technologies, with these students rarely use living technologies (for instance, Facebook or mobile phones) for educational purposes. Results are explained in terms of privacy and the reluctance to use particular applications for several non-educational reasons. We end with some possible suggestions for follow-up research.

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INTRODUCTION

For several years, many researchers have conducted empirical research with respect to information and communication technologies (ICT) and higher education (e.g. Kennedy, Judd, Churchward, Gray & Krause, 2008b; Lorenzo, Oblinger, & Dziuban, 2006). However, few researchers have investigated what higher education students actually do when they are staring at their screens. In our research, we wished to shed light on students' use and meanings of study-related use of ICT. We asked the students how much time they spent using ICT applications and for what reasons. More precisely, we wanted to unravel the relationship between study and non-study related ICT use from students' perspectives. Therefore, the following central research question was developed: "How do living technologies relate to learning technologies concerning frequency, time and educational use from students' perspectives?"

In order to answer the central research question, we begin from our theoretical background on the complex relationship between ICT and education, by outlining some terms and well-known research outcomes. Next, we look more in depth at the popularity of so-called "living technologies". In our research, only four kinds of living technologies were studied (namely computers, mobile phones, video games, and mp3 players). This is followed by a summary of the rise of learning technologies, with virtual learning environments (VLEs) as one of the most popular types of educational application. Through the literature review, we show whether or not living technologies are embedded in higher education. We end our theoretical framework by showing to what extent students and the faculty are inclined to use living technologies in their educational activities. The section on methodology is then followed by the results obtained from the research. These data are addressed in the same way as our theoretical background: first we outline the results concerning the rate and use of living technologies, followed by a discussion of students' use of learning technologies. Next, we show whether or not living technologies are embedded in higher education from the students' point of view. Finally, we conclude with a reflection on the research outcomes, in order to attempt to explain some phenomena observed, and to provide suggestions for follow-up research.

THEORETICAL BACKGROUND

Students and ICT

Throughout the last decade, many researchers argued that the current generation of learners has grown up with ICT as an integral and very important part of their everyday lives. This generation has been referred to as "digital natives" (Prensky, 2001). These young people are (p.1) "surrounded by and using computers, video games, digital music players, video cams, cell phones, and all the other toys and tools of the digital age" (Prensky, 2001. Howe and Strauss (2000) referred to them as "Millennials", which they perceived to be a generation quite different from the previous, the "Generation X" (cf. Bennett, Maton, & Kervin, 2008; Pedró, 2006). In the literature other assertions are made, for instance, because Millennials are defined as being very creative with technologies and highly skilled at multitasking, they are also referred to as the "Net Generation" (Oblinger & Oblinger, 2005; Tapscott, 1998) or the "Instant-Message Generation", referring to the popularity of Instant Messages (Lenhart, Rainie & Lewis, 2001). Given the immense popularity among young people of video games, Carstens and Beck (2005) call them, not surprisingly, the "Gamer Generation". Finally Veen (2003) refers to this generation as the "homo zappiens", for their ability to control simultaneously different sources of digital information. Summarizing, one can state that today's students are very familiar with different types of ICT.

Despite the variety of labels, many educational researchers have raised the same fundamental question: is our current education equipped to meet the needs of today's students (cf. Bennett et al., 2008)? Tapscott (1998, p. 131) for example states: "There is growing appreciation that the old approach is ill-suited to the intellectual, social, motivational, and emotional needs of the new generation". Similar conclusions can be found in Veen (2005, p. 6): "… the education system itself will experience difficulties in keeping up the old teaching methods for students who think schools and traditional training is irrelevant to them". In other words, the differences are so significant that the nature of education itself must fundamentally change to accommodate the skills and interests of new generation of students. Moreover, there is also a substantial gap in ICT skills between the students and the faculty; Prensky (2001) refers to those born prior to 1980 as "digital immigrants", "people who became fascinated by and adopted many or most aspects of the new technology". Prensky (2001, p.2) argues that digital immigrants speak a different, outdated language and this is "the single biggest problem facing education today".

The distinction made by Prensky between digital natives and digital immigrants has received a lot of criticism. The first, and perhaps the most crucial here, is the observation that the distinction has been based on conjecture and anecdotal accounts (Bennett et al., 2008; Waycott, Bennett, Kennedy, Dalgarno, & Gray, 2010). The second comment on Prensky's work is twofold: on the one hand, empirical research has shown that the "one size fits all" approach, characteristic for digital natives, does not reflect reality. A study among 2,120 first year students of an Australian university by Kennedy et al. (2008b) showed that "the patterns of access to, use of and preference for a range of other technologies show considerable variation" (p. 117). In a similar vein, Lorenzo et al. (2006, p. 4) state that "today's students are not just the traditional-age Net Generation, nor have they all had the benefit of state-of-the-art, ubiquitous technology". Reasons for this heterogeneity, for instance, were found by Lee (2005). She concluded that the technologies used by children and teenagers depend on the contexts of use, for example, children's school and home backgrounds.

Pedró (2006, p.6) concluded, in a comparative research among the Organisation for Economic Co-operation and Development (OECD) countries concerning ICT use, "that in all OECD countries teenagers behave differently with ICT at home and at school". Furthermore, Pedró refers to gender issues: boys have been using computers for a longer time than girls. Kennedy et al. (2008b) identified potential differences in students' experiences with technology related to socio-economic status, cultural and ethnic background, gender and discipline specializations. Conversely to Prensky's statement, it seems that the "digital divide" between generations does not fit in classroom reality. Although little empirical research about this "digital divide" has been conducted, Kennedy et al. (2008a) found limited evidence of a divide between staff and students in technology use: for four out of eight categories of technology usage (namely standard mobile use, advanced mobile use, standard Web and music, and computer games), statistically significant age related staff-student differences were found, but in each category the differences were relatively small. Waycott et al. (2010) conducted research on student and staff perceptions of ICT and concluded that their findings do not support (p.1208) "the claim that there is a substantial gap between more technologically adept younger students and their less savvy teachers caused by differences in exposure to technology during their lives". In other words, it could be stated that there is no difference *between* generations as far as access and use of ICT are concerned, but rather *within* generations.

Rise of Living Technologies

This second part gives a short overview of modern popular living technologies. In the absence of a clear definition of living technologies, we regard living technologies as current technologies that are commonly used during everyday activities (e.g. communication, work, hobbies). This analysis is focused on four common living technologies: computers, including social networking sites and Web search engines (e.g. Google and Yahoo!), mobile phones, video games (and attributes such as the Wii) and mp3 players (cf. Anderson, 2008), because our focus during data-collection was upon these living technologies.

Computers

In the literature, we found that some surveys were conducted to obtain an overview of students' access to computers. In a 2004 study undertaken by the Educause Center for Applied Research (ECAR) regarding the computer ownership and use of students in 13 American universities, Kvavik, Caruso and Morgan (2004) found that 93.4% owned one or more personal computers (either a desktop or a laptop computer), and 11.9% owned a handheld computer (also known as personal digital assistant (PDA)). The most common applications of these technologies were word processing (99.5%), e-mailing (99.5%) and surfing the Internet for pleasure (97.2%). An ECAR study in 2007 (Salaway, Caruso, & Nelson, 2007), collected data from 27,864 students at 103 community colleges. It revealed that 98.4% of the participants in the study already owned a personal computer. There is no equivalent study available for Flanders, Belgium, but in a study of computer use amongst first-year students in a large Flemish university we found similar information. These Flemish researchers found in 2004 and 2005, that 99% of the first-year students owned a computer, and all except two students in the sample, had Internet access at home and/or at their university residence (Verhoeven, Heerwegh, & De Wit, 2010). In 2005 the computer was used daily by 49% of the students for study, by 54% for chatting, by 9% for games, and by 18% for other hobbies.

Although these results reveal more about the technologies than the access and use of students, it is more interesting to narrow the view to the most popular technologies used by students given our research focus, namely students' use of social networking sites. Furthermore, this popularity in social networking sites increases the chance that living technologies will also be used as "learning technologies" (Vivian & Barnes, 2010). One of the most popular living technology types are social networking sites. For instance, Tufekci (2008) found that between 80% and 90% of college students have a profile on some form of social networking sites. In September 2009, 71% of a sample of American young adults owned a Facebook account, 66% a MySpace account, and 7% a LinkedIn account (Lenhart, Purcell, Smith, & Zickuhr, 2010). In February 2010, Facebook surpassed 400 million active users, and is by far the world's most popular social networking site, followed by Windows Live Profile, and MySpace (Blevis, 2010).

Mobile Phones

Empirical research studies on students' rates of mobile phone ownership are scarce. Most researchers focus upon young school children's use of mobile phones (e.g. Döring, Hellwig, & Klimsa, 2005; Williams & Williams, 2005; Wilska, 2003). A recent Flemish study however (Onderzoeks- en Informatiecentrum van de VerbruikersOrganisaties (OIVO), 2010), demonstrated that 98% of 17-year-olds possess their own mobile phone. In the already-mentioned ECAR study, Kvavik et al. (2004) revealed that 82% of the students owned a mobile phone. As the ECAR study shows, it would be reasonable to expect similar results concerning the rate of mobile phones for university students.

Waycott et al. (2010, p.1206) found that "many students suggested that the mobile phone was a wholly personal tool and therefore not an appropriate medium for university-student communication". In a similar vein, some staff members interviewed chose not to employ such technology, in order to clearly separate work from home.

Video Games

There is an enormous amount of empirical research available concerning youngsters' possession of video games (cf. Buchman & Funk, 1996; Pratchett, 2005), but here we limit ourselves to the Flemish context. A Flemish study (OIVO, 2009) of 2,336 pupils (age 7-17), demonstrated that in two out of three cases, they owned a game console to play video games. To attain a more in-depth view, Aupaix and Vandercammen (2007) undertook research regarding leisure activities, and collected 2,200 structured interviews of youngsters between 9 and 18 years old. They found that 64% regularly played video games whereas 93% regularly surfed the Internet.

Mp3 Players and other Mobile Applications

The research domain concerning mobile learning[1] is booming but this is not our research focus. Nevertheless for our project information on the educational use of mp3 players was important. In the UK, four characteristics of educational podcasting have been distinguished: teaching-driven means for example that podcasting provide a repeat or summary of a lecture given. Service-driven (p. 549) "allows for diverse choices and preferences in usage for information gathering and dissemination" (Harris & Park, 2008). Marketing-driven means that allowing podcasts can lead to higher amounts of students. Technology driven podcasting, finally (p.551), "is based on the belief that the use of any technology may help in teaching about podcasting, for use by teachers" (Harris & Park, 2008). Without over-elaborating on these podcasting usages, we take this research domain into consideration as part of the popular living technologies spectrum.

This overview of these four living technologies then, demonstrates the observation that today's students' living and learning environments are permeated by current technologies. The results from our research (see below) are conceptualized within the framework of international literature concerning the current popularity of such living technologies.

Rise of Learning Technologies

Along with living technologies, attention toward learning technologies has also increased. Due to the rapid development of the World Wide Web, learning technologies have gained global general acceptance (Brown, 2010; Jacobs, 2001). Rapid growth in e-learning has coincided with the emergence and growth of VLEs, also known as Learning Management Systems (LMSs) or Course Management Systems (CMSs). As with the living technologies, it is rather difficult to give a common definition of learning technologies. The UK Joint Informations Systems Committee (JISC), however, gives us a clear definition of VLEs, describing them as computer applications that support online interactions of various kinds which take place between learners and tutors, and the components through which learners and tutors participate in such interactions, includes online learning (JISC, 2002).

In the past decade, there has been a dramatic increase in the uptake of VLEs by UK higher education institutions with a penetration rate of 95% (e.g. Oliver, 2005). According to Brown (1998), the drivers behind VLE adoption can be traced back to the early 1990s, when higher education institutions were facing new challenges, such as rising costs, greater variability between students, and calls for increased accountability[2] (Virkus et al, 2009). Notwithstanding the hype around VLEs, Brown (2010, p. 7) concluded in a very recent reflection paper that "Web 2.0 tools might turn out to be a lot more popular [compared to VLEs] among learners and teachers because they meet user needs better than institutional VLEs". Brown (2010) prefers Web 2.0 tools to VLEs because Web 2.0 tools have the potential to fundamentally change the nature of learning and teaching. Furthermore, their use may challenge the role of traditional institutions in a way that previous technologies could not.

In line with Brown's preferences, we focus more on Web 2.0 tools. In fact, we investigate more closely educational possibilities and more exactly students' use and their opinions of these Web 2.0 tools.

Living Technologies in Education

Given the enormous popularity of living technologies and the rise of VLEs in higher education, it will not come as a surprise that universities are trying to use such living technologies for educational purposes. From the long-term commitment to bring the world into the classroom (cf. Brown, Collins, & Duguid, 1989), it seems this movement of making a more realistic classroom is considered as quite normal. Around five decades ago, educators started with the use of instructional television, films and radio (cf. Cuban, 1986). Later, as an efficiency approach, the computer was introduced into Flemish higher education, and nowadays much research is conducted about the educational use of technologies, for example, the educational use of podcasts (e.g. Harris & Park, 2008), the educational use of social networking sites (e.g. Schroeder & Greenbowe, 2009; Selwyn, 2009) and "educational video games" (e.g. Egenfeldt-Nielsen, 2006; Hutchison, 2007).

In the literature concerning the educational use of popular technologies, modern students seem to perceive living technologies (e.g. computers, mobile phones) as learning tools. Krause, Hartley, James and McInnes (2005), for example, reported that in a survey among 2,344 first year undergraduate students of Australian universities, the average time per week spent on the Internet for study and research was 4.2 hours. Only 3% admitted they had never used the Internet for study purposes. A more recent survey of first-year engineering and business students of Australian universities by Oliver and Goerke (2007) indicated that over 90% of the students used online resources for study purposes. An American study surveying 1,277 students found that 56% used social networking sites for education-related topics, such as college planning and schoolwork (National Boards Association, 2007).

Focusing on social networking sites, things become clearer as to what extent living technologies find their way into higher education. Today, social networking sites are being promoted as an adequate environment for exchanges between lecturers and students in higher education. Several scholars have argued that social networking sites create tools and possibilities for the establishment, fostering and strengthening of *informal* learning (e.g. Bartlett-Bragg, 2006; Bugeja, 2006; Mason & Rennie, 2007; Selwyn, 2007). On the other hand, some research has been conducted in order to grasp possible learning opportunities of social networking sites directly related to *formal* education. For instance, Ajjan and Hartshorne (2008) conducted a survey among 136 members of the teaching staff of an American university about the benefits of using Web 2.0 technologies in the classroom. They found that 26% of the teachers currently use social networking sites, and another 14% plan to use them. The results of such research give us interesting information as to the extent living technologies are used for educational purposes. More interesting however, is the question of whether such daily use also has positive educational effects.

Klein (2008) indicates that the use of social networking sites in secondary education can lead to the improvement of academic performance, to higher test scores, and to better student achievement. Not only academic performances, but motivation and class climate as well, seem to benefit from a highly self-disclosing faculty on Facebook (Mazer, Murphy, & Simonds, 2007). Undoubtedly, research with such positive findings contributes to the conviction of many that social networking sites are not only providing educational opportunities, but should be integrated into formal learning practices as well. Despite these promising results, using social networking sites in education also seems to entail some drawbacks. Brabazon (2007) argued that using social networking sites for educational purposes carries feelings of disengagement, alienation and disconnection from education. In a "New Yorker" article, Cassidy (2006) warned of the ample opportunities for distraction social networking sites provide.

While research on social networking sites is rather recent, research on the effects of video games has a longer tradition, with a recent boost (Bourgonjon, Valcke, Soetaert, & Schellens, 2010; Kebritchi, Hirumi, & Bai, 2010). Despite the explosion of research upon the use of video games for educational purposes, only a few researchers have studied the effectiveness of "educational" video games as a subject of research. In a literature study, Egenfeldt-Nielsen (2007) argued that motivation and involvement of students are significantly higher when video games are used in education. A few years ago the EPN-platform for the Information Society (2003) in the Netherlands published a document referring to seven advantages of using video games in higher education compared with the more traditional ways of education. The advantages identified included motivation, one-on-one interaction, coaching, interaction, suitability for different sorts of information transfer, natural learning and the saving of time and money. Subsequently, Copier (2004) has indicated that virtuality, connectivity, multimediality and interactivity as the properties of digital media, are also the reasons for which video games should be implemented in education.

This accumulation of claims and results is very promising, but has to be nuanced. There are indeed a lot of difficulties that arise concerning the research of educational video games. It is, for example, very challenging to define the concept of "educational effectiveness", and to find valid instruments that can measure the "learning outcomes" of video games. Furthermore, questions have to be asked as to what extent the current infrastructure of faculties is sufficient to implement video games in higher education (cf. Tüzün, 2007).

Willingness

The above literature review of the implementation of living technologies in higher education focuses on the positive and/or negative *effects* of such technologies. What participants in this debate tend to neglect however, is the *willingness* of the students and faculty to work with living technologies in their educational activities. "Willingness" can here be defined as a free choice to do or use something, free from reluctance or coercion (cf. Brainyquote, 2011). This is, in our view, of crucial importance: when neither students nor faculty members want to use living technologies in the educational context or for educational purposes, it seems that these effects, which were mentioned above, will not become visible. Therefore, and in order to frame our research questions, we further studied the literature on this concept of willingness with respect to the educational use of living technologies such as video games and social networking sites on the Internet.

With some exceptions concerning the heterogeneity of students (e.g. Waycott et al., 2010), the observation that college students are more enthusiastic users of new technologies in higher education than their faculties, seems to be a common presumption today (e.g. Ajjan & Hartshorne, 2008; Kleiner, Thomas, Lewis, & Greene, 2007; Roblyer, McDaniel, Webb, Herman, & Witty, 2010). The sparse research base regarding student willingness to use technologies for education purposes is not unanimous however, especially where Facebook is concerned. For example, Hewitt and Forte (2006) surveyed 176 undergraduate students of an American university and came to conclude that of the 102 students who responded to the question on whether or not it is acceptable for faculty to be on Facebook, 66% found this acceptable. Similar results can be found in the research by Mazer et al (2007). They enrolled 133 undergraduate students (average age of 18.76 years) in sections of the basic communication course at an American university and showed that 61%, to a more or lesser extent, found it to be appropriate for the faculty to be on Facebook. A recent US report (Kleiner et al, 2007, p.11) on educational technologies use in teacher education programs by the National Center for Education Statistics concluded that "54% [of the institutions] reported that teacher education candidates' lack of interest was not at all a barrier [with respect to integrating technologies in education] and 41% reported it was a barrier to a minor extent". Roblyer et al. (2010) held an online survey among 120 students, representing a sample of an American university's student population, about the use and perception of social networking sites. They found that 46.7% of the students answered positively to the question on whether it would be convenient to use Facebook in education.

However, other research has come to different conclusions. Madge, Meek, Wellens and Hooley (2009, p.150) showed in a study among 213 UK students that a considerable group (41%) "would not like tutors to contact them via Facebook for formal teaching purposes".When facing the question of whether or not it is appropriate for teachers to use Facebook for educational purposes, only 36% answered this question positively. Furthermore, Madge et al. (2009) found that UK students actually use Facebook more for socializing and talking to friends about education-related matters than for undertaking formal educative work (e.g. making group papers). West, Lewis, and Currie (2009) examined the extent to which older adults and, more specifically, parents are accepted as Facebook friends by students. They interviewed 16 students, all between the ages of 21 and 26, and found that the majority of the students were inclined to consider Facebook as a tool as being part of their private lives. Concretely, only one student reported that her mother was a member of her Facebook's friends list.

The 2007 ECAR Study (Salaway et al, 2007, p.14) resulted in a clear conclusion: "Students in our focus groups were quite consistent on this topic, saying that they prefer that IM [Instant Messaging] and social networking remain within the scope of their private lives". Connell (2009) conducted research concerning libraries using Facebook and MySpace as outreach tools for students. Based on a survey of 366 Valparaiso University first-year students, she recommended that librarians proceed with caution if they want to use Facebook or MySpace as a support tool. She found that 12% of respondents reacted negatively due to a possible incursion on one's privacy. Finally, it seems that higher education students are even reluctant to use hardware for educational reasons. Lohnes and Kinzer (2007, p.3) concluded in their small study interviewing nine students from eight different liberal arts colleges, that these "students almost universally reviled the idea of using a laptop in the classroom".

Turning then to the faculty, Kleiner et al. (2007) concluded that staff reluctance, more than student reluctance, remains a major barrier to effective integration of technologies in teacher preparation. Similar results can be found in Roblyer et al. (2010): 53.2% of faculty members of an American university, compared to only 22.5% of the students, accepted the theory that Facebook is for personal and social use, and not for education. As already mentioned, there is no unanimity on this research topic. For example, Waycott et al. (2010) asked 64 first-year students and 31 teaching and support staff from three Australian universities about their perceptions of ICT. Although there were limitations for staff members in using technologies within higher education (e.g. workload increases, usability/technical issues), several benefits were also given including (p.1207): "communication benefits, convenience, gaining access to information resources, distance education benefits and providing opportunities to review and revise learning materials".

Clear conclusions about students' and faculty's willingness to implement living technologies in educational activities are missing. What we can conclude, however, is that survey analysis is the most implemented method of investigating students' (and faculty's) willingness to use technologies for educational purposes (e.g. Kleiner et al. 2007; Madge et al., 2009; Salaway et al., 2007). Qualitative research about students' and faculties' willingness to use living technologies educationally appears to be rather sparse (e.g. Sturgeon & Walker, 2009, although mixed methods research designs are emerging. An exception is the research conducted by Selwyn (2009), who studied the content of wall messages on Facebook posted by students. He analyzed the Facebook 'wall' activity of 909 undergraduate students in a UK university and found that students hardly (only 4% of all wall messages) discussed educative topics on Facebook, and when they did, this often appeared uncomfortable for at least one of the parties. However, even the qualitative analysis of wall messages seems not to account for the potential richness and depth of experiences in students' self-reports of their Facebook usage (Selwyn, 2009). In other words, students' opinions or students' voices as such are not questioned. Thus, researchers who give the word literally to the students (and staff members) are very scarce (exceptions are Lohnes & Kinzer, 2007; Waycott et al., 2010; West et al., 2009), especially in the Flemish context.

In this research, we were specifically interested in the daily ICT use of the respondents. As such, we investigated the relationship between the living technologies used by our respondents and their use of learning technologies, focussing on the opinions and perceptions of the students on their ICT use. Hence, the following research question was framed: "How do living technologies relate to learning technologies concerning frequency, time and (educational) use from students' perspective?"

METHODOLOGY

To ascertain the daily use of ICT by students, and their perceptions and opinions of this use, data were gathered in two ways. First, 15 randomly selected students from different programs at a Flemish university (Flanders/Belgium) were interviewed several times in-depth during the 2009-2010 academic year. Students were recruited at random, and their participation was voluntary. Five males and ten females participated, all bachelor students studying different courses of the university. The rationale behind choosing bachelor students as respondents was that college students tend to easily adopt new technologies (Pempek, Yermolayeva, & Calvert, 2009). In this sense, we received results from 'ICT-minded' students. Possible respondents were invited to participate in the study by e-mail. Furthermore, first-year students were excluded because of their limited experience with the specific Blackboard-based Learning Management System installed at the university, called TOLEDO. In other words, the TOLEDO system is a brand of Learning Management System (LMS).

Prior to the interviews, two focus groups were composed to test the interview guidelines. These focus groups also helped to familiarize the researchers with students' vocabulary related to these new living technologies. These 15 students were interviewed four times, in order to observe the possible evolution of the ICT use of the participants. In fact, due to drop-out, failed appointments and the work pressure on these respondents, we were obliged to select new respondents during the data collection. Therefore, only four respondents were interviewed four times. The other respondents were interviewed once, twice or three times, mainly depending on their perceived workload. In total, 36 in-depth interviews were conducted. Overall, the face-to-face interviews were directed towards exploring the use of different ICT applications for study and non-study related purposes, as well as the meaning of that use. The interviews were conducted as much as possible at the students' residences on campus for two reasons: to create an environment where students felt comfortable, and to give the opportunity to the interviewer to check the living technologies used by the participants.

A second part of data collection consisted of two online surveys: the first in November 2009 (further referred to as Web Survey 1) and the second in March 2010 (further referred to as Web Survey 2). The two Web Surveys were conducted outside of examination periods. These surveys concerned the students' daily ICT use. Students filled in responses to the questions for seven consecutive days. The online survey contained 28 questions and consisted of three sections. In the first section, demographic characteristics of respondents were collected through four questions. The second section contained 12 questions and aimed to gather information on the respondents' use of their personal computers. The final section, with 12 questions, asked students about their use, and perceptions of their use, of living technologies besides their personal computers (for example their mobile phones). Students received an e-mail containing a link to the survey. During Web Survey 1, 67 students (26 males, 41 females) provided data about their everyday ICT use, and in Web Survey 2, 76 students (14 males, 62 females) responded to the survey. Despite the samples being prepared using the same principles, these two online surveys cannot be merged because significant differences appeared with regard to gender and faculty[3] (respectively χ^2 = 7.344, p =.007, df = 1 and χ^2 = 27.042, p =.008, df = 12). In addition to completing the surveys, students were also asked to keep a diary with respect to their daily ICT use.

All interviews and the focus groups were digitally recorded with the interviewees' permission, and transcribed verbatim. A qualitative data analysis tool, NVivo 8.0, was used to assist with the coding of the data into themes and subcategories. These themes and subcategories reflected the research question and the themes that emerged from a close reading of the data. Data from the online survey were analyzed using SPSS 17.0. Chi-square test and Fisher's Exact test were used to search for correlations between variables (e.g. amount of computer use, time spent on social networking sites, time spent on TOLEDO, total amount of checking their private e-mail, total amount of checking their Webmail, total SMS sent, total SMS received, and so on).

RESULTS

In order to answer the central research question and to increase our understanding of the different kinds of results found, first we explore which living technologies were frequently used by our respondents. Second, we present a summary of the learning technologies used by the students. Finally, we discuss how students perceive the relationship between living and learning technologies. This discussion then allow us to draw conclusions on the extent living technologies are implemented in students' educational activities.

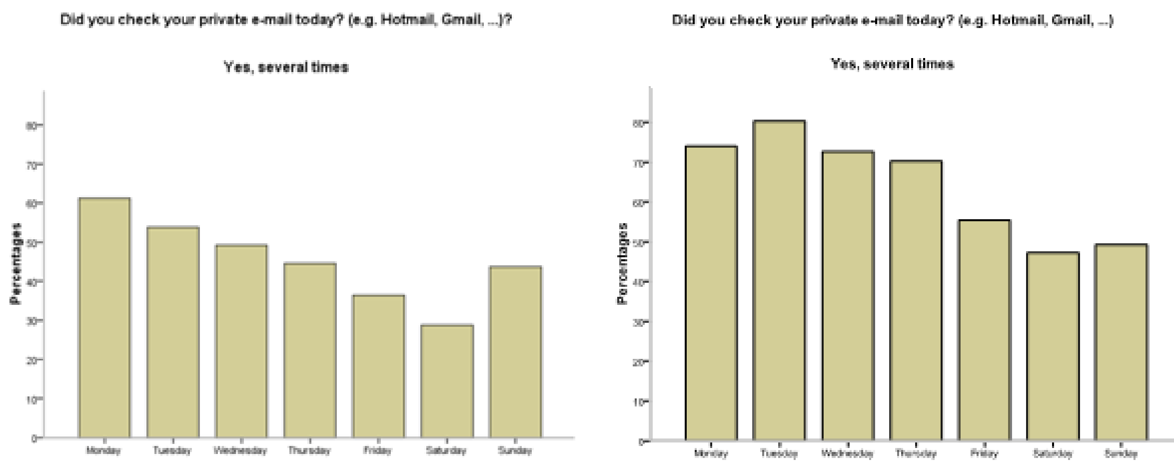
Popularity of Living Technologies

Computer

It was no surprise that every respondent participating in the in-depth interviews and the Web Surveys possessed their own computer (cf. Kvavik et al., 2004; Salaway et al., 2007). While visiting the interviewees, it became clear that most of the students[4] enjoyed many other related living technologies as well: printers, external hard disks, PlayStations, and so on. One student even possessed two screens: " I use my external screen for watching television[5] " (respondent 1)).

When we looked more closely at the students' use of their personal computers, we found students used them approximately every day:

Figure 1. Proportion of students checking daily their private e-mail (websurvey 1 and 2)



Interviewer: "So you use your laptop every day?"

Respondent 12: "Yes".

Interviewer: "And do you think that's also the case with your peers?"

Respondent 12: "Yes, I think so".

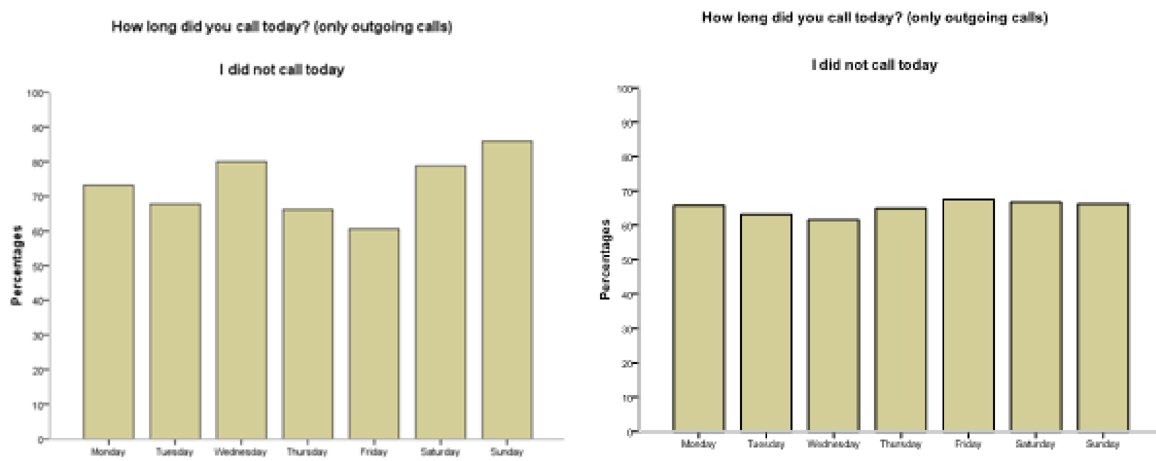
With respect to the Web Surveys, we collected the following figures: 93.7% of the 143 students of both Web Surveys used a computer daily, 5%, 5 or 6 times per week, and only 2 students (1.4%) used this popular device 3 or 4 times/week.

When we looked closely at their everyday activities, interesting behavioral patterns emerged. Figure 1 shows the distribution of students' checking of their e-mail on a particular day. In Web Survey 1, more than 40% of the students checked their private e-mail several times a day during the week, except on Friday. The results of Web Survey 2 had the same pattern, however with a higher level of overall use than at the beginning of the academic year.

Our results confirm, as already stated above, the enormous personal popularity of social networking sites among students. There is some indication that Facebook might be even more popular during the exam period, as respondent 6 mentioned: "But during the exams I visit it [Facebook] more often because, as I said before, if I reward myself I may visit it for example like 10 minutes". Indeed, 92.50% of Web Survey 1 students and 84.20% of Web Survey 2 students indicated they are members of at least two social networking sites with MSN Messenger and Facebook being by far the most popular. Furthermore, students with a Facebook account indicated they are connected every day to the Facebook website, on average, for almost 77 minutes[6].

Other well-known websites are also very popular. For example, 43.30% of the Web Survey 1 students and 50.70% of the Web Survey 2 students indicated they visited the search engine Google on Monday. However, these figures decreased as the week progressed with 9.10% and 25% of the students respectively indicating they used Google on Saturday. On a weekly basis, 17.87% of Web Survey 1 students and 29.44% of Web Survey 2 students visited You Tube. Other often referred-to websites were news sites (e.g. www.

Figure 2. Results of web survey 1 and web survey 2 for the question: How long did you call today? (only outgoing calls)



destandaard.be) and websites for online gaming (e.g. www.spele.nl).

Mobile Phones

All participants, except one interviewee, owned a mobile phone. This is not very surprising and corroborates earlier research conducted in Flanders (cf. OIVO, 2010). More precisely, we asked the students what they actually did with their mobile phones:

Interviewer: "And can you tell me how many SMS you send each day?"

Respondent 7: "Between the (- -) 10 and 15 each day, I guess. Sometimes it's a bit more but that's the average".

Similar results were to be observed in the Web Surveys. Web Survey 1 students sent an average of 16.71 SMS messages on a daily basis, Web Survey 2 students only 12.94 SMS messages. However, students were not inclined to use their mobile phones for making phone calls. On an average daily basis, 73.19% of Web Survey 1 students and 65.14% of Web Survey 2 students did not use their mobile phone to call someone (cf. Figure 2).

Moreover, only 4.77% of the students in Web Survey 1 and 6.09% of the students in Web Survey 2 made phone calls that lasted for more than 15 minutes during a day.

Video Games

43.3% of the students in Web Survey 1 and 30.1% of the students in Web Survey 2 indicated they played an online video game on Monday whereas only 19.7% and 18.1% of the students in respectively Web Survey 1 and Web Survey 2 indicated they play an online video game on Saturday. We only asked them to give the hyperlinks they used, so we can not give more accurate information about the popularity of different types of online games. Furthermore, these results are restricted to online games[7].

Mp3 Players

43.28% of the students in Web Survey 1 and 42.10% of the students in Web Survey 2 indicated that they have an mp3 player[8]. On a weekly basis, 13.79% of the students in Web Survey 1 and 13.56% of the students of Web Survey 2 indicated they listened more than 7 hours/week to their mp3 player.

Popularity of Learning Technologies

At the university in which the research was conducted, a specific Blackboard-based Learning Management System is installed, known as TOLEDO where students can find, for example, documents about courses, tasks, exams. The overwhelming majority of faculty members make their teaching content (e.g. slides) available on TOLEDO and often refer to it when students require more information about several aspects of their study. Students indicated in the interviews that they use TOLEDO quite often:

Respondent 2: "I visited it [TOLEDO] at least four or five times a week, maybe on a daily basis"

Respondent 3: "I check TOLEDO at least once every two days"

Other respondents, like Respondent 14, tackled the issue differently:

Interviewer: "Do you use it [TOLEDO] a lot?"

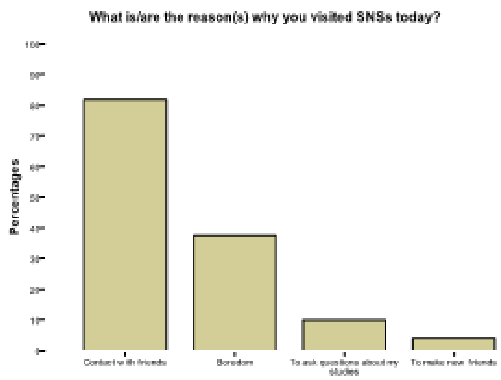
Respondent 14: "No, rarely. Just to check my schoolwork and that's all".

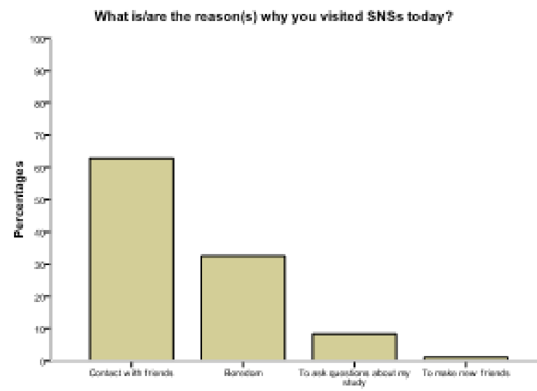
The results from the online surveys confirmed these qualitative findings. Web Survey 1 indicated that 43.07% of students visited the TOLEDO website once a day, and 40.77% answered that they visited the TOLEDO website several times a day. Similar results were found among Web Survey 2 students: on average 40.41% of them visited TOLEDO once a day, and 43.07% several times a day. Very striking however, is the frequency of visits to TOLEDO by students during the weekend. Whereas only 1.5% of Web Survey 1 students admitted that they did not visit the TOLEDO website on Monday, 30.3% did not look at it on Saturday. The results of Web Survey 2 are even more striking: 43.1% of these students did not visit TOLEDO on Saturday, whereas only 4.1% did not do so on Monday.

We also asked our respondents why they checked TOLEDO, several times or just once, on a daily basis. For most students TOLEDO is perceived as a place to gather information, as reflected by 81.93% of Web Survey 1 respondents, and 85.13% of Web Survey 2 students. Other reasons given related to accessing reading sources, participation in discussion groups and/or checking "Webmail". When students matriculate into the university, they receive an e-mail address known as a Webmail account. Newsletters of the university, e-mails from teachers are sent to students' Webmail. On average, 53.44% of Web Survey 1 students checked their Webmail once a day and 31.7% did so several times a day. In Web Survey 2 the figures were respectively 50.39% and 37.8%. Finally, only a few students mentioned in their daily reports about their use of ICT, that they applied some specialized computer programs such as statistical data analysis programs like SAS or SPSS. Probably this is due to the very few research activities they have to undertake in their undergraduate years of study. However, the results demonstrate differences in frequency use in one of the two cohorts: whereas 68.7% of Web Survey 1 students did not apply a data-analysis program on Monday, 92.4% did not on Saturday.

The reason why we sometimes split up the results into different days of the week, is to stress a very interesting phenomenon we encountered by collecting data about students' daily ICT use. More concretely, our results show that, especially on Friday and Saturday, students don't use computer applications that much comparing to other days of the week. These results bring us to the conviction that, in students' view, the week-end

Figure 3. Results of web survey 1 and web survey 2 for the question: What is/are the reason(s) why you visited SNSs today?





already starts Friday afternoon but already ends Sunday evening.

Living and Learning Technologies

Although former results show which types of living technologies are popular, we explored further to find out to what extent living technologies are embedded in students' educational activities. Above, the enormous popularity of social networking sites has been shown. We also asked our respondents *why* they visited social networking sites. Most students spent time on social networking sites in order to keep contact with friends. Therefore they checked what other people were doing, looked at new pictures and wrote messages on their friends' walls. These activities were mostly mentioned in the in depth interviews:

Interviewer: "And what is the specific reason?"

Respondent 12: "Just to stay in contact with everyone."

Interviewer: "What are you doing on Facebook?"

Respondent 7: "Eh too much actually. I use it as my e-mail, for example friends who are abroad. […] And I use it mostly if I have too much time, I watch what other people are doing at that moment."

On the other hand, some students used living technologies for their study. However, it seems those messages only dealt with practical questions regarding their studies, as the following example illustrates:

Interviewer: "Do you send documents on Facebook, for example documents related to your studies?"

Respondent 1: "No, Facebook is just for fun. It has nothing to do with my studies."

Interviewer: "And when you are on Facebook, do you talk about your studies with peers?"

Respondent 9: "Not really. I have received a message 'which elective are you gonna take?' but that's all".

Results of both Web Surveys show similar patterns: students indicated they visited social networking sites to stay in contact with friends (cf. Figure 3).

It appears though, that a small group of students did use social networking sites to talk about education-related activities, with 9.93% of Web Survey 1 and 8.34% of Web Survey 2 respondents pointing out that they used social networking sites to ask questions about their studies. This corresponds with results found by Hartshorne & Ajjan (2009), who demonstrated that, in a survey of 423 participants between 16 and 40 years of age, 46% did not currently use, and had no plans to use, social networking sites in educational contexts. This is also in line with the results of Selwyn (2009), showing that Facebook is mainly used for maintaining strong links between friends and furthermore that Facebook is only used very rarely for university-related issues. Students mentioned also that they used non-specialist programs such as Microsoft Office and others including LaTeX, and OpenOffice Impress. Most of them applied these programs to the undertaking of their studies: 88.87% of Web Survey 1 and 88.43% of Web Survey 2 respondents indicated they use such programs for education-related activities, such as preparing presentations, summaries or reports.

The question, of whether living technologies are being used by students spans not only computer-related technologies, but also mobile phones. Students were asked to report in the online surveys upon their SMS-usage during one week and why they had sent these SMS messages for private, study-related, hobbies, or other purposes. Web Survey 1 students indicated they sent an average of 16.71 SMS messages each day, of which 7.19% were study-related. Web Survey 2 students sent an average of 12.94 SMS messages every day, with 11.31% of them being study-related.

We found similar results concerning the phone calls. As already stated, students sent far more SMS messages than they made calls. The most referred-to reasons to make calls were not related to study. Students called other people primarily for private reasons or to make appointments with their friends. Only 2.47% of the calls made by Web Survey 1 students and 4.73% of the calls made by Web Survey 2 students were labelled by our respondents as education-related.

Students of this university did not indicate they were aware of possible educational possibilities of the mp3 player. Only 6.2% of the Web Survey 2 students who owned an mp3 player had already recorded a lesson[9] upon it (i.e. 2 of 32 students). These results seem to demonstrate that living technologies, such as social networking sites and mobile phones, have, according to the students of this university, little to do with education-related activities. But before drawing such a firm conclusion, we looked more closely at the relationship between living technologies and learning technologies[10].

First of all, we looked at the relationship between the degree of computer usage and e-mail activities. Given the confusing results of the chi-square test and the Fisher's Exact test (respectively.06 and.02), we checked whether or not these variables correlated. Checking private e-mails is related to the amount of daily PC-use (ρ =.398, p =.0001), which is a moderately high correlation. Quite similar results are to be found with respect to the Webmail account, the e-mail address students at the university receive, and the amount of daily computer-use (ρ =.205, p =.08). When comparing both e-mail activities, results showed the frequency of checking their private e-mail and Webmail is related (ρ =.398, p =.0001). With respect to the TOLEDO website however, another image emerges.

The amount of visits to TOLEDO was not related to the time spent checking private e-mails (ρ = -.036, p =.758). Even more surprising, the frequency of visiting TOLEDO was also not related to checking their university Webmail (p = -.049, p =.673). This finding could be due to the fact that TOLEDO offers a quick link to the Webmail account, eliminating the necessity to check Webmail as a separate act. Similar results were found regarding the amount of visits to Facebook: no relationship was found concerning the amount of visits to Facebook and checking Webmail (ρ = -.049, p =.682). Similar results were found in regard to visiting Facebook and checking the TOLEDO website (ρ = -.003, p =.983). These results are obviously more in line with the data retrieved from interviews, highlighting a clear distinction between the use of living and learning technologies.

FUTURE RESEARCH DIRECTIONS AND CONCLUSION

In this paper, we have attempted to answer the following research question: "How do living technologies relate to learning technologies concerning frequency, time and (educational) use from students' perspective?"

Our data shows that most students make a clear distinction between living technologies and learning technologies. Whilst we observed that students used more living technologies than learning technologies (for instance, almost 55% of our respondents checked their private e-mail account several times a day while only 35% looked several times a day at their university Webmail account), we also saw that students barely used living technologies for educational purposes. Facebook, mobile phones and mp3 players were shown to be very popular, but only minimally related to educational activities (cf. Waycott et al., 2010). Furthermore, the results showed the degree to which an individual visits Facebook is independent of the frequency of checking TOLEDO and, correlatively, their Webmail account.

Importantly, we found that students made a distinction between living technologies and learning technologies. In other words, students showed they are aware of making a difference between education-related activities and other activities taking place in the private sphere. They want, with the exception of one interviewee, to avoid an overlap in terms of use and, more precisely, reasons of use of living and learning technologies. In other words, students use particular applications for particular reasons. For example, they visit Facebook just for fun; to check friends' photographs, to post messages on their wall. They do not want to use this social networking site for educational reasons. However, they visit the TOLEDO website for one purpose; to collect study-related information. Another example further illustrates the argument. Almost all respondents own several e-mail accounts. Each of them uses a particular account for one or more specific reasons. The Webmail account supplied by the university is used for educational reasons; to send an e-mail to a faculty member or to ask questions about the curriculum. Students use their private e-mail account to e-mail friends and to divert potential spam mail.

Given this distinction between the reasons for using living technologies and learning technologies, it is important to reflect on some related problems. More precisely, it is important to discuss problems concerning the current research upon the effectiveness and the educational possibilities of living technologies. This kind of research has already existed for several decades (cf. Cuban, 1986), but it requires some critical reflection. Indeed, the distinction between living and learning technologies made by students shows that students do not want to use living technologies like social networking sites, mobile phones, and mp3 players for educational reasons. If this is correct, we could speculate upon why researchers are investing a lot of time and money in such research, given the observation that one of the target groups does not want to apply it to educational support?

A second possible subject for further research is the implementation of certain kinds of social networking sites in Blackboard. Research can be set up to check what would be the consequences if living technologies like social networking sites would be implemented into a Blackboard system. This implementation could eventually lead to a raising of students' willingness to use such applications in educational matters. Indeed, students have the opportunity to chat and interact with each other concerning the curriculum without endangering the distinction between living and learning technologies. Pilot studies with universities owning a Blackboard system which makes use of a social networking sites-like discussion board would be very helpful in this respect.

A third suggestion for further research we wish to mention is a form of replication research among faculty members. There are indicators showing that the distinction between living technologies and learning technologies is not only made by students. Faculty members, as already shown by Roblyer et al. (2010), will probably do the same. This legitimizes the hypothesis that the distinction between study (or work) and private activities is common to most adults, and not exclusive to students.

Finally, we would like to stress the explorative character of our research, which is reflected in two ways. On the one hand the central research question is innovative in character, in that has no predecessors in the research literature. This observation makes it difficult to compare our results with earlier research in this field. On the other, the sample, especially the interviewed respondents, is too small to claim representativeness. Therefore, we hope similar research is set up in other countries as well to unravel this interesting research domain.

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KEY TERMS AND DEFINITIONS

Blackboard: A software company that supplies online learning and more particularly, Learning Management Systems (LMS) (e.g. TOLEDO).

Digital Divide: Is used to stress the difference in ICT skills between adults (e.g. tutors) and students.

Information and Communication Technologies (ICT): Is used as an umbrella term for different sorts of (computer) applications.

Learning Technologies: Are all kinds of technologies that were originally created to support learners and tutors in all kinds of study-related activities.

Living Technologies: Are technologies that were originally created for making everyday activities (e.g. work, hobbies, communication) faster, more pleasant, easier, and so on.

TOLEDO: The Blackboard-based system of the Flemish university mentioned in this research.

Webmail: An e-mail account every student receives when he/she enters the Flemish university mentioned in this research.

ENDNOTES

1. For more information see Caballe, Xhafa, & Barolli, 2010 and Squire, 2009.
2. For more reasons to integrate VLEs, see Virkus et al., 2009.
3. Faculty should be interpreted here as an organizational unit of the university, and not as teaching staff
4. These citations are not representative for all respondents interviewed
5. All citations are translated from Dutch
6. 76.91 minutes for Web survey 1, 76.60 minutes for Web survey 2
7. For more recent information about the popularity of the game industry, see ESA, 2011.
8. The term mp3 player includes here an iPod as well
9. This question was not a part of Web survey 1
10. Hitherto, chi-square tests were only computed from results of Web survey 2

Chapter 12
Social Learning Sites?
Using Students' Views to Explore the Use and Possibilities of Facebook for Educational Purposes in Flanders

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ABSTRACT

Social networking sites are extremely popular nowadays – especially amongst students – and are increasingly the subjects of educational research. But there is a sparse research base on students' willingness to adopt social networking sites in their education. In this chapter we investigate to what extent Facebook is used as an educational tool. By means of semi-structured interviews, we asked students why they use Facebook and whether they allow faculty members into their personal sites, or not. During the period of one academic year 2009-2010, 15 students of different bachelor programs in a Flemish University were interviewed several times. The results demonstrate that students draw a sharp distinction between the ways they use Facebook, and why they do so. Furthermore, they barely use the social networking site for educational purposes. Consequently, students are not inclined to allow faculty members presence (as 'friends' on Facebook). These results are interpreted in terms of privacy concerns, and we conclude this chapter with some critical reflections concerning the current research about the effectiveness and the educational possibilities of social networking sites.

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INTRODUCTION

Almost a decade and a half ago, Andrew Weinreich launched SixDegrees.com, a website now believed to be at the same time both the first instance and precursor of more current social networking sites such as Facebook, MySpace, LinkedIn, Twitter, Hyves, and so on. In the years to follow a multifarious gamut of initiatives proliferated, exhibiting the same characteristics as SixDegrees.com: the possibility to create profiles, to list friends, to surf friends' lists (Boyd & Ellison, 2008). SixDegrees.com's popularity waned pretty soon though and in 2000, the site was shut down. At the start of this new decade however, social networking sites have become widely accepted amongst youngsters and young adults. According to Tufekci (2008), 80% to 90% of college students have a profile on a social networking site. Our own research points to similar results. In a Web survey conducted with 143 bachelor students, 88.8% indicated they are a member of at least two social networking sites (Bruneel, Elen, De Wit, & Verhoeven, 2010).

One of the first social networking sites that popularized prototypical features (e.g. the possibility to create a digital representation of oneself by means of profiles, the possibility to make public comments on other users' profile, the ability to make friend lists) of social networking sites was Friendster, which was launched in 2002 and rapidly gained momentum (Boyd, 2008). The real breakthrough came with MySpace (Hinduja & Patchin, 2008, p. 130), "due in large part not because of innovative functionality and utility, but because it centralized many attractive functions that were already a part of other social networking sites in a user-friendly way". Launched in 2003, MySpace soon gained tremendous popularity: only four years later, it was by far the most adopted social networking site amongst youngsters – attracting 230,000 new users each day at some point in time (Lenhart & Madden, 2007; Sellers, 2006). This popularity however, did not mean MySpace was the only one of its kind. On the contrary: despite MySpace's popularity, a plethora of other (often culturally bounded) social networking sites emerged.[1] Those other social networking sites were no mere epiphenomena: MySpace soon experienced competition from a lot of them (e.g. Bebo, Grono Hi5, Hyves, LunarStorm, Mixi).

Until recently, Bebo and Facebook seemed to be the two main contrivers 'assaulting' MySpace (Nielsen/NetRatings, 2007). Today, it seems as if the global dispute has been settled and that the battle has been won by Facebook. In a follow-up study, Lenhart found MySpace was no longer the most consulted social networking site: in September 2009, 71% of a sample of American young adults (in previous years always more inclined to use MySpace) owned a Facebook account, 66% of them owned a MySpace account, and 7% of them owned a LinkedIn account (Lenhart, Purcell, Smith, & Zickuhr, 2010). In July 2010, Facebook reached over 500 million active users (Facebook, 2010). Currently, Facebook is not only the social networking site that is being used the most, it is also by far the most discussed social software program in the literature (Epperson & Leffler, 2009). This brief history implies at least two conclusions. Firstly, despite the rise and fall of different social networking sites, these sites, as a social practice seem to be here to stay. Secondly, social networking sites seem to be adopted by youngsters in a capricious (that is, they are always searching for the most popular one), but enduring way.

In this chapter we focus on Facebook, currently the most popular social networking site in the world. Taking into account the steady adoption of Facebook by college students, a lot of scholars see opportunities and possibilities to use Facebook as an educational tool. Obviously, their interest is not new: ever since technological progress allowing distance education (like the introduction of television into schools), scholars have been paying attention to an education that is one way or another technologically mediated or facilitated (Cuban, 1986). This curiosity equally applies to social networking sites: over the last years, a lot of research concerning the relationship between education and social networking sites has been conducted (e.g. Anderson, 2007; Mason & Rennie, 2008; Roblyer, McDaniel, Webb, Herman, & Witty, 2010; Sandars & Schroter, 2007). Other researchers have adopted a more critical attitude to social networking sites in education (e.g. Bugeja, 2006). Yet, what has often been ignored in the literature concerning social networking sites is the willingness and acceptance of students to use such tools to ameliorate, modify and/or facilitate their learning processes (Roblyer et al., 2010). In this chapter, we delve into students' own, self-reported perceptions of the use of Facebook in education. Indeed, if students are not inclined to use Facebook as a tool for educational purposes, it might be expected that the points in favour of using Facebook in educational initiatives might be rather limited.

This chapter starts with an overview of the literature on the steady rise of social networking sites in particular, and of virtual learning environments in general. In a second section, a conceptual framework is proposed, in which we offer some insights into the particularities of the Flemish/Belgian context – the region in which this research was conducted. The third section elucidates the methodology adopted, which leads in a fourth part of the chapter to a discussion of the results. The chapter ends with directions for future research and some concluding remarks.

BACKGROUND

The Rise of Facebook

As mentioned in the introduction, Facebook is only a part of a much broader field of social networking sites – albeit a very influential part. Some contestation about how to define social networking sites notwithstanding (Bartlett-Bragg, 2006; Beer, 2008; Boyd & Ellison, 2008), there seems to be agreement upon the observation that sites like MySpace and Facebook are about making virtual connections between people that may or may not overlap with connections in the physical world. However, focusing on social networking sites as a broad umbrella term alone, would leave out the idiosyncrasies of Facebook: both its unique features and its particular genesis are important to understand the current emphasis on the educational possibilities of this social networking site.

Founded in February 2004 by Mark Zuckerberg, then a student at Harvard University, Facebook.com was to be an application only accessible to people with a Harvard e-mail address. Pretty soon though, Facebook opened its doors to students of other colleges (Cassidy, 2006; Hirschorn, 2007). Initially, students were only allowed to make contacts ("Friends") with students of their own college. This requirement (p. 218) "kept the site relatively closed and contributed to users' perceptions of the site as an intimate, private community" (Boyd & Ellison, 2008). Unmistakably, this perceived privacy contributed to the overwhelming adoption of Facebook by college students all over the world (which contrasts sharply with the enormous privacy issues Facebook and its members encounter nowadays). The following months, Facebook expanded gradually: towards high schools, towards companies and eventually (more particularly in 2005), everyone with an e-mail address was allowed to join. This gradual expansion was followed by an exponential growth of subscribers – at the end of 2005, 5.5 million active users had subscribed, and at the summer of 2010, the site had more than half a billion members (Cassidy, 2006; Facebook, 2010).

This tiny genealogy is crucial in understanding Facebook's success. Indeed, at first glance Facebook seems not to differ that much from its major counterpart MySpace, or from any other social networking site. When joining Facebook, every new user is asked to make a profile. This profile, acting as a digital representation of oneself (Boyd, 2008), can be as extensive as one wants: one can provide personal data such as sex, date of birth, living place, siblings and interests; join networks as the college one attends or the company one works for; display pages ("Groups") one is connected to (e.g. raising a communal voice for a particular interest or topic); and so on. Once a member, one can connect with other members by sending a friend request. If the other party approves the request, a friendship is formed and displayed in the friends list on the homepage of both users. Based on those friendships, Facebook automatically suggests other possible friends one may have in common with already established friends. In addition, it is possible to upload photographs, and to tag the friends who appear on these photos. All these features are, however, prevalent on MySpace as well. This equally applies to the so-called "Wall", an interactive section on every user's profile page that allows friends to post messages for everyone to see, based on the question 'What's on your mind?': the Facebook "Wall" pretty much resembles the "Stream" page of MySpace. Other Facebook functions (such as posting messages in someone's account, or announcing which events one is going to attend) are prevalent in MySpace and other social networking sites as well. Those overlapping functions (see Kwong, 2007) are not only to be noticed on a theoretical level: the reasons Facebook adopters give for using this particular social networking site, are in fact all pretty much features of all social networking sites (exemplified in, for instance, Joinson, 2008). Several scholars have suggested Facebook is that popular because of its closed nature (Boyd & Ellison, 2008): on Facebook you know who you are talking to, which makes it a much safer environment than MySpace, for instance (because there, people are not always who they say they are).

The Rise of Electronic Learning Environments

Due to the rapid development of the World Wide Web, learning technologies soon gained general acceptance (Jacobs, 2001). This rapid growth of e-learning coincided with the emergence and growth of virtual learning environments (VLEs), also known as learning management systems (LMS) or course management systems (CMS). VLEs enable online interactions of various kinds which take place between learners and tutors. The components through which learners and tutors participate in such interactions, include online learning (Joint Informations Systems Committee, 2002). Since 2002, there has been a dramatic increase in take-up of VLEs by higher education institutions. Oliver (2005) found that in the UK already 95% of higher education institutions had taken up some form of VLE.

According to Brown (1998), the drivers behind VLE adoption can be traced back to the early 1990s, when higher education institutions were facing new challenges such as rising costs, greater variability in their student populations and calls for increased accountability.[2] Notwithstanding the hype around VLEs, Brown (2010, p. 7) concluded in a recent reflection paper that "Web 2.0 tools might turn out to be a lot more popular among learners and teachers because they meet user needs better than institutional VLEs". More particularly, Brown prefers Web 2.0 tools to VLEs because the former have the potential to change the nature of learning and teaching fundamentally. According to Brown, VLEs only have the capacity to organize online interactions and to offer online information. Web 2.0 tools, on the other hand, may challenge the role of traditional institutions in a way that previous technologies (and learning environments) could not.

THEORETICAL FRAMEWORK

Given the rise of electronic learning environments in education and the massive adoption of Facebook by college students (Tufekci, 2008), it should not be surprising that universities are trying to use Facebook for educational purposes. According to Roblyer et al. (2010), social networking sites are used in three different ways at college level. A first way is *librarian* use. Although librarians see possibilities in contacting students via Facebook, others tend to mention possible problems regarding (p. 3) "the potential to infringe on [students'] sense of personal privacy" (Roblyer et al., 2010). A second way is *administrative* use, which has the function to make announcements, give school news, and other such information to students (a function most VLEs contain nowadays). The third and last use is *faculty* use, which implies a faculty creates its own personal Facebook account. This consequentially allows students to make their professors and assistants virtual friends. As this third use is of central interest in this chapter, we will delve deeper into the potential and already mentioned possible pitfalls of a faculty use of Facebook in the research literature in the next paragraphs.

Multifarious Accounts of Educational Possibilities and Faculty Use of Social Networking Sites

New technologies have always elicited enthusiastic reactions from educationalist scholars (Cuban, 1986). This equally applies to current Web 2.0 developments in general and social networking sites in particular (Thompson, 2007, p. 4):

[Institutes of Higher Education] do not cope well with disruption, especially in the short term; however, coping with this disruptive force could mean engaging students in extended collaborative learning environments. From this perspective, the perceived disruption could entail many positive implications for higher education.

Various scholars have already propagated, on both a theoretical and an empirical level, the educational opportunities and possibilities accompanying the rise of Facebook. That is, Facebook is currently being promoted as an adequate environment for student learning in general, and higher education in particular. Maloney (2007), for instance, states that for the largest part, technologies have only played a role in education if they were concerned with course management (i.e. content delivery, evaluation, communication), and hence, have not centered around the individual student. According to Maloney, though, the rise of Web 2.0 and accompanying social networking sites seem to hold the promise of more profound and more individualized learning experiences. However, because of its young age and only recently high adoption rates, the research base regarding Facebook is still very sparse and a lot of this promise remains to be explored (Nosko, Wood, & Molema, 2010; Schroeder & Greenbowe, 2009).

Currently, the promotion of social networking sites as valid learning-enablers is argued from different perspectives. Several scholars have put forward the belief that social networking sites create tools and possibilities for the establishment, fostering and strengthening of *informal* learning (e.g. Bartlett-Bragg, 2006; Bugeja, 2006; Mason & Rennie, 2007; Selwyn, 2007). Other research has been conducted in order to grasp possible learning opportunities of Facebook directly related to *formal* education. As Mason (2006) states, social networking sites often contain characteristics comparable to other, more well-known, education technologies (e.g. peer feedback, a good fit with the social context, and interaction tools, see also Ajjan & Hartshorne, 2008). Muñoz and Towner (2009), in contrast, focus more on *new* features and new possibilities of Facebook: tapping into a greater amount of learning styles, alternative possibilities for lecturing, and creating online class communities. Furthermore, Junco and Cole-Avent (2008) observed that prospective students are prepared to invest time in education-related topics on Web 2.0 applications such as social networking sites (see also Schroeder & Greenbowe, 2009). An American study surveying 1,277 students found that 56% of them stated they use social networking sites for education-related topics, e.g. college planning and schoolwork (cf. Karlin, 2007; Maloney, 2007; National Boards Association, 2007).

Klein (2008) noted that the use of social networking sites in secondary education can lead to improvement in academic performances, leading to higher test scores and student achievement. Not only academic performances, but motivation and class climate as well seem to benefit from the highly self-disclosing nature of Facebook (Mazer, Murphy, & Simonds, 2007). Undoubtedly, research with such positive findings contributes to the conviction of many that social networking sites are not only providing educational opportunities, but that they also should be integrated into formal learning practices, as valid pedagogical tools (Gillet, El Helou, Yu, & Salzmann, 2008; Lockyer & Patterson, 2008). This equally and more specifically applies to Facebook, since a large amount of enthusiastic scholars state that this particular social networking site is a decent educational tool offering a lot of opportunities and possibilities, that are inherent in its features (Mazman & Usluel, 2010).

Despite these current weaves of enthusiasm, using social networking sites in education seems to entail some drawbacks too: ample opportunity for establishing distraction (Cassidy, 2006); feelings of disengagement, alienation and disconnection from education; a disadvantageous effect on more 'traditional' skills and literacies (Brabazon, 2007 in Selwyn, 2009); and the improper use during designated class time (Bugeja, 2006).

The major part of the debate on whether or not to integrate social networking sites into education then, seems to focus on the (positive and/or negative) *effects* of this integration. What proponents tend to neglect in this debate, is the *willingness* of students, as well as faculty, to work with social networking sites - and in particular with Facebook - in their educational activities. Indeed, despite all possible future efforts made, it is more than probable Facebook will not be used for such purposes, if neither students nor the faculty are willing to engage in educative activities via this medium. Such circumstances could lead to a limited (if any) educational usage of Facebook, the core activity being limited to curriculum management and the mere "networking" with students (cf. Ellison, Steinfeld, & Lampe, 2007; Lemuel, 2006; Maloney, 2007).

Students' Willingness towards Educative Facebook Usage

Educative usage of Facebook, even if only limited to curriculum management and networking, presupposes students are willing to engage faculty in that Facebook activity. The observation that college students are more avid users of new technologies in higher education than their faculty is, seems already to be considered common knowledge nowadays (for example Ajjan & Hartshorne, 2008; Kleiner, Thomas, Lewis, & Greene, 2007; Roblyer et al., 2010). Nevertheless, as far as Facebook is concerned, the sparse research base on student willingness is not unequivocally unanimous concerning the willingness of students towards their faculty 'intruding' in their online, virtual, Facebook life.

Hewitt and Forte (2006) surveyed 176 undergraduate students of an American university and came to notice that of all of the 102 students who responded to the question about whether or not it is acceptable for the faculty to be on Facebook, 66% of them found this practice to be acceptable. In a similar vein, Roblyer et al. (2010) surveyed faculty and students and found students were rather positive-minded about future perspectives of Facebook in higher education, as did Mazer, Murphy and Simonds (2007), who found that 61% reported it, to a more or lesser extent, appropriate for the faculty to be on Facebook. Other research points to the observation that the majority of students are, despite all their self-disclosure, inclined to consider Facebook as a tool that is part of their private lives and consequently, are not fond of the idea of letting educational matters slip into their Facebook activities (West, Lewis, & Currie, 2009).

Equally, Madge and colleagues (Madge, Meek, Wellens, & Hooley, 2009, p.150) showed in a study with 213 UK-students that a considerable group (41%) of them "would not like tutors to contact them via Facebook for formal teaching purposes". When faced with the question of whether or not it is appropriate for teachers to use Facebook for educational purposes, only 36% answered this question in a positive way. Furthermore, Madge et al. (2009) found that students used Facebook more for socializing and talking to friends about education-related matters, than for doing formal educative work (e.g. writing group papers). The reason for students' denial to accept faculty members as Facebook friends is they perceived such requests as an incursion on the privacy of the student.

West, Lewis and Currie (2009) interviewed a sample of 16 undergraduate students of British universities, and found only one of them had his mother as a Facebook friend. These authors concluded (p. 624): "The reasons for not wanting older adults, and particularly parents, as friends appeared to be related to embarrassment, social norms, and worries about mothers being exposed and made vulnerable. Underlying these reasons were various notions of privacy". Connell (2009) conducted research concerning libraries use of Facebook and MySpace as outreach tools for students. Based on a survey among 366 University freshmen she recommended librarians to proceed with caution if they wanted to use Facebook or MySpace as a support tool. She found that 12% of the students reacted negatively to such approaches, because of possible incursions on one's privacy.

The predominant way of investigating students' willingness to accept Facebook as an educative tool seems to be via survey analysis conducted from a quantitative angle (Hewitt & Forte, 2006; Kleiner et al., 2007; Roblyer et al., 2010). Indeed, qualitative research in this neglected research field of students' willingness to use social networking sites educationally seems to be pretty sparse (e.g. Sturgeon & Walker, 2009). A remarkable exception however is research conducted by Selwyn (2009), who studied the content of wall messages posted by students. The study of wall messages is a new method of analyzing youngsters' use of social networking sites which seems to gain very promising results in diverse fields (besides Selwyn, see e.g. Decuypere & Bruneel, 2010; Walkley, 2009). In his own study of wall messages, Selwyn analyzed 909 students and found that students hardly ever (4% of all wall postings) discussed educative topics on Facebook and when they did, this often felt uncomfortable for at least one of the parties. However, even the qualitative analysis of wall messages seems not to account for the potential richness and depth of experiences of students' self-reports of their Facebook usage (Selwyn, 2009). Thus, studies that give the word literally to students remains scarce at this point – some survey exceptions notwithstanding (Lohnes & Kinzer, 2007; Waycott, Bennett, Kennedy, Dalgarno, & Gray, 2010; West, Lewis, & Currie, 2009). This paucity of research is not only true at an international level, but it is also particularly the case for the Flemish context, where - to our knowledge - no such research has been conducted yet.

Facebook in Belgium/Flanders

There is little research available about the popularity of Facebook in Flanders, the Dutch speaking part of Belgium. Apestaartjaren (2010), a platform for youngsters and new media, conducted an empirical investigation among 1725 youngsters between 12 and 19 years old, and found that 65% of those younger than 14 had a profile on Facebook. Among the group of youngsters older than 16, the percentage increased to 88%. Most of these young people reported that they use Facebook to upload photographs or to stay in touch with friends. More exactly, the youngsters wanted to know what their friends were doing in their leisure time. Despite this high percentage, only 61% indicated they use their personal computer to do their homework.

Faems (2010), commissioned by KlasCement, conducted research to unveil to what extent teachers and faculty members use Facebook for educational reasons. With more than 900 surveys received, Faems found that, overall, 79% of teachers do not add any pupils on Facebook; 11% add pupils on a selective manner and 10% add all pupils on Facebook. Differences appeared when taking into account different school types: 7.8% of teachers in elementary schools (students aged 6 -12) indicated they add all pupils on social networking sites, compared to 23.3% of faculty members in higher education. Furthermore, 37% of the respondents declared Facebook had no educational value; 56% indicated Facebook has educational value even though they did not use it themselves, and only 7% indicated they use Facebook for educational reasons because they were convinced by the educational value Facebook possesses.

In conclusion, even though social networking sites are being studied more and more in the field of education, and a lot of work remains to be done, there seems to be no agreement about whether or not Facebook for educative purposes is useful *according to college students themselves*.

Research Questions

The research this chapter reports of was conducted in order to fill in this gap concerning students' perceived educational possibilities of Facebook. In other words, by listening to students themselves and by framing their experiences (that is, by giving them an often neglected voice), we wanted to shed more light on the following research interests/questions:

1. Are there any educational possibilities of Facebook from students' perspectives and if so, which?
2. Are students themselves inclined to recognize/utilize (possible) educational possibilities of Facebook or do they use Facebook only in leisure time?
3. Are students willing to add faculty as Facebook friends? Why (not)?

METHODS

In what follows, we will explore and answer these research questions by means of a systematic reporting of interviews we conducted with 15 participants. The respondents were students from different study programs at a University situated in Flanders/Belgium. We interviewed those students several times in depth during the academic year 2009-2010. Five males and ten females participated, all bachelor students studying different programs of this university and recruited at random. The rationale behind choosing bachelor students as respondents was that college students tend to adopt new technologies easily (Pempek, Yermolayeva, & Calvert, 2009). Prensky (2001, p. 1) called today's students "digital natives", and one of their main characteristics he identified was that they "think and process information fundamentally differently from their predecessors". To participate in our research, there was no other requirement than being a bachelor student at the particular university in order to be eligible for interviewing.

The interviewees participated voluntarily. In this sense, we received results from 'ICT-minded' students because possible respondents were invited by e-mail. The interviews were part of a larger study which had as its purpose to shed light on the daily use of technologies by students (Bruneel et al., 2010). A considerable part of each interview was reserved for asking questions about students' educational use of Facebook. The interviews were semi-structured and conducted by one of the authors. Semi-structured interviews allowed us to explore the questions we had in mind systematically, at the same time permitting to diverge from the path sometimes, and to let the respondents speak in more elaborated ways on a particular personal experience (Kvale, 1996). Furthermore, the structured nature of the interviews allowed us to compare data over all respondents.

Prior to the interviews, two focus groups were conducted in order to test the interview guidelines and to familiarize the researchers with students' vocabulary related to these new living technologies (Kvale, 1996). In this chapter, we regard "living technologies" as current technologies that are commonly used during everyday activities (e.g. communication, work, hobbies). The initial purpose was to interview these 15 students four times in order to observe the (possible) evolution of their Facebook use. As it turned out however, due to drop-out, failed appointments and the work pressure of our respondents, we were obliged to select new respondents during data collection. Consequently, only four respondents were interviewed four times. The other respondents were interviewed once, twice or three times, resulting in 36 in-depth interviews. The interviews were conducted at the student's residence as much as possible, in order to create (and sustain) an environment where students felt comfortable (Kvale, 1996).

All of the interviews (also those conducted with the focus groups) were digitally recorded (with the interviewees' permission) and transcribed verbatim. A qualitative data analysis tool, NVivo 8.0, was used to assist with the coding of the data into themes and subcategories. Excerpts of the interviews used in this chapter have been translated from Dutch into English.

RESULTS

To answer the three research questions and in order to maintain the structure given in the theoretical framework, we first consider which educational possibilities of Facebook the students proposed. In the second part, we summarize to what extent students used Facebook in educational activities. The last part discusses whether or not the students wanted to add faculty members as Facebook friends.

Perceived Educational Possibilities of Facebook

Interviews made clear no faculty members used Facebook for educational purposes. Most of the interviewees remarkably struggled with perceiving Facebook as a tool capable of helping in learning on the one hand and with giving concrete educational possibilities on the other. 10 out of 15 students (all 15 students having a Facebook account) did not see any educational possibilities at all, and this was even more exemplified in their answers on the particular question we posed related to this: those students had to think a while before giving an answer and this answer, moreover, tended to be very short. More particularly, 10 interviewees were very concise in their answers on questions like the following:

Interviewer: "Do you see opportunities to use Facebook in your studies in a certain way?"

Respondent 1: "I really don't know actually."

Interviewer: "Do you see opportunities to use Facebook in higher education?"

Respondent 3: "(- -) Euhm, I don't know."

Interviewer: "Do you see overall educational opportunities of Facebook, to involve Facebook in higher education?"

Respondent 9: "Euhm, no, not really."

Thus, a manifest amount of students apparently had not thought about the potential educational characteristics of Facebook, even though the idea had been discussed with them. This is pretty remarkable, given the observation that Facebook is extremely popular, and that students are increasingly using computer applications (e.g. Microsoft Office, Photoshop) for educational activities (cf. Brown, 2010; Cassidy, 2006).

This first category of students, which we henceforth call "non-adopters", was extended by a second group of students. These students acknowledged that Facebook has some educational possibilities, but they found it hard to point to concrete examples:

Interviewer: "Do you see overall educational opportunities of Facebook, to involve it in higher education?"

Respondent 6: "Euhm yes, that can probably be done. There are innumerable applications on Facebook but…" (does not finish the sentence).

Interviewer: "Do you see overall educational opportunities of Facebook?"

Respondent 5: "Yeah, it could be educative in some way but I don't know how. At first sight, it seems hardly the medium to do so, to do educational affairs."

Finally, unlike this second category of students of "potential adopters", there are some students that venture to a tentative attempt:

Respondent 3: "But if it's possible, I see opportunities to use it as a forum or something. But not as the forum we use now on our Blackboard because that is not widely used. Maybe this is due to the absence of constant updates, something that surely happens on Facebook."

Respondent 8: "You can make a Facebook group, that could be educational."

Respondent 4: "Yes, if all faculty members would be on Facebook and you could check their publications for example, that would be handy. If I could find an article about neurology for example, I would certainly read it."

Because of their tendency to adopt possible educational applications on Facebook, this third category of students was further referred to as "probable adopters". Concerning our first research question, then, three categories of students emerged: the non-adopters, the potential adopters and the probable adopters. Most students had difficulties with giving examples of a possible educational use for Facebook in higher education; a category of students who already had adopted Facebook as an educational medium could not be found.

Students' Perspectives towards Facebook Usage

All but one interviewee made it clear that students draw boundaries and apply firm distinctions between the use of Facebook (for leisure time) on the one hand, and VLEs (for study time) on the other. After they had thought about opportunities to implement some of the functions of Facebook in their higher education, students added some concerns soon. Several students indicated it would be regrettable to use Facebook for educational activities. Specifically, a lot of students stated they use Facebook only for entertainment and did not want education-related activities to be involved (cf. West, Currie, & Lewis, 2009), as the following exchanges illustrate:

Interviewer: "Do you see opportunities to use Facebook in your studies in a certain way?"

Respondent 1: "(…) For me, I think you need to separate work and pleasure. But I don't know, I don't think Facebook can give an educational value."

Interviewer: "Do you see overall educational opportunities of Facebook, to involve it in higher education?"

Respondent 6: "(...) I would regret this because I really associate Facebook with leisure time and when my study gets involved... Facebook now is something I do during my breaks and it would be unfortunate if this would not be the case anymore."

Interviewer: "Is Facebook used in terms of study, for example to ask questions to each other?"

Respondent 2: "No I don't think so, Facebook is just for fun."

Interviewer: "Are there any study-related documents passing by on Facebook or is it just for fun?"

Respondent 12: "That's just for fun."

Interviewer: "Is Facebook used in terms of study, for example study-related documents?"

Respondent 2: "No, Facebook is just for fun. There are no study-related affairs involved."

It seems that for these respondents, Facebook is only used in their leisure time. Apparently, most respondents did not want Facebook to get an educational connotation at all. Despite this clear distinction the students made for their reasons of use, other results emerged.

For instance, students sometimes use Facebook as a communication tool to send short, study-related messages. However, those messages deal most of the time with what was termed above, as administrative issues – in the sense that they do not influence students' study processes in a profound way, but tend to deal with matters of organization of courses, giving news and so on. Some citations from the interviews exemplify this:

Interviewer: "(...) Do your peers use Facebook for educational reasons?"

Respondent 8: "I think, especially after the exams, they just ask how it went."

Interviewer: "And when you are on Facebook, do you talk about your studies with peers?"

Respondent 9: "Not really. I have received a message 'which elective are you going to take?' but that's all."

Students thus preferred to limit their Facebook usage to leisure activities, for example checking, sharing and tagging photographs with friends, and posting messages on the walls of their friends. These views were reflected by the non-adopters.

Other participants also indicated they wanted to use Facebook, mainly in their leisure time but could nevertheless give some more or less concrete examples of how to use Facebook in education. Given the usually non-educational usage of Facebook, we broadened our view to get in touch with applications that are nowadays effectively used by students in an educational context. More particularly, we asked the respondents the following question: "Which (computer) applications do you use for educational purposes?"

Respondent 6: "Photo programs (...) I work with it quite often."

Respondent 2: "Euhm, Linux, I use Linux. And MATLAB, to calculate mathematical models and so."

Respondent 7: "Euh none, in fact."

Respondent 13: "LaTeX for writing group works and such things".

This shows students use some computer programs as part of their studies. To what extent students use such particular programs, depends on their studies: on average, mathematicians use more specialized computer programs than students studying education, for instance. Moreover, the applications mentioned by the respondents are compulsory for some courses: in other words, they are *obliged* to use these particular programs in their studies.

Besides the applications that students currently use, we were also interested in their opinions regarding "future technologies". In other words, the students were asked which technologies they could foresee as having a future role in education. In order not to steer answers in one particular direction or the other, we operationalised this additional research interest as "How will the auditorium of 2015 look like?" Some answers to our research question were:

Respondent 1: "Maybe it would be the case that all students will take notes on their computer."

Respondent 2: "I don't think that a lot of things will change. Maybe they will renew some classrooms with projectors? (...) And I think that video conferencing will be more popular."

Respondent 9: "I think the use of Smartboard will rise the coming years. We already had that in high school but nobody worked with it. I think nobody knew how it worked."

These answers show some students predict a growing computerization of higher education. Another student, however, limited her answer to a more practical suggestion:

Respondent 10: "Maybe they will install wireless Internet connection in all auditoriums."

Given these answers concerning future uses of technologies in higher education, we concluded that students now commonly speak of using several computer programs for educational reasons, and that they suspect higher education to be characterized by more computerization in the rather short term. Three other students, though, gave negative comments with respect to further computerization in higher education:

Interviewer: "And what do you think of the possible use of Smartboard in the university?"

Respondent 9: "That is not necessary for me, slides are good enough if they are clearly drawn. And I don't think it's useful for all courses."

Interviewer: "And how about videoconferencing?"

Respondent 3: "No, I get a headache from it. Broadly speaking, when I'm staring too much at a screen, I get a headache."

Interviewer: "What do you think the auditory of 2015 will look like?"

Respondent 1: "(...)[Y]es, I still write better and faster on paper [compared with the use of a computer]. And I still prefer to study by means of paper materials than via a computer screen."

This makes clear that the respondents currently use pen and paper, mixed with specific computer programs, in classes and for studying. Keyboard and Internet, on the other hand, are more used for leisure activities. These answers thus show that not every student is refractory to a further computerization in higher education.

Students' Perspectives towards Faculty Members' Presence on Facebook

In this last part of the results section, we present our findings in relation to what extent students are willing to accept friendships requests on Facebook from faculty members (cf. Mazer, Murphy, & Simonds, 2007; West, Lewis, & Currie, 2009). In line with the results given above, which show students draw a clear distinction in usage of particular applications for study- and non study-related activities, none of the interviewees indicated they would accept a friendship request from a faculty member (cf. Madge et al., 2009; Roblyer et al., 2010). On the question "What would you think if a faculty member sends you a friendship request on Facebook?", several respondents answered negatively in a firm way:

Respondent 1: "No, I would ignore that."

Interviewer: "Yes and why?"

Respondent 1: "I don't know, if I don't know them, why should I add them? I mean, it's the same with other people, if I do not know them, I would not add them."

Respondent 2: "I think I would ignore that pretty hard."

Interviewer: "Why would you?"

Respondent 2: "They don't have to know what I'm doing in my leisure time. Yeah, I would say it depends which faculty member but I think I would refuse the vast majority."

Respondent 3: "I would absolutely say no."

Interviewer: "Yes and why?"

Respondent 3: "Facebook is meant to talk with friends, with people I know. If someone adds me on Facebook and I don't know the name, the chance is certainly 90 per cent that I would just say no because I don't know that person."

Respondent 6: "The chance that happens is very small of course but I don't think I would accept."

The reasons students gave not to become Facebook friends with faculty members were varied: some of them mentioned they only wanted to get "real" friends on Facebook, while others were more afraid of a possible incursion upon their privacy (cf. respondent 2). Additionally, we asked the respondents whether it is acceptable for faculty members to get a profile on Facebook (cf. Hewitt & Forte, 2006). Quite surprising in the light of the answers on the previous question, students' perceptions were unanimously positive:

Respondent 1:"Yes, why not? Faculty members are people too, don't you think?"

Respondent 2:"Oh, I don't have any problem with that. They have their own life, they must do what they like to do."

Furthermore, and drawing on the previous question, we wondered to what extent precisely students are cautious about their Facebook usage. As the interviews showed, some of them pay attention to an excessive self-disclosure of messages and photographs on their profile (cf. West, Lewis, & Currie, 2009). Students gave several reasons for avoiding too much self-disclosure:

Interviewer: "Is it dangerous somehow?"

Respondent 7: "Dangerous is not the word, but for example: my parents are on Facebook too and when I'm drunk on a party and there are pictures, than I would have to justify myself."

Respondent 15: "I've got a girlfriend who really likes taking photographs and I have to be careful because my uncle is on Facebook too and he may see everything what we're doing."

Respondent 4: "I think it's dangerous, especially when you're looking for a job. I think they'll check your Facebook profile. For example, I want to work for Mise en Place [catering company] and I think they'll screen you on Facebook. I think that would be the case."

Apparently then, students are very aware of a collision of contexts (Boyd, 2006 in West et al., 2009) and potential pitfalls of disclosing too much personal information on a profile that every friend/contact can see. Our results show a clear pattern here: the faculty are not allowed to be friends with students, based on a strong distinction between study and leisure time on the one hand, and a strong awareness of the consequences of too much self-disclosure on the other. However, this does not mean the students did not want faculty members to be on Facebook at all – just not as friends. In the next section, we propose subjects for follow-up research.

FUTURE RESEARCH

Before we delve deeper into some consequences and implications of our study, it is important to note some limitations. For instance, the rather exploratory nature of the study and the sample of 15 students is too small to claim representativeness. Further research with greater samples is desirable: on the one hand we need pupils' perceptions and opinions to frame our results and to get a more broad view of the students' willingness to use Facebook as a learning tool. On the other hand, it would be very interesting to conduct replication research among faculty members. There are indicators showing that the distinction between study (or work) and private activities is not only made by students. Faculty members, as already shown by Roblyer et al. (2010), tend to do the same.

Furthermore, future research should focus on students' inability to sum up some educative possibilities of Facebook. For instance, one suggestion is that this students' ignorance, as found in this study, can be the result of difficulties with transferring their knowledge and experiences to another context. Facebook is not a part of students' formal study context (cf. supra); this may be a reason why students experience difficulties to sum up some educational advantages of Facebook. Further research could unravel the rationales behind these difficulties.

A last suggestion for further research focalizes on students' denial to accept faculty members as Facebook friends. Students' opinions made clear there are multiple reasons for this (e.g. students only want "real" friends on Facebook, others are more afraid of a possible incursion upon their privacy). However, could it also be that students are apt not to talk to 'strangers' on the internet because of previous warnings of and/or experiences with cyber-bullying? The frequent advice to only talk to people one knows could be a cause of students' wariness on the Net. In other words, could it be that students' *general* prudence in cyberspace is another reason to be taken into account when pondering why students deny faculty on Facebook? We hope further research can shed more light on this theme.

CONCLUSION

The research reported of here was conducted in order to shed more light on students' conceptions of possible, educational opportunities of Facebook. Therefore, data were collected with an explicit attention to the perceptions and opinions of students themselves, an important part of educational research that – as has been made clear in the rendering of the research literature – is often neglected in social networking site research. Results showed three categories of students, according to their ability to enumerate some educational possibilities of Facebook: the "non-adopters" who gave none; the "potential adopters" who were unconcerned with (possible) educative characteristics of Facebook; and the "probable adopters", who indicated some tentative possibilities for the educational uses of Facebook.

Students however, were concerned about the notion of educational uses of Facebook because they associate Facebook with leisure time and want to keep it that way. With these results in mind, it is no surprise that the participants did not want faculty members to use Facebook for educational reasons or purposes. Furthermore, the students' usage of computer applications other than social networking sites in higher education, was also investigated. The findings made clear that students refrain from using particular software, if this software is not provided and its' use compelled by the university itself. Moreover, in asking students which technologies will play a role in education in the near future, it seems that they expect higher education to be somewhat more computerized in the future.

To follow are some interpretations framed by these findings, and more particularly the non-educational use of Facebook in view of the current literature.

A first interpretation of the findings concerns the possible incursion of one's privacy. As results showed, students refused friendship requests from faculty members because they did not want the lecturers to interfere with their leisure activities (cf. Connell, 2009; Madge et al., 2009; West, Lewis, & Currie, 2009). Too much self-disclosure of faculty members gave students the uncomfortable feeling that the distinction between school and leisure activities was in danger.

A second interpretation of the findings relates to the distinction students made between study-related and non study-related activities: students used particular applications for particular reasons. Students know, for instance, for what reason they visit the Facebook website: Facebook is a tool used mainly in leisure time; study-related affairs are excluded from this social networking site (with exceptions of administrative messages about exams or tasks). This distinction on the basis of sorts of activities is largely analogous with the distinction students make between living and learning technologies. Students use living technologies, for instance mobile phones and social networking sites, almost exclusively for leisure activities, and learning technologies almost exclusively for learning activities (Bruneel et al., 2010; Kent & Facer, 2004).

A third and last interpretation is found in the specific, Flemish educational context. Despite Universities' high priority to guided methods of instruction, especially in the first bachelor years (and including this sample), the classes are characterized by large groups of students. This means that many students see faculty members (e.g. assistants and professors) to a large extent as strangers. As envisioned in the results, students are comfortable with this situation and seem to maintain this divide as much as they can. This is a factor explaining our results and more especially the reason why students did not want to have faculty members as Facebook friends (see Selwyn, 2009).

Reflections about these results suggest that with the incursion of students' privacy (cf. Connell, 2009), the debate concerning (and difficult distinctions between) private and public spheres comes to the fore. It seems, as West et al. (2009) have already mentioned, that the "public" appears to be the individual's private social world. Indeed, the "personal" messages youngsters post on the Facebook wall are in fact not personal at all, but public in the sense that everyone who is a Facebook friend can read those messages. We can state, in line with West et al. (2009), that social networking sites like Facebook reconstruct in some way the notions surrounding the traditional public/private dichotomy. Although a clear distinction between the public and private sphere concerning social networking sites in the literature is still absent, it seems as if instant-messaging and computer-mediated communication (such as forums) make this dichotomy even more fuzzy: forums and the like are open to anyone who wants to give his or her (private) opinion on the one hand, and to anyone who is interested the forum's (public) topic on the other.

Given our results, it seems important to discuss problems concerning the current research about the effectiveness and the educational possibilities of social networking sites and more in general, living technologies. The distinction between the study-related and non study-related use of particular applications shows that students do not want to use living technologies as social networking sites for educational reasons. The distinction students make could be resolved, or at least dealt with by means of making some advantages explicit to students. In any case, more research is required to unravel the particular problems associated with the educational use of social networking sites.

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KEY TERMS AND DEFINITIONS

E-Learning: Can be described as an accumulation in knowledge gained by means of using an electronic device (e.g. computer, smartphone, tablet pc, etc.).

Learning Technologies: are all kinds of technologies that were originally created to support learners and tutors in all kinds of study-related activities.

Living Technologies: Are technologies that were originally created for making everyday activities (e.g. work, hobbies, communication) faster, more pleasant, easier, and so on.

Non-Adopters: Are students who could not see any educational possibilities of Facebook.

Potential Adopters: On the one hand acknowledge possible educational possibilities, but find it on the other hand hard to point to some concrete possibilities.

Probable Adopters: Are students who can enumerate some educational possibilities of Facebook, and who would probably embrace and use these possibilities when introduced.

Social Networking Sites: Are websites aiming at the reflecting, establishing and/or maintaining of social relations and/or networks among people. Examples are Facebook, MySpace and Hyves.

Virtual Learning Environments: Are all computer applications that support online interactions which take place between learners and tutors.

ENDNOTES

[1] For an overview, see Boyd & Ellison, 2008

[2] For more reasons for integration of VLEs, see Virkus, Alemu, Demissie, Kokollari, Melgar Estrada & Yadav, 2009.

Chapter 13
The Transfer Value of Successful Learning Practices Using Web 2.0

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ABSTRACT

Listening to students' voices might result in the design of more effective learning practices, assuming that learning and teaching can be attuned more adequately in those practices. Therefore, research was carried out to investigate the characteristics of successful innovative learning practices using Web 2.0 technologies to establish to what extent they might serve as a model for learning practices in more or less similar contexts. Five learning practices were investigated through a range of processes including document analysis and by interviewing students. Additionally, a cross case analysis was carried out to track down success factors of teaching and learning with Web 2.0 technologies, and to find out to what extent these practices are contextual. The analysis showed the importance of co-production and co-creation in learning practices supported by the use of Web 2.0 technologies, and the crucial role of students' motivation and teacher's willingness to experiment with new learning practices.

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INTRODUCTION

In the academic year 2008-2009 research was undertaken in Australia and the Netherlands into the experiences, expectations and ideas of students and young, novice teachers regarding the use of information and communication technologies (ICT) in learning processes: referred to as "Students' Voices" research[1]. Building on the results of this research and the insights gained from it, a second round of "Students' Voices" research was started in January 2010, in the Netherlands and Australia, but also in other interested countries. All "Students' Voices" research is based on the assumption that it is important to listen to the learner when designing learning practices, as this increases the chance that the learning processes are perceived as meaningful (Bottema, Fransen, Swager, Van Goozen, & Wijngaards, 2010).

It is becoming increasingly clear that listening to the experiences and ideas of students provides insights into the ways learning practices can best be designed, and the ways learning processes can best be supported with the use of ICT. The input of young people provides valuable insights that may lead to improvements in education. A greater involvement of the learner in the design of learning practices strengthens the students' motivation, and results in the learner feeling co-responsible for the learning processes (Oblinger & Oblinger, 2005; Spires, Lee, & Turner, 2008). Their involvement can be described as a form of co-ownership, and this ownership can be enhanced by the strategic use of ICT (Sandford, 2006; Scardamalia & Bereiter, 1994; Shaffer, 2006). With the arrival of Web 2.0 technologies, users become producers as well as consumers, and this is increasing with the technologies' broadening influence and input (Downes, 2006; Fuchs, 2009; Siemens & Tittenberger, 2009). So, the use of Web 2.0 technologies in particular offers possibilities for offering learners an important role in determining both content and direction in their own learning.

But the use of Web 2.0 by itself does not guarantee that learners become co-owners of their learning processes. Other factors and circumstances in a given learning context also play a part in this. It is, therefore, important to investigate the success factors in innovative learning practices with shared ownership and shared direction using Web 2.0 technologies. As such, the study reported in this chapter set out to discover to what extent these success factors are context specific, or whether it would be possible to develop similar learning practices in more or less similar learning contexts. The focus was on identifying innovative learning practices with Web 2.0 technologies in education, where the decision-making in the learning was shared between students and the educational institute, regarding learning content and/or direction of the learning processes. The goal of the study was to draw on the views of students to describe a number of inspiring examples of innovative learning practices, in order to determine by means of a cross case analysis, what factors contribute to the success of these learning practices, and what is the transfer value of those factors. In doing this research, it was important to determine in what sense there was co-ownership in a learning practice, how co-ownership was achieved, and to what extent the successes were context specific or transferrable to other learning contexts.

The central question of this study was formulated as follows:

What are the characteristics of successful learning practices using Web 2.0 technologies that allow them to serve as models for redesigning similar learning practices in more or less similar contexts?

From descriptions of successful practices by students, it was proposed that more insights should arise into which characteristics of a given learning practice contributes to its success. It was determined that such a description would involve aspects as characteristics of the contexts, content of the learning practice, pedagogical strategy, choices regarding media and forms of communication, characteristics of the target group and other people involved, involvement and motivation of all actors, the learning environment available and its design, and any other identified factors that contributed to the success. In order to make the results of this research transferrable, it not only involved descriptions of results, but also the collection of video recordings, which present the success factors from different angles and allowed those involved to have their say, especially the students. In this way, it was intended that the study would contribute to the transfer of innovative learning practices to other contexts, and possibly inspire others to create similar learning practices.

THEORETICAL BACKGROUND AND CLARIFICATION OF CONCEPTS

This section discusses the concepts of "Web 2.0 technologies" and "co-ownership in learning practices" in order to operationalize them for the purpose of reporting on the research.

OWNERSHIP IN LEARNING PRACTICES

A distinguishing characteristic of Web 2.0 applications is that they deal with interactions and ownership of content, contrary to what are now called Web 1.0 applications, which do not allow interaction with content, and where the content of communication is determined entirely by the owner and producer of the information published on the Internet (Downes, 2006; Fuchs, 2009). Terms used regarding the use of Web 2.0 technologies include "user-generated content" and "prosumer" (Fuchs, 2009; Tapscott, 1997). These terms respectively refer to users themselves generating and exchanging information and knowledge on the Internet; and that users are not merely consumers, but also producers of content made available on the Internet. Content does not only include knowledge and information, but also refers to communal assessments, evaluations of information and knowledge, and the sharing of experiences within communities. In addition to these practices, people share personal information through the Internet, contributing to the development of specific social networks within which they collaborate. These interactions and exchanges of information or knowledge can be described as "informal learning", where "informal" refers to the learning that takes place outside of traditional formal learning practices.

Traditional learning practices in regular education are characterized by directions that are almost completely in the hands of the educational institute, regarding both the content and the learning processes (Van 't Hooft, 2007). More recent views on learning acknowledge the importance of the learner, but in practice this view is usually translated into reallocating part of the direction of the process to the learner, without preparing the learner for this new task and role (Garrison, 1997; Kolikant, 2010; Kostons, 2010). Direction concerning the learning content still lies solely with the institute, while it is this aspect in particular that barely, if at all, fits the current situation of learners (Van 't Hooft, 2007). In the educational practice co-ownership might mean that a learning practice is initiated with a basic idea, or start with some reason to collaborate, after which the best method is chosen based on experience. This method will then be further developed and tweaked in the course of the process.

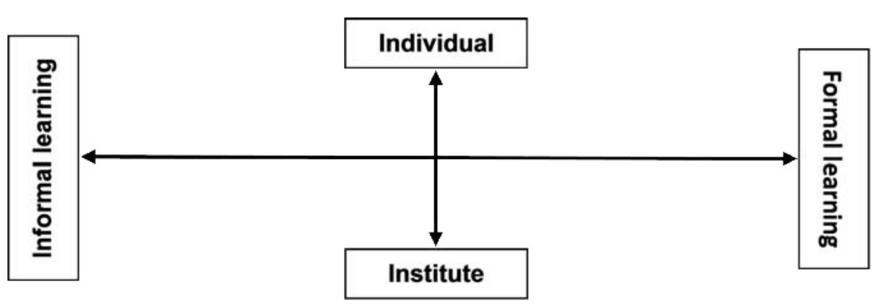
FORMAL LEARNING AND INFORMAL LEARNING

The emergence of the Internet has enhanced the possibilities for informal learning, and the development of Web 2.0 applications enables learners to contribute to the production of (new) learning content more than ever (Siemens & Tittenberger, 2009). Informal learning processes in online communities are powerful examples, and can be a source of inspiration for redesigning learning practices in regular education. The research was based on the proposal that learning would be even more effective if formal learning practices could be linked to informal learning practices, so that the added value of both may be benefited from. Linking formal learning to informal learning requires a connection between the institute's formal electronic learning environment ('virtual learning environment') and the informal electronic environments managed by the learners themselves ('personal learning environment'). This can only work if the learning practice is designed on the basis of co-direction, regarding both learning content and learning process. The matter of the direction of learning content and/or process is detailed in the diagram below, based on two dimensions that can be distinguished: type of learning and ownership.

The dimension of 'formal learning' versus 'informal learning' offers space to indicate to what extent a learning practice is organized. Informal learning may be described as incidental learning, or learning that is the result of any activity people undertake. Formal learning is also called intentional learning, meaning the learning is organized based on predetermined learning goals. Regular education is considered an example of intentional organized learning, but in reality there is always a combination of informal and formal learning. People also informally learn through their contact with fellow students or colleagues, and in the course of learning activities there will always be additional unintended learning outcomes (Anderson, Lucas, & Ginns, 2003; Billett, 2004; Griffin, 1994; Malcolm, Hodkinson, & Colley, 2003). And although informal learning is based on learning as an unintentional result of other activities, there can be a degree of intentionality as well, without explicitly defined learning goals. Nevertheless, this distinction can be used to indicate on what type of learning a given learning practice focuses. The emergence of the Internet is making informal learning ever more important, as people are part of all kinds of informal networks, related to their areas of interest. This way, 'communities of practice' emerge (Wenger, Pea, Seely Brown, & Heath, 1998), where learning is the result of the exchange of experiences, and where knowledge construction takes place based on debate and discussion.

In Figure 1, the dimension of 'individual' versus 'institute' refers to the ownership in a learning practice, also called the locus of control. Learning processes differ in the extent to which the direction of content and/or process lies with the learner. With learning paths chosen by the learner, aimed at the development of specific competencies, the starting point may lie with the individual, who then asks the organization for specific input or involvement in the form of guidance, content or resources. With learning paths designed by the educational institute, the starting point lies with the institute, which thereby determines the content,

Figure 1. The relation between types of learning and ownership of learning as a characterization of learning practices



and possibly the process as well. In secondary education in the Netherlands, for example, content and process are usually directed by the school, while higher education institutions experiment more with demand-driven direction and personal learning paths (C. MacDonald, Stodel, Farres, Breithaupt, & Gabriel, 2001; Snoek, 2003). The position within the dimension of 'individual' versus 'institute' has major implications for the technology used for the distribution and access of learning content, pedagogical strategy and communication. A learning process in which the direction lies with the learner is well suited for a learning environment that allows learners themselves to shape the development and management of learning content and the communication regarding the learning process. In those kinds of learning processes, personal learning environments may be preferred to learning environments owned by the organization (Wilson et al., 2006).

The use of Web 2.0 applications in learning practices in the educational context suggests that informal learning is coupled with formal learning, and that there is a certain degree of co-ownership regarding the electronic environment. This coupling could mean there is also a certain degree of co-direction of the learning content and/or the learning process. In the research reported here, a distinction was made between co-production, referring to situations where students are co-producers of learning content, and co-creation, referring to situations where students contribute to both content and direction of the learning process. The matter of direction requires further explanation, being an important aspect of both co-production and co-creation.

Clarification of the concept of 'co-direction' is in large part derived from the framework of terms used in a study of self-direction in learning practices (Taks, 2003b). To gain more insight into aspects of self-direction and the degree to which self-direction is used in learning practices, the learning process within a learning environment is described as a cycle with four stages: orientation, planning, execution and evaluation (Taks, 2003a). There is only self-direction if the student is responsible for the direction in these four stages. Orientation involves exploring the learning task and determining the required knowledge and skills to successfully complete the task. Planning involves defining the goals to be met and the learning activities required, including the order in which those learning activities need to be undertaken. Execution involves monitoring and, if necessary, adjusting the learning process. Evaluation involves both the assessment of the learning process and reflection on the effectiveness of that process.

In principle, co-direction involves fine-tuning of the direction by the teacher, and self-direction by the student. If both types of direction are geared well to one another there is "congruence" (Vermunt & Verloop, 1999). If they are not geared well to one another, there is "friction". In the case of "destructive friction", too much direction is offered in areas where students can easily take over direction themselves, or too much is left to self-direction while the student is not yet ready for it. In the case of "constructive friction", the students are expected to show a little more self-direction than they can actually handle without help, but the difference is limited and actually encourages students, with some proper support, to take the next step in the development of their capability for self-direction. As far as self-direction is concerned, this research distinguished three levels: the level of active learning (the student co-directed the execution of learning activities), the level of independent learning (the student co-directed both planning and execution of learning activities), and the level of autonomous learning (the student was responsible for all four stages of the learning process). In addition to the necessity of stating explicitly what is meant by learning practices, using Web 2.0 applications and the concept of co-direction, the theoretical framework used in this research also provided guidelines to categorize the multitude of different learning practices available.

WEB 2.0 AND LOCUS OF CONTROL

At the outset it was established that learning practices from both secondary and higher education should be included, in order to get a more complete perspective on the various ways Web 2.0 applications that were being used, and because this would allow for some interesting comparisons. Within the theoretical framework, the choice was made to combine the dimension of "informal – formal learning" with the dimension of "individual – organization", and both dimensions were considered continuums in which any position could be determined. The combination of both positions results in a matrix of four quadrants and characterizes learning practices in both dimensions. Based on these dimensions, a matrix with four quadrants emerges in which all learning practices to be studied can be positioned according to the extent to which learners are in control and the extent to which there is an organized learning process. The position of a learning practice within this matrix might determine the choices available regarding the use of Web 2.0 applications within those practices.

Each learning practice has a design, based on a vision, be it explicit or not (Fransen, 2007). Additionally, the extent to which the learner directs learning content and processes, and the extent to which Web 2.0 applications play a part in this, will probably be higher in learning practices that were not designed and constructed in detail by the institute. The use of Web 2.0 applications will in many situations tend to be an unexpected result of a method and the contributions of those involved in the course of a learning practice, where the added value will sometimes have been discovered by accident. But that does not make the learning practice any less interesting, since the conditions that have led to the use of Web 2.0 applications, as well as the experiences that have resulted, could provide useful information for others. From this information, success factors and guidelines can be distilled that may be useful in similar contexts.

Nevertheless, the following aspects can be distinguished, regarding the design of a learning practice, and they have to be considered in an analysis: the aim and type of learning goals and the learning processes planned, the pedagogical strategies chosen to achieve the goals and processes, the media and means of communication used, and the learning environments designed.

EVALUATION CRITERIA FOR LEARNING PRACTICES

The type of learning processes and goals formulated are a given within the learning practice, and likewise, the characteristics of the learner are part of the variables that cannot be influenced. It is, of course, important to have sufficient insight in these, as these variables to a large degree determine the subsequent choices that can be made. Although a pedagogical strategy follows from the goals aimed at and the characteristics of the learner, it also depends on the vision the design is based on. In learning practices with the emphasis on informal learning, the vision will tend to be more implicit, although in formal learning practices too, the underlying vision is not always made explicit. Still, it is useful to determine the nature of that vision, as it influences the choices made in the design to a large degree.

When planning this research, it was also thought it would be especially interesting to look at the variables this research was aimed at most directly through the views of students: the extent to which the learner contributes to the direction of content and/or process in the given learning practice (or in other words, determining the locus of control) and the ways these processes are realized. Learners not only have their own input and develop learning content themselves, but also determine how and with whom content is shared, and the learner may or may not direct the process within the learning practice. There may be a personal learning environment in which design, development, exchange and distribution are managed by the learner, but it may also be limited to the exchange of sources and experiences.

The choice of media is an obvious point of interest in the design process, although this choice also depends on the type of learning environment used. An electronic learning environment offers many opportunities for multimedia support of learning processes, but each medium also has its own limits and possibilities. The choices depend primarily on the learning goals aimed at, and the kind of interaction necessary in the various stages of a learning process (Laurillard, 2002). Although the use of media offers opportunities to approach learning content from various perspectives, doing justice to the level of the learner's reading skills, not all media are equally effective in every situation.

Each learning process can be characterized as a combination of interactions between learner and learning content, between learner and teacher, and amongst learners. This combination of interaction goes for both formal and informal learning processes. Communication between people requires the use of the right *means* of communication. Usually, a distinction is made between synchronous and asynchronous communication, where the latter allows communication to take place fully independent of time and place. The choice for either type of communication depends on the type of learning process and the support required, but also on the learners and their demands for flexibility. It is also possible to use both forms within one learning practice, so that they are related to periods when someone is learning independently and periods when they collaborate with others (J. MacDonald, 2006).

Although the analysis of a learning practice was intended to provide insights into the success factors underpinning teaching and learning with Web 2.0 technologies, from the researchers' point of view, it also required a form of evaluation, as those success factors might have been valued differently by the various people involved, as a result of their subjective interpretation of their significance. Interviews with those involved in a given learning practice, and especially with students, was undertaken to show to what extent there was agreement about those success factors and their significance for the learning practice. At the same time, it was important to determine how form, content and results of the learning practice were valued by those involved. It was determined that if those involved largely agreed on the nature and significance of success factors and on the quality and value of a learning practice, it would be so much easier to develop guidelines for the transfer of that knowledge to another context. Therefore, evaluation of the results and added value of a learning practice should not be the researchers' exclusive domain. Rather, the evaluation had to emerge from a process of analysis and negotiation in collaboration with those involved in a given learning practice.

RESEARCH METHOD

This research involved the development of five case studies which were analyzed for successful innovative learning practices using Web 2.0 technologies. The purpose of the case studies was to track down the factors contributing to their success. After that, a cross case analysis was carried out to gain insights into the similarities and differences between the case studies, and the transfer value of the identified learning practices. The cross case analysis also offered insights into the extent to which the success factors collected were context specific.

Research Steps

Potential innovative learning practices were identified on the basis of document study and consultation with experts from the network of the Centre for eLearning of Inholland University of Applied Sciences, and by means of a call through various channels, such as mailing lists, Linked-in, Twitter and in meetings with professionals in relevant educational organisations. These processes led to a long-list of potentially interesting innovative learning practices that involved the use of Web 2.0 technologies. After that, the long-list was reduced to a shortlist of learning practices that could be analyzed by selecting practices on the basis of the use of Web 2.0 technologies, the innovative nature of the learning practice, and shared ownership on learning content and/or learning process. Students, and also teachers participating in the selected learning practices were asked if they would be prepared to participate in the study. In the end, five practices were selected and analyzed.

Each case study started with a fact-finding interview, which was followed by document study and interviews with people directly involved with the learning practice. At the same time, video recordings were made from interviews with participant in the learning practice. Data were collected in the form of audio recordings of the interviews, written reports and video recordings. An important goal of each case study was to hear the views of the various actors within a learning practice, with particular attention to the views of the learner.

The interview protocol was derived from the theoretical framework. The interviews were semi-open in nature, so that those involved were interviewed about all relevant aspects, while keeping enough space for further questions and unexpected results. The results from the document study and interviews were described, after which each case study was evaluated by means of evaluation criteria derived from the theoretical framework.

Analysis of the interviews was conducted within the perspective of topics of the theoretical framework. Two researchers discussed their interpretations in order to reach consensus. The inter-subjectivity does contribute to the validity and reliability of the analysis. Final descriptions of the cases were presented to the key figures of the learning practices to check if the descriptions matched the reality of the learning practices, which contributed to the face validity of these case descriptions (member check).

CASE DESCRIPTIONS

As part of the research, five case studies were carried out, which led to five descriptions of innovative learning practices using Web 2.0 technologies. These short descriptions cover the main aspects of these five learning practices, more specifically the professional and/or educational context, the type of learning process and the intended learning outcomes, characteristics of the participants, the pedagogical vision, and the use of Web 2.0 technologies.

Although the results by themselves can inspire others, a more interesting aspect is the question whether these five learning practices show similarities in the factors that determine their success, and to what extent the success of these learning practices can be translated to other learning contexts. That was the result of the cross-case analysis that was executed.

The case studies were located in different learning contexts as outlined below. The results of the cross-case analysis are presented next.

Knowmads

"Knowmads", located in Amsterdam, is a combination of a school, a non-profit agency, and a platform for creative and entrepreneurial youths. "Knowmads*"* is formally not an educational institute within regular education, but a company. "Knowmads*"* is a collective of young, creative and entrepreneurial knowledge workers who can work anywhere, with everybody. They function against the backdrop of an increasingly complex society, where a new socio-economic playing field is arising under the influence of globalization and rapid technological developments. This

situation requires the use of creativity, innovation and leadership.

Data were collected during three visits at location. Observations were made during the first visit, and a teacher and three students were interviewed during the second and third visit respectively, by using the interview protocol.

With "Knowmads", the primary goal is to develop professional expertise in the field of international business, with a focus on the integration of practical knowledge and professional skills while carrying out realistic professional tasks. It is primarily about developing professional skills, because the realistic nature of the context and the fact that students are working on real life assignments automatically make an appeal to attitudinal aspects, productive knowledge and specific skills, which have to be developed and used integrally.

GNR8

"GNR8" (pronounced as 'generate') is a student training company founded by Inholland University Haarlem. Students carry out various media related projects for companies from the creative industry. Students work here for their internship, elective minors, or graduation project. The mission of "GNR8" is to build a bridge between higher vocational training and the business world. Within "GNR8", students learn to cooperate and innovate. Web 2.0 applications play an important role in this. "GNR8" presently has two offices: Haarlem and Amsterdam.

Data were collected during two visits at location in which one student and two teachers were interviewed, using the interview protocol. During these visits also observations were made.

With "GNR8", it is all about doing graduation projects, commissioned by organizations and companies. Although the school preselects projects, the goal is working on a realistic professional task in order to generate a product or result that will actually be used in practice. The execution of such tasks requires the development and use of competences specific to the profession, or in other words, the integration of attitudinal aspects, practical knowledge and specific skills.

Hair Level Xl

Hair Level XL is a cross-media hairdressing school method developed by "Bespeak" and "TinQwise" on behalf of the Philyra Institute, a trade association. Competence-based learning and a link to the professional practice are central to this method. Students work on lessons and assignments at school and in practice, in an attractively designed online learning environment. This is supplemented with action cards and a beautifully designed reference book. Students complete various levels, and doing so they fill their online portfolio. In 2010, Hair Level XL won the "National e-Learning Award" and the "SpinAward".

Data were collected during two visits at location. During the first visit an open interview was held with one of the developers, during the second visit observations were made and one teacher and three students were interviewed, using the interview protocol.

With "Hair Level XL", the goal is to develop relevant and relatively complex expertise in a gradual and structured way, as participants carry out realistic tasks, increasing in complexity and difficulty, depending on their level of development. The use of realistic professional tasks fits competence-based education, which assumes that only through the execution of real professional tasks the integration of attitude, knowledge and skills can be achieved.

Game Factory Del.icio.us

"Game factory Del.icio.us" is a learning practice that can best be described as 'building a gaming museum', where students in the course Concept Entertainment Industry (CEI) at the Media & Entertainment Management School of Inholland University process information by creating a 'Delicious'. Approximately 150 students are taking the CEI course this year and some of them participated in this study. As part of the course, the teacher has his students describe a game. Subsequently, the students have to develop a well-founded opinion of this game. For this purpose, the students collect background information in the form of websites (links), YouTube videos and other media. Finally, the students create a wiki, which is the end result of this assignment. All background information about the games is collected and shared by means of an account on Del.icio.us. Students share the knowledge gained with the teacher and fellow students.

Data were collected during three visits at location. The developer and teacher were interviewed twice and the interview protocol was used during the second interview. Students were not interviewed, but results of the assignment and their reflection reports on the process were analyzed.

With "Gamefactory Del.icio.us*",* the learning practice is primarily aimed at autonomously collecting and presenting knowledge about computer games, and making this knowledge transferrable and sharing it through Del.icio.us. In addition to this, students develop collaboration skills and an attitude of freely sharing information and knowledge. Although the assignment is developed by the teacher, it is modelled to similar assignments that could be given to teams in the world of the entertainment industry.

Mees Podcasting

This learning practice is about a passionate teacher with a great deal of affinity with Web 2.0 applications. He teaches at a small primary school in Belgium in a class of eight students in the third grade (age: 10 to 12). The school is characterized by traditional ideas about education. Three years ago, Maarten H. started using a weblog in the classroom. He uses Twitter, and together with his students he regularly presents an episode of the podcast series *Mees*. By using Web 2.0 tools, Maarten H. turns his students into co-owners of the learning content. The radio podcasts are discussed as an example of a successful learning practice.

Data were collected during a half-day visit at location in which observations were made, the teacher was interviewed using the interview protocol, and open interviews were held with students while they were working on an assignment.

"MEES podcasting" did not really involve realistic professional tasks, but considering that this was a learning practice in primary education, that did not come as a surprise. In this stage of education, attention was focussed more on the development of basic skills, such as communicating and collaborating, and specific knowledge as a result of the topics students cover in the podcasts. Collaborating on a project is a way to develop social competences, while at the same time the students gather knowledge about the world and train specific skills. These include speaking and listening skills, and skills involving the use of technology.

The learning practices in each context involved a type of learning process that can be described as "competence-based education", where attitudinal aspects, practical knowledge and specific professional skills are acquired on the basis of realistic tasks. This feature was not equally prominently the case in all the learning practices described. "MEES podcasting*",* for instance, being a learning practice in primary education, was more concerned about learning basic skills and knowledge, while "Knowmad*s"* was concerned with developing students' professional skills, which are acquired through paid jobs for companies and organizations. However, in both cases the learning tasks are authentic and realistic given the relation to professional practice and/or the real world.

CROSS CASE ANALYSIS

The cross case analysis was conducted and the five learning practices were analyzed and evaluated based on two characteristics: the pedagogical strategy chosen, and the use of Web 2.0 technologies in concert with the design of the learning environment.

Pedagogical Strategy

With "Knowmads", the pedagogical strategy was consistent with the theoretical educational visions of constructivism. In practice it was "cooperative learning", as students worked in teams on assignments, using and developing their personal qualities. Meaningful knowledge and competences can only be fully developed in a realistic and complex professional context, and a shared vision of the meaning can only come from social interaction. The learning process can be described as "learning in practice". The starting point was the intrinsic motivation and learning style of the type of students taking part in this learning practice. Co-ownership of content and process was emphatically strived at as students in large part were responsible for the success of the assignment they undertook and influenced the learning processes to a large degree.

"GNR8" put collaborative learning into practice. Students worked in teams on jobs for companies and organizations in the field of media production. The school does make a preliminary selection of relevant companies and assignments, and the learning practice is positioned within the programme curriculum. Considering the pedagogical vision of the school, it was considered competence-based education, where this learning practice focussed on linking theory and professional practice. The learning practice operates on the meeting point of school and work and is aimed at optimally connecting both learning environments. The school developed all the contacts and generated and selected assignments, so the students' co-ownership of the learning content was limited. Co-ownership of the process, however, was aimed at by having the students formulate their own learning goals, and by transferring the responsibility for a good result.

"Hair Level XL" was considered a learning practice in the tradition of competence-based education, based on the idea of "learning by doing". A professional task was the starting point, and all the required knowledge and skills were developed in a structured way. The tasks were designed for, and fitted within, a learning path aimed at acquiring professional competences. The direction of both content and process lies primarily with the school, which is understandable, considering the educational context of this learning practice. The participants may have a greater need for a structured learning path and support regarding the learning process. Co-ownership is generated in part by giving the participants some options in the creation of their learning path, and by making them co-responsible for a correct execution, reflection and registration, although assignments and learning tasks are developed by the teachers.

With "Game factory Del.icio.us", the students worked in couples on assignments that were initially formulated by the teacher. This way, the teacher safeguarded the goal and took care that the learning practice fitted within the students' vocational training. The assignment, however, was considered meaningful by the students, and in this respect a certain degree of co-ownership of the content was created. The created content, a rich database on gaming, was shared with all the other students, and in this way there was also collaboration at class level. The development of the right cooperative attitude and skills in this area was also considered a goal. The learning practice can be positioned in the context of competence-based education, and the development of a rich database by students could be described as a realistic professional task. The fact that others can build on the results makes the task more meaningful. Additionally, there was co-ownership of the process, as the teacher only guided the process by means of formulating the testing criteria in advance and providing feedback during the process.

The pedagogical strategy of "MEES podcasting" was positioned in "realistic learning", and possibly in experiential learning, discovery learning or inquiry-based teaching, where students do their own research and work on thematic projects. Learning to collaborate was a secondary goal here, but taking responsibility for the process of collaborating and production of the podcasts was more important. Students were not obliged to participate, which means that only sufficiently motivated students took part. The students did not have co-ownership as far as direction was concerned, but they did when it came to taking responsibility and contributing to the process' successful progress.

It was concluded that all these learning practices involved a form of cooperative learning, where the learning was focussed on the execution of realistic and meaningful tasks related to practice. Where possible, co-ownership of content was aimed at from the point of view of intrinsic motivation of the student, although this varied from choosing from learning contents already available, to determining the learning content with a large degree of autonomy. Co-ownership of the process was also aimed at all learning practices, but this too varied, from students' having a say in deciding what will be done at what moment, to almost complete responsibility for the progress of the entire process. There appears to be a clear relationship between students' intrinsic motivation and the amount of space they were offered to contribute to the direction of content and process in a learning practice.

Additionally, it can be said that the degree of co-ownership of content and process was inversely proportional to the degree the learning practice had been designed, structured and created in advance. This is hardly surprising, as an educational design is usually created by an educational institute. Learning practices that are clearly embedded in a school's curriculum leave less space for co-ownership of content and process than learning practices that arise outside a curriculum and are developed as independent learning practices. These relatively independent learning practices usually do not involve a detailed design prior to the start of the learning practice. In these cases, the design is one of the results of a learning practice, because on the basis of co-ownership, the learning practice is initiated with a reason to start collaboration, after which the best method is chosen based on experience. This method is then further developed and tweaked in the course of the process.

Use of Web 2.0 Technologies in the Learning Environment

In "Knowmads", the role of Web 2.0 technologies is in large part determined by the students themselves. The students were not required to use Web 2.0 applications, but in practice they used this technology anyway, according to their own views and demands. Usually this involved the technology they were already using in their daily communication and had in common with the others in their team. Additionally, they shared their own learning processes with others through the website of "Knowmads". Information about "Knowmads" was distributed through Facebook and Twitter, and these channels are now very important for the intake of new students. The school mainly provides a physical environment where the students can meet and collaborate on their assignments. In addition to this, there are meetings with the clients, being professionals from the businesses, for the purpose of consultation, progress reports, and the presentation of results.

"GNR8" more emphatically promoted the use of Web 2.0 applications, because the organizations and companies for whom the students work, are also using this technology more and more. Students produced Internet television with UStream, shared photographic material through Flickr, and reflected on their learning processes in blogs. Twitter was used to advertise the learning practice for students throughout Inholland University, so that they would know of its existence and respond to the news messages. The school provides a physical learning environment where students from this learning practice can meet for consultation and collaboration. In addition to this, there were consultations with the clients, being the professionals from businesses in the field.

With "Hair Level XL", there really was no use of explicit of Web 2.0 applications, but there were exchanges and sharing of information through the digital environment that was created for this learning practice. This environment enabled the student, learning company, teachers of the school and participants of the learning practice to find each other and share information regarding the direction of the learning process and the responsibility for the end result. The way the learning environment has been set up and the possibilities it offers, do refer to what is generally aimed at with Web 2.0 technology. The online 'portal' is the connecting link between two ways of learning, namely the practical lessons at school and the tasks carried out in practice. The learning practice has a channel on YouTube with instructional videos. Outside lessons, participants use MSN and Hyves for consultation.

With "Game factory Del.icio.us*"*, the use of Web 2.0 technology mainly involved the use of Del.icio.us, which is an online database, aimed at freeing up and sorting information, and to share it with others. The students found various sources for any given topic, which meant other Web 2.0 applications were linked to the database. They found films on YouTube, for instance, and all sorts of material on other websites. Although the physical environment of the institute was available for consultation amongst students, and between students and teacher, a large part of the learning process was created online, because of the nature of this project and the product to be delivered.

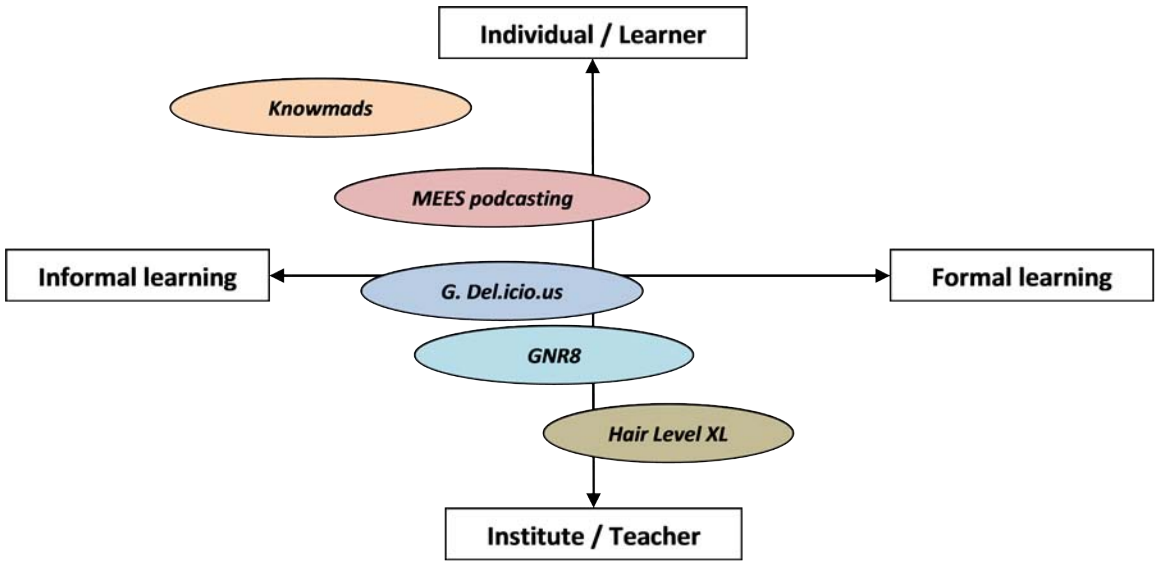
With "MEES podcasting*"*, the use of Web 2.0 was both the reason for and the starting point of the learning process, for creating a blog was a goal by itself, and for this purpose the students made podcasts, amongst other things. In addition to this, Twitter was used to allow students to communicate with each other outside the classroom. Consistent within primary education, the physical environment was the most important learning environment, but the electronic environment certainly offered an addition to it. This electronic environment connected the school with the outside world, and provided others with insights into what the children learn and the results this can yield. For the parents in particular, being able to follow online what their children are doing at school is very important.

Summarizing, it can be said that all five learning practices used Web 2.0 technologies for the purpose of collaboration, for developing, recording and sharing information and knowledge, and for communication with their surroundings. Not all functions were equally important in every learning practice, but depended on the task or assignment, and the role the environment plays regarding direction or support of that learning practice. Sometimes the use of Web 2.0 was completely optional, like with "Knowmads*"*, and sometimes there were strict rules for how it was to be used, like with "Game factory Del.icio.us". Sometimes the use of Web 2.0 technology was a goal in itself, like with "MEES podcasting*"*, and sometimes it was purely instrumental, like with "Hair Level XL*"*. In all cases, the use of Web 2.0 played a part when it came to active involvement of the learner in particular, with the design of the learning practice, regarding both content and direction of the process.

CONCLUSION

The cross case analysis was undertaken primarily to determine the success factors of the learning practices described, and to see to what extent their success can be transferred to similar and less similar contexts. First, there will be a brief discussion of the position of the analyzed learning practices in the matrix, after which the success factors and their transferability are discussed.

Figure 2. Positioning the five learning practices within the matrix



Position in the Matrix

In relation to co-ownership and the concepts of co-production and co-creation, it was proposed earlier, to use a matrix, combining the dimension of "individual-institute" and the dimension of "formal learning-informal learning". It has assumed that the use of Web 2.0 technologies contributes to co-ownership, which opens up chances for forms of co-production and co-creation within learning practices. Furthermore, informal learning is generally associated with those same Web 2.0 technologies, assuming the locus of control lies solely with users, and learning can be the unintentional result of the network of users that is created this way.

The dimension of formal learning versus informal learning requires some further refining. In the definition provided earlier, it was said that formal learning involves intentional learning, and that this type of learning practice is characterized by a design with a strategy that has been developed in advance. With informal learning, it was suggested, learning would be an unintentional side effect of other activities. But regarding the qualification of the learning practices that have been studied, informal learning might be understood in a slightly broader sense, as there *can* actually be some sort of intentionality in informal learning.

At the same time, it is also true that there are always unintentional learning results in strictly formal learning practices. Therefore, it can be said that the position of the learner and the realization of the final learning practice partly determine the extent of informal learning in any given learning practice, or in other words, the extent to which unintentional learning results may be generated. The more space the learner gets to have a say in what happens, how and when in the process, and the larger the role of Web 2.0 technologies, the more it might be considered a case of informal learning. This is also reflected in the characteristics of the design of a learning practice, for the less the learning practice has been designed and developed in advance and the more the design is the result of a process, the larger the part of informal learning will be and the more influence learners will have on the final design, which will be the result of the process that is started. Based on this refined definition, all the learning practices can be positioned within the matrix.

This positioning shows that "Knowmads" can be considered the learning practice with the highest chance of unexpected learning outcomes through informal learning processes, and the one where learners can exert the most influence on content and process. This learning practice is not situated within regular education and instead, has completely broken away from it. The position of "Hair Level XL" as the learning practice with the least chance of unexpected outcomes from informal learning, and the one where learners have the least influence, can be explained from the fact that this involves a curriculum that has been designed in advance and has been concretely worked out in sub-tasks with a pre-defined learning path, which offers some space for choice, but where the structure and requirements are fixed. Also, in this practice, no explicit Web 2.0 technology is used. The three remaining learning practices take up intermediate positions. With "GNR8", the learning practice is situated within an institutional curriculum, and the institute directs the selection and execution of assignments. With "Game factory Del.icio.us", the assignment offers more freedom, but the teacher still directs and structures the learning process. With "MEES podcasting", the assignments are for the most part carried out in school, but the idea is that students can experiment freely.

Success Factors

The study identified several success factors. Characteristics can really only be considered success factors if they are to some degree found in all the learning practices studied. Discussed below are the following identified factors which were evident in all the learning practices: aspects of motivation, characteristics of the learning environment, and characteristics of the teacher.

Aspects of Motivation

All learning practices studied showed a certain degree of co-ownership of content and direction of the process, which means they fitted interests and learning preferences to some degree. That is, the students were motivated to learn.

Motivation is important to make learning successful, with a distinction usually made between intrinsic motivation of the learner, which is the learner's involvement with the learning content and learning practice, and extrinsic motivation of the learner, which is involvement because of reasons that lie outside the content of the learning process. An important factor for intrinsic motivation is the extent to which learners have a say in shaping their own learning process and in determining what they learn. This generates co-ownership and a sense of responsibility with the learner, and with that, the enthusiasm to actively take part in the process.

Learners who have a say in choosing the learning content will experience space for their own interests. If they can have a say in what they learn, the process can be made to fit their personal learning preferences more. Learners have a say and feel they are taken seriously, and this results in the development of co-responsibility for the learning practice. This became apparent in almost all the learning practices, although it is obviously more prominent in learning practices learners choose on their own accord, and where the co-ownership is more clearly defined.

Intrinsic motivation is partly generated by the attractiveness of both content and process. The fact that the assignments were realistic and that many learning practices work with real partners from the professional practice, made a practice more meaningful and interesting. The design of the learning environment, both the physical environment and the use of technology, may have also contributed to that attractiveness, and therefore to students' intrinsic motivation. It should be noted that all the learning practices had an inspiring teacher or supervisor, which also contributed to strengthening the motivation of students to their learning. In addition to this, the learning processes were perceived as meaningful because the results of the assignments had a function and were actually used. Learners acted more or less as starting professionals, except for the learners in primary school, and in that role they are more or less treated as real professionals. Furthermore, the students' intrinsic motivation was strengthened by appealing to the learners' creativity and ingenuity, as was confirmed by the students that were interviewed. Through offering them authentic and challenging assignments, learners felt stimulated to contribute, and they were offered space to excel.

Extrinsic motivation is not so much about motivation for the learning process and content, but rather about other outcomes, such as rewards in the shape of "membership of an attractive community" and the appreciation or assessment from a teacher or supervisor. Rewards outside the learning practice, such as status in the learner's family or community, and chances of a well-paid job, also play a part. The learning practices studied involved extrinsic motivation, be it in varying degrees, as especially the use of Web 2.0 technologies and the links with the outside world generated outcomes in the form of recognition and status outside the learning practice.

In all learning practices collaboration was a core concept, which not only led to strong group bonding, but also contributed to a sense of membership of a community that learners regarded as meaningful, and from which they also derived their own identity. Therefore, learning in these types of learning practices showed similarities to what is called "communities of practice", where people can experience the culture, acquire professional skills, and where visibility within in the group is determined by the acknowledged expert status they manage to achieve (Lave & Wenger, 1991; Wenger, et al., 1998).

Summarizing, it can be said that motivation of the students was a core concept in all learning practices, and can therefore be considered a success factor. This motivation was a combination of both intrinsic and extrinsic motivation, and it depended on the learner and the learning practice how these two were balanced, and whether the ratio would change in the course of future activities. With "Knowmads*"* and "GNR8*",* the intrinsic motivation played a bigger role, because learners chose assignments that fitted their own interests. With "Hair Level XL", *"*Game factory Del.icio.us*"* and "MEES podcasting" the emphasis was more on extrinsic motivation, because of the importance of the membership of the group, appreciation from the teacher and recognition from the learners' social environment.

Characteristics of the Learning Environment

All the learning practices studied used rich and attractive learning environments. Rich and attractive because of the physical environment, the technologies available to the young people, and also because of the links between the learning practice and real world experiences afforded students. The learning also often involved contact and collaboration with real companies and organizations, and with real involvement of professionals from those companies and organizations. The use of technologies not only made the learning more interesting because of the availability of various types of media, but also because it offered possibilities for variation in the learning processes and for adaptation to personal learning preferences. Combinations of text, video and audio offered new possibilities for shaping and supporting the learning processes, but also for product development as a result from that learning process. Furthermore, the user-friendliness of most Web 2.0 applications contributed to the attractiveness of the learning environment, because they linked to learners' personal environments and enhanced their personal involvement.

All the learning practices studied also showed a degree of "learning by doing", where learning is the result of the execution of actions and tasks, and where learners gain experience and learn what an action or a task entails. "Learning by doing" means that knowledge is not generated in isolation, but is virtually always the result of the execution of authentic tasks. This way of learning strongly resembles the way professionals learn while doing their job, so linking learning and working makes the learning processes more meaningful and practical. This is true for all the learning practices, be it at different levels. With "Knowmads*",* the situation could be considered similar to the way professionals learn in practice. With "MEES podcasting", the entire learning process takes place within the safe environment of the educational institute, but its meaning is enhanced by the links made with the outside world. The remaining three practices take up positions between these two extremes.

Apart from learning practices being rich and attractive, safety also played an important role in all learning practices. Learners have to feel they have enough space to be vulnerable, make mistakes, and experiment with new things. This freedom also creates space for creativity and innovation. To a large degree, this pedagogical safety is determined by the teachers/supervisors and the culture they manage to realize, but sometimes it is also determined by the design. With "Knowmads" and "GNR8", students felt safe because they could experiment and because their talents were used optimally. With "Hair Level XL", participants felt safe because of the strong culture and supporting supervision, which takes away any stage fright to start working. With "Mees podcasting", it was especially the teacher who provided a safe environment in which the group could create a product, time and time again. A key factor was the informal learning atmosphere created, in which students could be vulnerable, and could contribute their own ideas with respect to the opinions of others.

Each of the five learning practices had a structure that fitted the type of learning practices and the characteristics of the learners, or in other words, the degree to which structure and direction were offered suited the needs of the learners. With "Hair Level XL" and "MEES podcasting", the structure was determined by the design of the curriculum and the teacher, respectively. With "Knowmads", *"*GNR8" and *"*Game factory Del. icio.us*",* the structure was less rigid, and students were offered more space to take responsibility for it themselves. So, it is not so much the structure offered which is a success factor, but rather the right balance between the structure offered and the learners' need for structure. Naturally, with the more independent learning practices, which have been formed earlier as a result of the execution, this balance is partly developed through interaction between learners and supervisors, and this might be an adequate way to reach the right structure.

Characteristics of the Teacher

In all the learning practices studied, there was a pioneer who at one point started the learning practice, and in most cases that pioneer was an enthusiastic teacher. That teacher was like no other capable of inspiring people, and knew how to challenge learners to actively learn. They were also the kind of teacher who offered learners space to form co-ownership over the content and processes, who had an innovating attitude, who knew how to use new technologies, dared to experiment, and who knew how to find the right balance between directing and facilitating in relation to the learners' need for structure and supervision. So, in the learning practices studied, each involved teachers who were capable of taking an initiative and who knew how to build on that initiative in order to create a learning practice that attracts recognition and appreciation. These teachers required decisiveness and endurance, as recognition is never a given, and innovation requires flexibility from the institute.

Apart from the characteristics of the teacher, it was important that the institute provided space for experimentation. This meant that there was sufficient confidence in the teachers and learners, and all those involved in the learning practices. They all had to be given the opportunity to shape the learning content and learning processes. With "Knowmads", maximum freedom was realized by operating outside regular education. With "GNR8", freedom was sought within the existing curriculum, and positioning this learning practice as a minor, which also allowed for a certain level of freedom. With the remaining learning practices, freedom was offered by the organization and/or was exacted by the teacher.

The type of teacher that is at the base of these kinds of initiatives can be considered being in a special category, and within educational organizations they are exceptions rather than the norm. These characteristics makes it both a success factor and a limiting condition, as these teachers are few and far between. Educational institutes are therefore advised to have an eye for the quality of their teachers and pay attention to their willingness to innovate and experiment. In addition to this, the institute's policy should be aimed at offering enough space for valuable initiatives and at supporting such initiatives.

Transferability

This study showed that transferability of a learning practice is to a large extent determined by the context specificity of that learning practice, or in other words, the degree to which a learning practice is unique and functions within a certain context. All the learning practices studied had a certain level of specificity regarding both content and organization, which makes the transfer to similar and less similar contexts more difficult. Also, every learning practice was colored by everybody involved, not in the least the teacher and the students. To a certain extent the learning practices are tailor-made practices that fit the given context and suit the learners' wishes and needs. More often than not, these tailor-made practices are the result of the specific activities in a specific context, and this embeddedness makes transfer far from a matter of course. This tailor-made aspect does not contribute to the context specific nature of a learning practice, but rather means that the conditions that lead to the success of a learning practice are realized in similar and less similar contexts.

The success factors that have been distinguished can be described as conditions that have to be met, or principles of design that apply to this type of learning practice in similar and less similar contexts. First of all, motivation is a key principle, and this means that both extrinsic and intrinsic motivation are important points of interest when creating and designing a successful learning practice. Intrinsic motivation can be strengthened by giving learners co-ownership of content and direction, but this co-ownership must fit the level and need of the learners. Finding and realizing the right balance in co-production and co-creation requires a design process in which this need is analyzed and acknowledged, and this implies that learners should be involved in the development, from the very start of the design process. This also fits in with the conclusion that a number of the learning practices studied were not designed in advance, but had a design that was the result of collaboration between all parties involved. So, co-creation also implies participation of learners in the design and concretization of a learning practice.

Other aspects related to motivation are the meaningful character of the learning process, which can be strengthened by working on realistic tasks, collaboration with the surroundings, and attention for "learning by doing" and collaboration with the world of practice. Collaborative learning can also contribute to the motivation, but only if learners perceive that collaboration as added value and if the collaboration is adequately supported. Obviously, the teacher/supervisor has much influence on motivation, and can contribute to strengthening the intrinsic motivation in particular. Offering a learning environment where learners can experiment freely and are allowed to make mistakes strengthens motivation, and this aspect of pedagogy may be realized in almost any learning practice. Furthermore, teachers can inspire learners and offer assignments that appeal to the learners' creativity and ingenuity.

The design of a learning environment contributes to the success of learning in all kinds of ways, and it is certainly not only about the use of technologies. In fact, with successful learning practices, the use of technologies does not determine the degree of success by itself. Rather, based on technologies there can be exchange, and communication within teams and with the surroundings. Sometimes a certain technology was prescribed, but usually learners were left plenty of space to choose for themselves from the applications available and pick those that best suit the learning goal or the learners' preferences. It is important that the technology offered is easily accessible and that its use fits the learners' needs and the goals aimed at. Although the use of new technologies can to some extent also make learning more attractive, this can never be a goal by itself. In the end, its use must be perceived as added value in the learning process.

Finally, it can be noted that the degree of a learning practice's autonomy, or in other words, the degree to which a learning practice can be developed outside the conditions and limits of an institute's curriculum, also contributes to the success. Often, this autonomy is exacted by the pioneers, and these pioneers are an important factor for the success. For that reason, educational institutes are advised to offer space for new initiatives, and certainly initiatives that are developed together with students, for chances are not only that this will lead to an innovative learning practice, but also that the implemented technology will actually be used and contribute to the quality of the learning process. In those cases the students' voices are not only heard and appreciated, but their contributions will lead to active participation of students in developing meaningful innovative learning practices.

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KEY TERMS AND DEFINITIONS

Active Learning: Learning that implies involving students directly and actively in the learning process itself, which means that instead of simply receiving information verbally and visually, students are stimulated to participate by exploring, discussing, applying, and reflecting on the learning content.

Autonomous Learning: Learning process whereby a student acquires knowledge by his or her own efforts and develops the ability for enquiry and critical evaluation, usually outside the setting of an educational institute and formal learning processes (See also 'independent learning').

Co-Creation: Learning practices where students contribute to both content and direction of the learning process.

Co-Production: Learning practices where students are co-producers of learning content.

Co-Responsibility: Students taking responsibility for their own learning in educational settings, resulting in a shared responsibility for the learning process between student and educational institute.

Competence-Based Education: Model of instruction that refers to performance-based learning, which implies that students need to acquire attitudes, knowledge and skills in an integrated way on the basis of executing authentic complex assignments in order to learn to perform in professional practice.

Congruence: Occurs when students' learning strategies and teachers' teaching strategies are compatible.

Constructivism: A theory of knowledge that argues that humans generate knowledge and meaning from interaction between their experiences and their ideas, and as a consequence, individual understanding of the world is re-constructed and new knowledge is constructed through social interaction, debate, and shared interpretation.

Cooperative Learning: Refers to students working in teams on an assignment or project under conditions in which certain criteria are satisfied, including that the team members be held individually accountable for the complete content of the assignment or project, which implies a positive interdependence between the students in order for learning to occur.

Demand-Driven Education: Refers to what the student wants to learn at this moment in time and highlights the student's role and needs while the teacher becomes a manager, mediator and motivator of learning, as opposed to supply-driven education where the supply is 'absorbed' by the student.

Destructive Friction: Occurs when students' learning strategies and teachers' teaching strategies are not compatible.

Educational Institute: An organization in the formal educational context that is founded and united for the purpose of developing and delivering formal educational and training programmes.

Formal Learning: Learning that takes place within teacher-student interaction, such as in a school or an educational institute, and which implies instructional design and the delivery of a curriculum.

Independent Learning: Learning process whereby a student acquires knowledge by his or her own efforts and develops the ability for enquiry and critical evaluation, usually within the setting of education and formal learning processes (See also 'autonomous learning').

Informal Learning: Learning that occurs through the experience of day-to-day situations, and is often unintentional learning.

Innovative: In the context of learning practices it is defined pragmatically as not, or hardly, described as a learning practice, and building on recent or foreseeable developments in education, which refers to the use of ICT as well as to the way the roles of learner and institute are allocated.

Learning in Practice: Learning beyond the classroom, implying the execution of authentic tasks in real life situations and/or modelling professional skills by observing professionals in action.

Learning Practice: The interrelated teaching and learning activities in a specific learning situation, and in the context of this study to a learning environment in which students develop competencies by working on authentic tasks.

Media: A collective term for any form in which content can be offered and distributed.

Personal Learning Path: Refers to individual learning and demand-driven education, in which a student chooses and plans learning activities according to his/her personal needs and ambitions.

Realistic Learning: Learning on the basis of executing authentic tasks in real life situations, or simulation of real life situations, in order to acquire contextual knowledge and skills.

Traditional Learning Practices: Learning situations where students simply receive and consume knowledge, usually referring to supply-driven education.

Web 1.0 Applications: Refers to information on the internet that users only can read and software that users only can download but not change, in contrast to 'open source' Web 2.0 applications that users can change according to personal needs.

Web 2.0 Applications: Web applications that facilitate interactive systemic biases, interoperability, user-centered design, and developing the World Wide Web, for example: Twitter©, YouTube©, and Facebook©.

Web 2.0 Technologies: Applications related to what is also called the "social web", and that can be characterized by terms like "openness", "sharing" and "creativity".

ENDNOTE

1 The Students' Voices research has its own website: http://studentsvoices.org, where the latest information about the research can be found.

About the Contributors

Kathryn Moyle is the Executive Director of the Centre for School Leadership, Learning and Development and Professor of Educational Leadership at Charles Darwin University, Australia. Prior to holding this position, Kathryn was an Associate Professor at the University of Canberra, where she was the Director of the Secretariat for the peak national policy committee, the Australia, Information and Communication Technologies in Education Committee (AICTEC). Kathryn undertakes research into various aspects of including technologies into teaching and learning in education, particularly in relation to student voice and the relationships between school leadership and teaching and learning with technologies. Prior to taking up her academic positions, Kathryn worked as a teacher and policy maker in the Department for Education and Children's Services in South Australia where she led national professional learning, and research and development projects.

Guus Wijngaards practiced the following professions before he started to work as Professor on eLearning at the Inholland University: Teacher, Researcher, Journalist, Foreign Secretary teacher union, Secretary General European Association of Teachers (AEDE), Editor in Chief and Projects Manager of CONTEXT, EUN (European Schoolnet) Communication Manager and Deputy Director. Since 1973, he was active in many organizations, to mention a few: Member of the General Board and Chairman of the Working Party Management Training and Education of the European Movement, Member of Scientific Institute of the Dutch Christian Democratic Party, Member of Society of Dutch Literature, Member of Team Europe, National Chairman of the Dutch Herpetology Association "Lacerta". He attained in May 1973 an MA in Dutch and in February 1986, an Arts PhD on European cultural and scientific history. He has published several books and some 300 articles on educational, cultural, foreign political and literary subjects.

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Karen Andrews leads Research and Planning, for the School Technology Sector of Alberta Education. She implements research to catalyze innovation and inform policy and practice in Alberta's K-12 education system. She supports Research Communities of Practice in which multiple stakeholders design, implement and mobilize research to advance learning. Karen has lead national and provincial research initiatives exploring the connections between learning and a wide range of emerging technologies, broadband networks, 21st Century competencies, 1:1 Laptops, personal devices in schools and international space programs. Her work has been recognized by awards including the GTEC Premier's Award of Excellence and YWCA Woman of Distinction.

Elizabeth A. Beckmann is a Senior Lecturer in the Centre of Educational Development and Academic Methods (CEDAM) at The Australian National University, where she is responsible for the Foundations of University Teaching and Learning course and contributes to the Graduate Certificate in Higher Education, as well as being an educational designer and advisor with a special interest in technology-enhanced learning and authentic learning. She also works with the university's Research Student Development Centre to develop new skills development programs. A graduate of the University of Cambridge, The University of New England, and The Australian National University, Beth has a background in biological sciences, environmental management, heritage interpretation, museum education and higher education studies.

Jeroen Bottema works at the Centre for eLearning at Inholland University of Applied Sciences in Rotterdam (The Netherlands). Within Inholland University he holds a position in the School of Education, as a teacher and trainer in Information and Communication Technologies (ICT) and education and as a tutor for the Mastercourse Learning & Innovation. He is currently involved in ICT-literacy projects for the School of Education and Dutch education in general. He participated in projects concerning e-portfolios and streaming video. Before he started working at Inholland University, Jeroen held various positions in Dutch secondary education, as a teacher and eLearning specialist.

Bernard Brown is an Australian research student currently undertaking a PhD in Education at the University of Canberra. He completed his Masters in Education in 2006 at the University of Canberra, and also holds a post Graduate Diploma of Education from the Australian Catholic University and an Honours degree in History from the Australian National University. The focus of his research concerns digital technologies policies designed for schools and the ethical issues arising from the use of these technologies in school contexts. Bernard has been involved in teaching for nearly two decades and has taught in schools and universities both in Australia and South America. He currently works as a curriculum coordinator in a large secondary school in Canberra.

Steven Bruneel studied educational sciences and is currently researcher at the Centre of Instructional Psychology and Technology (University of Leuven, Belgium). His prime interests are digitalization in higher education, students' ICT-skills related to higher education and future, study-related technologies.

Anne Campbell is Associate Professor of Education at the University of Canberra, where she teaches in post-graduate courses in education, and Director of the Master of Education program in Harbin, a program delivered jointly since 2005 by the University of Canberra, Australia and Harbin Normal University, China. Anne has published a number of books and articles in professional journals related to student reactions to learning with technologies in a range of educational contexts, including *Developing Graduate attributes: Politics, Process and Assessment* (VDM) 'Learning with technology for pre-service early childhood teachers.' *Australian Journal of Early Childhood* and 'Developing generic skills and attributes of international students: The (ir)relevance of the Australian university experience' *Journal of Higher Education Policy & Management.*

Kurt De Wit is policy officer at the Office for Educational Policy of the University of Leuven (K.U. Leuven) in Belgium, where he monitors national and European higher education policy and carries out institutional research on students and education. He has a PhD in Sociology and is editor-in-chief of two sociological journals. He has published mainly on the Europeanization of higher education and policy frameworks in higher education.

Mathias Decuypere studied educational sciences and is currently pursuing his PhD in the same research area, investigating the impact of digitization on the professional life of academics. As a PhD researcher at the Laboratory for Education and Society (University of Leuven, Belgium), his prime areas of interest include the growing role of digital technologies in higher education, actor-network theory, the university in relation to globalization, qualitative research methodology, and the harmonization of higher and university education.

Jonny Dyer is a co-founder of the Inclusion Trust, where he serves as the Technical Director. He previously worked as a Senior Lecturer and Research Fellow at Anglia Polytechnic University (UK). His research interests involve using innovative digital technologies in such a way that they create real opportunities to improve learning for marginalized individuals through the application of new and advanced pedagogies. He has worked on a host of research projects including Notschool.net, ComeIn, The Way Programme and In2ition. He has a Master of Science in Conservation and a Bachelor of Science in Resource Development.

Jan Elen is professor instructional psychology and technology at the Department of Educational Sciences, K.U.Leuven. He earned his PhD at the K.U. Leuven on the transition from descriptions to prescriptions. His main research interests relate to the use of instructional interventions by higher education students and how the adequate use can be promoted. He has mainly published on topics on the use of educational technology and the integration of research into teaching. He teaches introductory as well as advanced courses on learning, instruction, educational technology and instructional design.

Jos Fransen is educational staff member of the Faculty of Education of Inholland University of Applied Sciences, and Senior Research Fellow of the Inholland Centre for eLearning. He is currently involved in the curriculum development of the Master Programme Learning & Innovation and is participating in several research projects in the Centre for eLearning. Additionally, he is engaged with rounding off his PhD Research Project on the topic "team effectiveness in the context of collaborative learning in higher education'" This research project will result in an instrument for testing learning teams on effectiveness in an early stage of collaboration. Team-specific and tailor-made tutor interventions may be developed on the basis of this test resulting in learning teams becoming effective and productive in an early stage of the process.

Bette Gray is Director of School Technology Sector for Alberta Education, and works collaboratively with the province's K-12 education sector to design innovative solutions for the use of technology to meet the changing needs of a contemporary education system. She has been involved in a range of initiatives including Alberta SuperNet, a provincial videoconferencing strategy, technology policy, the Alberta Information and Communication Technologies (ICT) K-12 program of studies, and numerous procurement, professional development and action research programs. Bette holds a doctorate in Educational Policy Studies with a specialization in applications of technology in education and a Master's degree in Adult, Career, and Technology Education. In addition to various administrative positions, she has worked as a community developer, high school teacher, school district technology facilitator, and an online instructor at the post-secondary level.

Sue Gregory (aka Jass Easterman) is a long term adult educator and lecturer in Information and Communication Technologies (ICT) in the School of Education, at the University of New England, Australia. She is also a Research Fellow with the Distance Education Hub (DEHub) research institute as well as being the New South Wales (NSW) Science, ICT and Mathematics Education in Rural and Regional Australia -ICT Representative. Sue is the Chair of the Australian and New Zealand Virtual Worlds Working Group and project leader of an Australian Learning and Teaching Council funded project. She is responsible for training pre-service and postgraduate education students on how to incorporate technology into their teaching. Since 2007 she has been researching *Second Life* with her students with respect to the various learning opportunities that virtual worlds provide and has been involved in many projects on the efficacy of virtual worlds.

Jean Johnson, after a number of years in working in industry, joined the teaching profession working in inner London Schools with difficult and disaffected teenagers. In 1993 she became involved in the introduction of the Internet to schools working in a variety of national and international projects focussing on the development of digital technology in the curriculum. In 2000 she began the current iteration of Notschool, an online learning community for disaffected youth. In 2005, Jean formed a charity dedicated to social inclusion through education. It has won several national awards for its work in this field. Jean is a frequent speaker at conferences including the Nobel event in 2006. She has published numerous papers and is a frequent contributor to TV and radio both here and overseas. Jean completed her PhD in the use of ICT as a pedagogical tool with those disaffected from education.

Ben Lockyer has a BA Hons in Philosophy. He joined Inclusion Trust Research Department in 2008. Since joining, Ben has co-authored several academic publications and presented his work at several conferences across Europe. He has worked on research projects such as the UK based Notschool.net and the European Commission funded project, ComeIn. Ben works closely with Jean Johnson and Jonny Dyer researching innovative methods to provide social inclusion using digital technologies. In 2009, Ben co-authored three reports for the ComeIn project, documenting the findings of ethnographic research into the needs of marginalized youth. Ben's research interests involve developing new pedagogies for disengaged and disaffected youth.

Eileen O' Donnell was conferred by Dublin City University with a Bachelor of Science in Information Technology in March 1997 and a Master of Science in Business Information Systems for Managers in November 2008. While lecturing on the Post Graduate Diploma in Business Information Systems in the Dublin Institute of Technology a research interest in Technology Enhanced Learning (TEL) commenced. This research interest has since evolved into the pursuit of a PhD in Computer Science which she is currently undertaking in the Knowledge and Data Engineering Group, Department of Computer Science & Statistics, Faculty of Engineering, Trinity College Dublin, Ireland.

Susanne Owen is the director of an educational consultancy company which focuses on national work across a broad range of areas. She utilizes her educational expertise in research and project management roles. Her areas of focus include improving academic teaching and learning in various discipline areas, understanding youth and their Information Technology needs, international developments in school innovation and health workforce issues and national approaches. Susanne has published over 60 academic papers and reports in a broad range of books, journals and organizational contexts. Susanne's previous experience includes primary and secondary teaching roles, high school and educational systems leadership, and leadership and senior research fellow responsibilities for an extensive range of national projects funded through the Australian Government.

L. Manning Pruden received a dual major, BS in Education and BA in Art from the College of Charleston, in 2006. After completing her degree, Manning worked as a literacy coach, an elementary teacher in South Africa, and a literacy outreach coordinator for an educational non-profit organization. Manning is currently working on her master's degree in Education from North Carolina State University. She is a graduate research assistant at the Friday Institute for Educational Innovation, working on a National Science Foundation grant to develop a Web-based writing tool for middle school students. After completing her masters, she will relocate to Kenya to cultivate her interest in international education reform.

Susan Schroeder has 18 years experience in K-12 education in Canada. She taught high school mathematics, science and chemistry, developed high school science curricula, helped to develop a Web presence for provincial education departments, managed an online learning resource development team, and collaborated on the development of several resources designed to support K-12 educators. As director of Learning Cultures Consulting Inc., Susan continues to support K-12 education in Alberta by providing writing and facilitation services to a broad range of education stakeholders.

Mary Sharp is a lecturer and tutor in the School of Computer Science & Statistics, Trinity College Dublin lecturing on undergraduate and graduate programmes. She is the Chair of the School's Ethics Committee and Erasmus co-ordinator for the school. She is involved at European Union level evaluating projects. Mary's research interests include: the evaluation of eLearning systems, medical informatics, and ethics in Information Technology.

Hiller A. Spires is a professor of literacy and technology in the College of Education and Senior Research Fellow at the Friday Institute for Educational Innovation at North Carolina State University. She received her MA in interdisciplinary English and her PhD in literacy education from University of South Carolina. Her research focuses on effects of digital literacies on learning, including emerging literacies in gaming and Web 2.0 environments. Dr. Spires is co-Principal Investigator on two National Science Foundation funded projects focusing on game-based learning. She coordinates the New Literacies & Global Learning master's program and co-directs the New Literacies Collaborative (newlit.org). She can be reached at hiller_spires@ncsu.edu

Pieter Swager works at the Centre for eLearning at Inholland University of Applied Sciences in Rotterdam (The Netherlands). Within Inholland University, he has held various positions, most of them in the School of Education as a teacher, co-ordinator, program manager and a member of the innovation team. In recent years, he has been concerned with the Centre for eLearning as project manager and with the Master course Learning & Innovation as a tutor. He is also a PhD-student at VU-university in Amsterdam doing research on Blended Learning. He has participated in several major eLearning innovation projects, including those of the Digital University (DU). Subjects concerned were: eTutoring and Blended Learning.

Bas van Goozen teaches as a Teacher Trainer at Inholland University for Applied Sciences in The Netherlands. He completed his Masters in Education in 2010. He is involved as an eTutor in the Inholland Digital Teacher Training Course and as a tutor in the Master Programme Learning & Innovation. He is also a researcher at the Inholland Centre for eLearning.

Jef C. Verhoeven is emeritus professor of sociology at the University of Leuven (Belgium). His recent research is focused on higher education and the use of ICT. He published in the fields of theoretical sociology and sociology of education including many books, and articles in, among others, the *European Journal of Education, Journal of Education Policy, Educational Management, Administration & Leadership, Higher Education Policy, Teacher Development, Research on Language and Social Interaction, Studies in Higher Education, Education Policy Analysis Archives, Tsinghua Journal of Education, Teachers and Teaching – Theory and Practice, Journal of Shandong University (Philosophy and Social Sciences), Assessment in Education: Principles, Policy & Practice, Computers & Education – An International Journal, Education and Information Technologies, Frontiers of Education in China.*

Meixun Zheng is a PhD student in the Department of Curriculum & Instruction at North Carolina State University. She received both her BA in English as a foreign language education and MA in educational administration from East China Normal University. She is conducting research in literacy education, with a focus on technology integration and new literacies. Specifically, she is interested in how game-based learning can be applied in classroom content instruction. She is a graduate research assistant at the Friday Institute for Educational Innovation working on the NSF-funded Crystal Island project, which aims to enhance K-5 students' science learning, problem-solving, and critical thinking through game-based learning.

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