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Using Blended Learning Evidence-Based Practices

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Using Blended Learning

Evidence-Based Practices

 Springer

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Chapter 1

Introduction

Abstract A recent study involving 113,035 students across 13 countries conducted by the EDUCAUSE Center for Analysis and Research found that blended learning environments persists as the preferred learning modality even when students are beginning to experiment with fully online open enrollment courses such as massive open online courses (MOOCs) (Dahlstrom et al. in ECAR study of undergraduate students and information technology, EDUCAUSE Center for Analysis and Research, Louisville, 2013). This chapter begins by presenting the various definitions used by scholars to characterize blended learning, ranging from a very broad definition that encompasses almost multiple learning methods or techniques, to one that narrows it down to the integration of online and face-to-face components. Specifically, in this book, we used the following definition of blended learning, adapted from Horn and Staker (The rise of K-12 blended learning, Innosight Institute, CA, 2011): “blended learning is any time a student learns at least in part at a supervised brick-and-mortar location away from home and at least in part through the Internet with some element of student control over time, place, and/or pace”. This chapter then discusses the reason why blended learning is increasingly being adopted by many educators by outlining its four main benefits: an ability to meet students’ educational needs, improving student-to-student communication, reducing the average overall per-student cost, and improving student learning outcomes as well as lowering attrition rates. More importantly, this chapter argues that the success of blended learning does not happen automatically, just because an online component is added to a face-to-face environment. Ultimately, the success or failure of blended learning hinges on a thoughtful connection between how the online and face-to-face components are integrated, the types of pedagogical approaches employed, and how all these elements are ‘blended’ together to attain the specific learning goals. This chapter ends by presenting a blended learning design framework that emerged from a recent study of seven experienced blended learning designers, along with a description of the various frameworks or taxonomies utilized in this book to classify the different types of pedagogies, cognitive processes of learning, and/or levels of affective learning.

Keywords Blended learning · Hybrid learning · Evidence-based practice · Pedagogy

1.1 What Is Blended Learning?

The use of blended learning is increasingly being adopted in many schools, colleges, universities, and industries around the world (Cheung and Hew 2011; Hadjerrout 2008). Horn and Staker (2011) argued that blended learning will be the vehicle to push the proportion of high school courses offered online to 50 % by 2019. Moreover, in higher education, blended learning has been predicted to be the “new normal” in course delivery (Norberg et al. 2011, p. 207), or the “new traditional model” (Ross and Gage 2006, p. 167). However, many definitions of blended learning abound in the literature. Some authors broadly define blended learning as the integration of almost all multiple learning methods or techniques such as the combination of laboratory sessions, face-to-face lectures, assigned readings, formal coursework, self-paced, collaborative, online format, as well as supervised hands-on practice (Cucciare et al. 2008; Rossett and Frazee 2006). Other authors, on the other hand, disagree with such a broad definition, preferring instead a narrower or more specific definition as the integration of online and face-to-face strategies (Dziuban et al. 2004; Graham 2006; Horn and Staker 2011; Sharma and Barrett 2007; Ward and LaBranche 2003; Young 2002).

We adopt this narrower definition of blended learning as the broader definition tends to encompass *all* kinds of possible learning methods, hence making the scope too large to cover in this book. More specifically, we used the following definition of blended learning, adapted from Horn and Staker (2011): “blended learning is any time a student learns at least in part at a supervised brick-and-mortar location away from home *and* at least in part through the Internet with some element of student control over time, place, and/or pace”. This definition can be illustrated in a two-dimensional matrix (see Fig. 1.1, extracted from Staker 2011, p. 6),

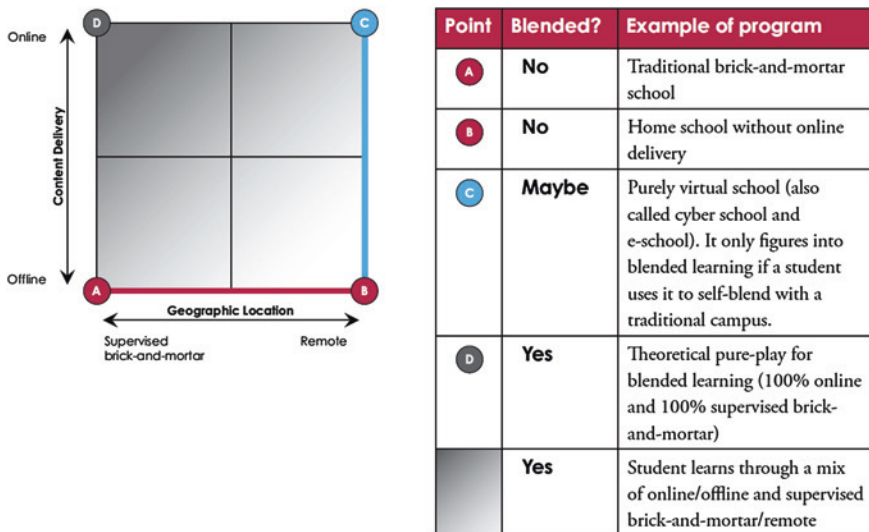


Fig. 1.1 Blended learning matrix (Horn and Staker 2011, p. 6)

where everything shaded gray represents blended learning. In our view, the exact proportion of online and face-to-face components does not really matter.

We know that some authors and institutions define a course as blended only if more than a certain percentage of the course is conducted online. For example, Allen and Seaman (2010) described a course as blended only if the proportion of content delivered online is between 30 and 79 %, a course as web facilitated if its online proportion is between 1 and 29 %, and a course as online if 80 % or more of its content is conducted online. Similarly, Watson et al. (2010) set a threshold of 30 % online delivery of content for a course to be considered blended. We felt, however, that such a definition is merely arbitrary and subjective, and may result in a ratio-centric construct. As Graham (2013) aptly argued, even if a percentage could be accurately established, what practical difference would it make between courses with 29 % versus 30 % of online content delivery?

Therefore, consistent with Dziuban et al. (2004)'s position, we believe that blended learning should be viewed as a pedagogical approach that combines the opportunities of face-to-face learning with the opportunities of the online environment such as increasing the interaction between students and students, as well as students and instructors, rather than a mere ratio of delivery modalities. However, if all instruction takes place online, we would refer it as full online learning, and not blended learning.

1.2 Rationale for the Growth of Blended Learning

Fuelling the growth of blended learning is the belief that blended learning is able to meet the educational needs of students, particularly adult learners. For example, many graduate students may have work and family responsibilities. However, a fully online course may not be satisfying to them as many students and instructors lament the loss of face-to-face contact (Dziuban et al. 2004). A recent New York Times article reported a five-year study which tracked 51,000 students enrolled in Washington State community and technical colleges. The study found that students who took higher proportions of fully online courses were less likely to earn degrees or transfer to four-year colleges (New York Times 2013). One of the main reasons for this is the lack of engagement with the instructor, resulting in online estrangement where students rarely get to know their instructors directly. Therefore, when these students need help to understand their studies, they do not know who to look for assistance.

Consequently, blended learning, which has a mixture of online learning and face-to-face component, can help overcome this problem. Blended learning can provide the flexibility that students and instructors require (McCray 2000; Strambi and Bouvet 2003; Wingard 2004) as it allows some time for face-to-face student- and instructor-engagement, as well as online learning that enables students to work on the course activities at their own convenient time and pace. It is therefore not surprising that blended learning plays an important factor in determining whether students enroll in and complete the program of study (Cheung and Hew 2011).

Blended learning can also improve communication with students via computer mediated communication tools such as asynchronous and synchronous communication technologies. Blended learning can offer a higher level of interaction than commonly experienced in face-to-face courses (Dziuban et al. 2004; Wingard 2004). This is because the various technology tools available in many blended courses and course management systems combine to form a communication environment such as facilitating access to course materials and experts that might not be otherwise available (Dziuban et al. 2004). Moreover, computer mediated communication tools also allow students to have more control over the discussion, as compared to face-to-face discussions which may be dominated by their instructors (Jones et al. 2006; Salmon 2004).

Blended learning can also lower the average overall per-pupil costs, an increasingly desired wish for many educational institutes in the face of today's budget constraints. A recent report published by the Thomas B. Fordham Institute attempts to describe "the size and range of the critical cost drivers for online schools in comparison to traditional brick-and-mortar schools" (Battaglini et al. 2012, p. 2). The report described two types of online learning: virtual schools, where all instruction takes place online, and blended-learning schools, in which students "attend brick-and-mortar schools where they alternate between online and in-person instruction" (p. 3). Based on interviews with 50 experts and vendors in the field and on information collected from public documents, the report estimates that the per-pupil costs of both virtual and blended-learning schools are lower than the US\$10,000 average per-pupil costs of traditional brick-and-mortar schools in the USA. More specifically, in blended learning schools, the average per-pupil cost is estimated to be \$8,900, with a range of \$7,600–\$10,200. Although the study is limited in its cost estimate by looking only at blended learning middle schools with enrolment of about 500 students, it is...

Furthermore, some research studies have found that blended learning can increase student learning outcomes. A meta-analysis of 23 experimental or quasi-experimental studies conducted by the U.S. Department of Education found that blends of online and face-to-face instruction, on average, had stronger learning outcomes than did face-to-face instruction alone (Means et al. 2010). In another study, Dziuban et al. (2004) reported that although success rates varied by college across discipline, blended courses generally produced successful student learning outcome rates (those students achieving an A, B, or C) comparable to or higher than their face-to-face and fully online counterparts. Similarly, the Community College Research Center at Columbia University found that students in blended classes performed academically as well as those in traditional face-to-face classes (New York Times 2013). In addition, the attrition rates for blended courses were also generally comparable to those in face-to-face courses (Dziuban et al. 2004, 2006). Xu and Jaggars (2011) reported that students were equally likely to finish a blended course as to finish a face-to-face course. On the other hand, students in fully online courses were more likely to fail or drop out; they were also less likely to attain an educational award.

It is no wonder then that these four main reasons: an ability to meet students' educational needs, improving student-to-student communication, reducing the

average overall per-student cost, and improving student learning outcomes as well as lowering attrition rates, increasingly attract more and more educational institutes to embrace the blended learning approach. However, it is crucial to note that the success of blended learning does not happen automatically, just because an online component is added to a face-to-face environment (Cheung and Hew 2011). As the New York Times (2013) puts it, “hybrid [blended] courses are rare, and teaching professors how to manage them is costly and time consuming” (p. A22). It is not sufficient to merely put course contents on a web site for students to download for a blended-learning course to be successful. Nor is the mere inclusion of more resources such as video or online quizzes appears to influence the amount of student learning (Means et al. 2010). Central to this book, is the conviction that it is the pedagogy or instructional strategy used which determines whether learning takes place, rather than the mere physical characteristics of the medium (Clark 1983).

1.3 Challenge in Finding the Right ‘Blend’

This therefore leads us to the important question: “How do we find the right ‘blend’ or ‘mix’ between online and offline (face-to-face) components?” This is a question that has intrigued many researchers and instructional designers of online learning environments. Although the physical characteristics of the learning environments (e.g., online or face-to-face) may not be causal factors, they can enable or constrain particular pedagogical models (Graham 2013). This has therefore led some researchers to theorize that successful implementation of blended learning capitalizes on the strengths of both online and face-to-face modalities as listed in Table 1.1.

We believe that although an understanding of the strengths and limitations of the two learning modes is useful, it is not sufficient. Essentially, how does one find the right ‘blend’ among these different modes? As mentioned earlier, the adherence to a certain ratio of online and offline components (e.g., 70–30 %) is merely arbitrary and subjective. It is not well supported in research and has not found widespread acceptance among educators and instructional designers (Foo 2014).

1.4 A Proposed Framework for Designing Blended Learning

Designing for blended learning can be characterized as a complex problem solving activity. Therefore, what are some of the essential steps or procedures to be taken when an instructor designs a blended learning course? So, in an attempt to answer this very question, one of our graduate students (Foo 2014) recently conducted an in-depth interview study that examined the design process of seven instructors with at least 5 years’ experience conducting blended classes. From the content analysis of the interview data, Foo (2014) postulated the blended learning design framework shown in Fig. 1.2.

Table 1.1 A summary of some key strengths and limitations of the online and offline learning modes (Adapted from Ellis 2001; Foo 2014)

Mode of learning		Possible strength	Possible limitation
Online learning	Asynchronous session (e.g., discussion forums or boards)	<ul style="list-style-type: none"> • Increased time for learners to reflect • Helps introverted students to learn without feeling embarrassed • Allows individuals to participate at own time and pace 	<ul style="list-style-type: none"> • Requires self-discipline on the part of learners • Heavy additional work load on the part of the instructors
	Synchronous session (e.g., chats, audio conferencing, video conferencing)	<ul style="list-style-type: none"> • Allows immediate interaction • Allows individuals to participate at location of convenience 	<ul style="list-style-type: none"> • Difficult to ask question and get it answered particularly when chats are rapid and filled with many voices
	Online content delivery (e.g., text, video, audio, animation)	<ul style="list-style-type: none"> • Allows learners to follow content at own time and pace • Learning content can be easily replicated and distributed to all learners 	<ul style="list-style-type: none"> • Possible interrupted or choppy delivery due to traffic congestion • Additional work load on the part of the instructors to prepare the online resources
Offline learning	Face-to-face session	<ul style="list-style-type: none"> • Provides immediacy of conversation (e.g., immediacy of response, interactivity) • Allows participants to read face-to-face nuances such as body language • Space to build interpersonal relationships 	<ul style="list-style-type: none"> • Limited scope for learner discussion due to time constraints • Difficult for introverted learners to speak up for fear of embarrassment • Requires effort and time to travel to a fixed location

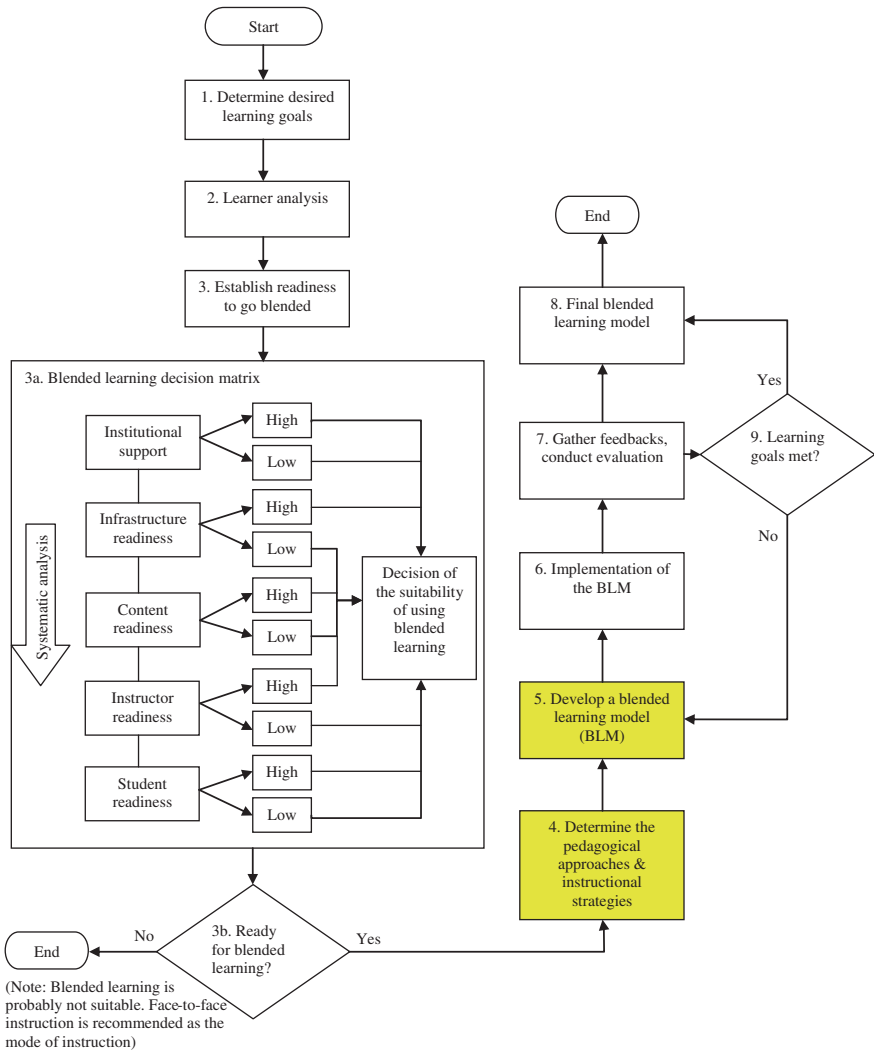


Fig. 1.2 A blended learning design framework (Adapted from Foo 2014)

The design for blended learning typically begins with an ‘Analysis’ stage (Steps 1 and 2) to determine the desired learning goals to be achieved at the end of the instruction, as well as conduct a learner analysis to understand the prior knowledge of the intended target audience. Next, comes the important process of establishing the readiness to go blended (Step 3). The blended learning decision matrix illustrated in Step 3a captures five key pre-conditions that need to be addressed (Foo 2014): institutional support, infrastructural readiness, content readiness, instructor readiness, and learner readiness. Table 1.2 summarizes some of the relevant issues to consider in each of the five key pre-condition (Foo 2014; Smith 2005).

Table 1.2 Some key issues for consideration

Key pre-condition	Issues to consider
Institutional support	<ul style="list-style-type: none"> • Adequate technical support? • Resources (e.g., time, money) for faculty to plan, design, and develop blended learning?
Infrastructural readiness	<ul style="list-style-type: none"> • Availability of a reliable and robust online platform system, broadband access?
Content readiness	<ul style="list-style-type: none"> • Starting from scratch (and hence can be quite expensive in terms of time and money to be invested)? • Adapting from open educational resources?
Instructor readiness	<ul style="list-style-type: none"> • Ability to facilitate student discussion online? • Willingness to contact students who are not participating? • Ability to deal effectively with disruptive online students? • Ability to promote online collaborative learning? • Ability to set up a well-organized course website?
Learner readiness	<ul style="list-style-type: none"> • IT skills of the learners? • Internet experience of the learners?

If the overall assessment in Step 3 yields a positive adequacy, then the design process moves on to Step 4: Determining the pedagogical approaches to be used. However, if the overall assessment suggests an overwhelming inadequacy, then the blended learning design process ends and the next logical thing to do is to revert to face-to-face instruction. Next, comes the crucial step of putting everything together, of which the by-product would be an initial blended learning model (Step 5) which usually depicts how the online and face-to-face components, as well as course resources are integrated. To test the initial blended learning model, the instructional designers would typically implement it in a course (Step 6), conduct some form of evaluations, and gather feedbacks on the effectiveness of the blended learning course in meeting the desired learning goals (Step 7), and make the necessary adjustments to yield a validated blended learning model (Step 8).

1.5 Knowledge Gap

Although the blended learning design framework postulated by Foo (2014) gives educators a useful bird's eye view of the entire design process, it stops short of providing actual evidence-based practice regarding how particular pedagogical approaches, how the online and face-to-face components, as well as course resources are put together (i.e., blended learning models) (see highlighted boxes four and five in Fig. 1.2) to attain certain learning goals.

Through our literature review, we found several scholars have previously attempted to describe the various models of blended learning found in practice. Staker (2011), for example identified six types of K-12 blended learning models—face-to-face driver, rotation, flex, online lab, self blend, and online driver (see Table 1.3).

Table 1.3 Blended learning models in K-12 practice (Staker 2011, pp. 7–8)

Model	Description
Face-to-face driver	<ul style="list-style-type: none"> • Teachers deliver most of the content face-to-face • Teachers use online learning on a case-by-case basis to supplement or remediate learning
Rotation	<ul style="list-style-type: none"> • Students rotate on a fixed schedule between learning online in an individualized, self-paced environment and a traditional face-to-face classroom • Online learning component can be remote or onsite in school • The face-to-face teacher usually oversees the online work
Flex	<ul style="list-style-type: none"> • Features an online platform that delivers most of the content • Teachers provide on-site support on a flexible and as-needed basis • Through in-person tutoring sessions and small group sessions
Online lab	<ul style="list-style-type: none"> • Uses an online platform to deliver the entire course but in a brick-and-mortar lab environment • Online teachers are provided to address students' questions about course content • Paraprofessionals supervise, but offer little content expertise
Self-blend	<ul style="list-style-type: none"> • Students take online courses to supplement their school curricula • The online courses are always remote
Online driver	<ul style="list-style-type: none"> • Uses an online platform and teacher that deliver all curricula • Students work remotely for the most part • Face-to-face check-ins are sometimes optional and other times required • Some programs offer participation in face-to-face extracurricular activities

Table 1.4 Blended learning models in higher education practice (Twigg 2003)

Model	Description
Supplemental	<ul style="list-style-type: none"> • Retains basic structure of traditional course, especially number of face-to-face class meetings • Supplements lectures and textbooks with a variety of online activities (e.g., online quiz)
Replacement	<ul style="list-style-type: none"> • Reduction in class-meeting time • Replaces, rather than supplements face-to-face time with online learning activities for students
Emporium	<ul style="list-style-type: none"> • Eliminates all class meetings • Replaces class meetings with a learning resource center that provides online materials and on-demand personalized assistance • Allows students to learn at own pace and need (e.g., choose when to access course materials, what types of learning materials to use depending on their needs, and how quickly to work through the materials)
Fully online	<ul style="list-style-type: none"> • All learning activities are online • Uses automated software graded assignments that provide immediate feedback to students
Buffet	<ul style="list-style-type: none"> • Offers students an assortment of learning choices or paths including lectures, individual discovery laboratories (in-class and online), group discovery laboratories, individual and group review (both live and online), small-group study sessions, videos, etc.

Twigg (2003) identified five different blended learning models that are used in higher education—supplemental, replacement, emporium, buffet, and fully online (see Table 1.4), while Rossett and Frazee (2006) outlined three general models for

Table 1.5 Blended learning in the corporate training environment (Rossett and Frazee 2006, pp. 10–12)

Model	Description
Anchor blend	<ul style="list-style-type: none"> • Starts with a substantive classroom event • Followed by independent experiences that include interaction with online resources, online learning, structured workplace learning activities, and diagnostics, and assessments
Bookend blend	<ul style="list-style-type: none"> • Characterized by a three-part experience—(a) something introductory online or face-to-face, (b) a substantive learning experience online or face-to-face, and (c) then something that concludes and extends the learning into practice at work
Field blend	<ul style="list-style-type: none"> • Individuals given an option about their learning paths • Individuals choose when and where the learning resources as needed to address work-related issues • Many learning resources are available online • Face-to-face sessions can be part of the blend

blended learning in the corporate training environment—anchor blend, bookend blend, and field blend (see Table 1.5).

Although the aforementioned models give educators and other researchers some ideas of how blended learning may look like in practice, they tend to focus on very general high-level pedagogical approaches, and the physical dimensions of the learning environments (Graham 2013). Hence, they may not be very helpful to educators who desire more detail description of the instructional strategies used.

1.6 Purpose and Plan of This Book

This book aims to fill the aforementioned gap by discussing evidence-based pedagogical approaches and specific instructional activities related to the use of blended learning in both K-12 and higher education settings. Following the field of medical science, evidence-based practice in education involves making decisions that are informed by relevant empirical research evidence. The use of such evidence-based practice would be very useful to educators interested in fostering student learning through blended learning.

Specifically, in this book we will discuss evidence-based practices in relation to the following five learning goals:

- (a) Fostering students' attitude change toward country (see Chap. 2),
- (b) Helping students solve ill-structured design task problems (see Chap. 3),
- (c) Improving students' critical thinking in assessing social studies sources of information (see Chap. 4),
- (d) Improving students' argumentative writing and oral proficiencies (see Chap. 5), and
- (e) Enhancing students' learning of factual knowledge (see Chap. 6)

To achieve this aim, we will draw upon our own research studies as well as review some other relevant recent studies. The findings of these studies are all based on

empirical support. With regard to each of the five learning goals, we will analyze each study, and describe the following elements or parameters:

- (a) The type of pedagogical approaches used,
- (b) The cognitive processes of learning or levels of affective learning involved,
- (c) The specific instructional activities utilized,
- (d) The technological tools and course resources used, and
- (e) The overall blended model of how all these elements are put together in a coherent manner.

In the Conclusion chapter, we develop a programmatic research construct for blended learning based on an earlier framework proposed by Meyen et al. (2002). The use of this programmatic research construct will not only inform researchers of future possible research related to studying learner outcomes, but also expand the scope of blended learning research to other dimensions that are hitherto not yet investigated.

Before proceeding further, it will be useful for us to begin with a description of the frameworks or taxonomies utilized in this book to classify the different types of pedagogies, cognitive processes of learning, and/or levels of affective learning.

1.7 Classifications Used in This Book

To classify the various pedagogies such as direct instruction, case-based learning, project-based learning, peer teaching, group discussion, and so on, we adopt Bower et al.'s (2010, pp. 182–183) framework which organizes the type of pedagogical approaches according to the degree of negotiation and production they foster (see Table 1.6):

- (a) Transmissive pedagogies—transmissive-based information delivery approaches, where a stream of information is broadcast to learners;
- (b) Dialogic pedagogies—centered on discourse or negotiation between participants, and often involving exemplars followed by periods of activity and feedback;
- (c) Constructionist—where learning occurs by developing a product or artefact; and
- (d) Co-constructive—groups of learners complete a series of goal-related tasks to produce an artefact.

To classify the type of cognitive processes involved in learning, we adopt Anderson and Krathwohl's (2001) taxonomy as it allows a more discipline-free way to examine the types of thinking processes which students engage with (Byrd 2004; Hanna 2007; Noble 2004; Oliver et al. 2004; Su et al. 2004). Specifically, the original cognitive process taxonomy by Anderson and Krathwohl (2001) includes six types: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating, and their corresponding descriptions. These sub-processes have been extended by Churches (2009) to include the types of cognitive processes that specifically relate

Table 1.6 Pedagogies categorized based on their degree of negotiation and production, extracted from Bower et al. (2010, p. 183)

	Non-negotiated	Negotiated
No product	Transmissive	Dialogic
Product	Constructionist	Co-constructive

Table 1.7 Taxonomy of cognitive processes

Types of cognitive process	Description
Remembering	Retrieving relevant information from memory—includes recognizing, identifying, recalling, listing, naming, locating, finding, <i>bullet pointing, highlighting, bookmarking, social networking, Social bookmarking, favorite-ing/local bookmarking, Searching, Googling</i>
Understanding	Constructing meaning; includes interpreting, paraphrasing, illustrating, instantiating, classifying, summarizing, predicting, comparing, explaining, exemplifying, <i>advanced searching, boolean searching, blog journaling, twittering, categorising and tagging, commenting, annotating, subscribing</i>
Applying	Using a procedure in a given setting; includes implementing, executing, carrying out, using, <i>running, loading, playing, operating, hacking, uploading, sharing, editing</i>
Analyzing	Breaking material into its component parts and examining how these parts relate to one another and to an overall structure; includes organizing, deconstructing, finding coherence, integrating, <i>mashing, linking, reverse-engineering, cracking, mind-mapping, validating, tagging</i>
Evaluating	Making judgments based on certain criteria or standards; includes checking, hypothesising, critiquing, experimenting, judging, testing, detecting, monitoring, <i>blog/vlog commenting, reviewing, posting, moderating, collaborating, networking, reflecting, Alpha and beta testing</i>
Creating	Putting things together to form a functional whole; includes designing, constructing, planning, producing, inventing, devising, making, <i>programming, filming, animating, blogging, video blogging, mixing, remixing, wiki-ing, publishing, videocasting, podcasting, directing/producing, creating or building mash ups</i>

to digital or technology-incorporated learning. Table 1.7 lists the various cognitive processes by Anderson and Krathwohl along with Churches' additional inputs in italics.

Finally, to classify the level of affective learning, we adopt Krathwohl's et al. (1973) taxonomy which consists of five levels, beginning with 'receiving', followed by 'responding', valuing, 'organization', and ending with the highest level 'characterization' in which students incorporate a particular value into their lives and consistently act it out. Table 1.8 lists these five different levels, along with their descriptions and illustrative examples.

Table 1.8 Taxonomy of affective learning

Level	Description	Illustrative example
Receiving	Refers to a learner's attending to certain stimuli or phenomena	Listens to other people's viewpoints; reads materials about a particular idea, belief, or position
Responding	Refers to a learner reacting to particular stimuli or phenomena	Completes homework; reads the assigned materials; participates in discussions; questions ideas or concepts; shares thoughts and feelings about particular issue
Valuing	Refers to a learner's accepting particular beliefs, ideas, positions	Seeks out information related to particular phenomena or stimuli; expresses preference or support for a certain activity or belief or idea
Organization	Refers to a learner's effort in conceptualizing particular values, beliefs, or ideas, resolving conflicts between them to build an internally consistent value system	Attempts to identify the characteristics or basic assumptions which underlie particular values, beliefs, ideas, positions, or objects; forms judgments regarding these elements; begins to form dominant values, beliefs, or ideas
Characterization	Refers to a learner acting consistently with the new value, idea, or belief	Adheres to particular values, ideas, beliefs (e.g., ethical practice)

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Chapter 2

Promoting Attitude Change Toward Country: A Theoretical Framework and Blended Learning Approach

Abstract Many countries around the world desire their students to have a positive attitude toward their own nations. Although the task of fostering a positive student attitude toward country is an important one, it may not be easy to achieve. The goal of this chapter is to provide a brief review of the scholarly literature on citizenship education, followed by a theoretical discussion on promoting attitude change particularly via the theory of persuasion, as well as a discussion of a blended learning approach that incorporates the use of persuasive messages, Socratic questions, asynchronous online discussion forums, and personal reflections. This paper concludes with a brief description of a research project of two grade five classes in Singapore that attempted to promote positive student attitude toward their country. The results of our study suggested that the blended learning approach was able to instill a positive student attitude to their country. Finally, we discuss several important lessons learned that could inform the design of future instructional strategies in implementing blended learning for the purpose of citizenship education.

Keywords Citizenship education • Attitude change • Blended learning • Affective domain • Asynchronous online discussion • Reflection • Socratic questions • Persuasion

2.1 Introduction

The development of citizenship of young people is typically considered one of the most important aims of formal schooling in many countries throughout the world. In the literature the concept of citizenship education appears to embrace a wide variety of domains (Schuitema et al. 2008), which may include the following:

1. Students' geographical knowledge of their own country and other countries (e.g., Barrett 1996; Barrett and Farroni 1996; Bouchier et al. 2002; Jahoda 1964; Moss and Blades 1994)
2. Students' political and civic knowledge (e.g., Kerr et al. 2002, 2003; Torney-Purta et al. 2001)

3. Students' attitudes toward government policy, laws, as well as civic concepts such as rights and social justice (e.g., Cleaver et al. 2005)
4. Students' knowledge of national emblems (e.g., Jahoda 1963; Barrett 2005)
5. Students' national stereotypes (e.g., Barrett and Short 1992; Barrett et al. 2003; Jahoda 1964; Penny et al. 2001), and
6. Students' national identity, as well as a sense of belonging, commitment or allegiance to one's country (Dixon 2002; Kerr et al. 2002, 2003; Torney-Purta et al. 2001).

Singapore is no exception to the notion of citizenship education. Ever since Singapore attained self-government in 1959, citizenship education in Singapore has appeared in many forms. There have been, perhaps, seven major forms of citizenship education in Singapore throughout the years. Citizenship education was originally taught as Ethics between 1959 and 1966; it was later replaced by Civics in 1967; Education for Living in 1973; Being and Becoming and Good Citizens in the late 1970s; Religious Knowledge and Confucian Ethics in 1982; Civics and Moral Education in 1992; and, National Education in 1997 (Sim and Print 2005) (Table 2.1).

Probably some of the most extensive changes to citizenship education have been related to National Education (Han 2000). The aims and objectives of National Education are encapsulated in the following six messages (Ministry of Education 2007): (a) Singapore is our homeland; this is where we belong, (b) We must preserve racial and religious harmony, (c) We must uphold meritocracy and incorruptibility, (d) No one owes Singapore a living, (e) We must ourselves defend Singapore, and (f) We have confidence in our future.

Underlying the launch of the National Education program was the concern over Singapore's young citizens' ignorance of the nation's history, of how the nation came into being, which might lead to these people taking peace and prosperity for granted (Chia 2012). As the then Prime Minister Goh stated, "One important part of education for citizenship is learning about Singapore—our history, our geography, the constraints we faced, how we overcame them, survived and prospered, what we must do to continue to survive. This is national education" (Goh 1996). Thus, the formal and informal curriculum initiatives for the implementation of National Education focus on instilling the facts of the Singapore story, particularly in school subjects such as civic and moral education, social studies, and

Table 2.1 Summary of blended learning parameters

Parameter	Description
Learning goal	To promote positive attitude toward country
Type of content	Affective learning—receiving, responding, valuing
Type of pedagogical approach	Dialogic
Specific instructional activity	Socratic questions, self-reflection, online peer discussion and face-to-face class discussion facilitated by the teacher
Technological tools and resources	Online asynchronous forum, country pledge, persuasive messages, <i>Singapore My Home</i> website
Overall blended learning model	See Fig. 2.3

history (Chia 2012). The teaching of the Singapore story tends to be didactic in its approach, and excessive as evidenced in the repetition of topics on Singapore's independence and racial riots (Chia 2012).

Although teaching of facts about Singapore's history is important, a more challenging and crucial task is instilling a positive attitude among her young citizenry toward the nation. The didactic approach of presenting Singapore's past tends to focus on the students' cognitive domain (e.g., how the nation became independent), but fall short on dealing with students' attitude toward the country. With the recent newspaper report on "1,200 Singaporeans give up their citizenship yearly" (Chua 2012), the task of fostering a positive student attitude toward their country has taken an increased importance and relevance.

The rest of the chapter is organized as follows. We present a brief review of the literature on attitude change, with an emphasis on persuasive theory. This is followed by a discussion of our blended learning approach that incorporates the use of persuasive messages, Socratic questions, asynchronous online discussion forums, and personal reflections. We then describe the citizenship education project, followed by the findings, and a discussion of several important lessons learned related to the use of blended learning for the purpose of citizenship education.

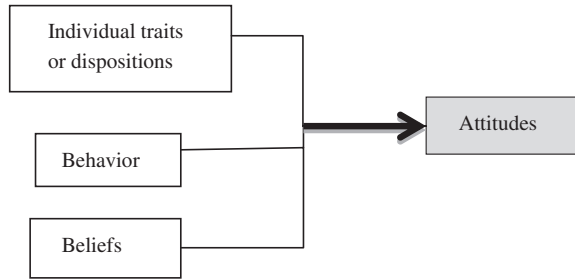
2.2 Review of Literature on Attitude Change

A recent review of the citizenship education literature by Geboers et al. (2013) revealed that past research studies tended to focus mainly on the political aspects of citizenship education such as student attitudes towards freedom of expression, immigrant rights, personal rights, and public rights. So far, none of the past studies reviewed by Geboers et al. (2013) examined the impact of citizenship education on student attitude toward their country.

Although the task of fostering a positive student attitude toward country is an important one, it is not easy to achieve. Thus, the main question that guides our research project is: "how could one promote a positive student attitude toward country?" To answer this question, it is first important to understand the meaning of the word attitude.

Despite the many previous studies on attitudes, there is no universally agreed upon definition (Olson and Zanna 1993). Various scholars have defined attitudes in terms of evaluation, affect, or cognition (Eagly and Chaiken 1992; Kruglanski 1989). Despite these various definitions, most attitude theorists agree that evaluation constitutes a predominant aspect of attitudes (Olson and Zanna 1993). Thus, attitudes may be described as the evaluative judgments, with some degree of favour or disfavour, about a given entity, object or event (Crano and Prislin 2006; Eagly and Chaiken 1992; Gawronski and Bodenhausen 2006). As Fishbein and Ajzen (1975) wrote, "an attitude represents a person's general feeling of favorableness or unfavorableness toward some stimulus object" (p. 216). In other words, attitudes can be conceptualized as perception or affect that indicate whether a person likes or dislikes something (Havelka 2003; Simpson et al. 1994). So for

Fig. 2.1 Factors that could affect attitudes



example, students’ attitudes toward Singapore may be conceptualized as students liking or disliking Singapore.

A review of the literature suggests several factors that could influence or affect attitudes. These factors include individual traits or dispositions (e.g., genetic, dispositions toward cognition), behaviour, and beliefs (Flaste 1991; Kohnstamm et al. 1989; Perry 1973; Schachter et al. 1977; Tesser 1993) (see Fig. 2.1). We described each of these factors in the following paragraphs.

2.2.1 *Disposition Toward Cognition*

Attitudes may be affected by certain individual traits such as a person’s dispositions (Sinatra et al. 2012). Dispositions are “relatively stable psychological mechanisms and strategies that tend to generate characteristics behavioral tendencies and tactics” (Stanovich 1999, p. 157). One of these dispositions is what Cacioppo et al. (1996) referred to as people’s tendency to engage in and enjoy effortful cognitive endeavors which could be represented in terms of a single factor called *need for cognition*. Scholars (e.g., Cacioppo and Petty 1982, 1984; Cacioppo et al. 1983, 1986) have found that individuals low in need for cognition, as well as those high in need for cognition must make sense of their world but they tend to derive meaning, adopt position, or solve problems in different ways. Individuals who are high in need for cognition tend to approach ideas or suggestions open-mindedly, and tend to engage in critical thinking, while those with low degrees of need tend to be close-minded, and less willing to engage in critical thought or discourse (Sinatra et al. 2012). Previous research has suggested that students with a high need for cognition tend to be more accepting of belief change (Sinatra et al. 2003).

2.2.2 *Genetic*

Besides individual dispositions, a person’s genetic or heritability could also influence his or her attitudes (Olson and Zanna 1993). Perry (1973), for example, studied the heritability of attitudes toward alcohol, cigarettes, and coffee, and found that attitudes toward drinking alcohol had a genetic component (51 %) but attitudes toward drinking

coffee and smoking cigarettes did not. In a stimulating paper, Tesser (1993) described several examples and studies that argue strongly for the genetic basis of attitudes. For instance, Tesser (1993) suggested that genetic differences in sensory structures such as taste and hearing could affect attitudes toward food and loud music, and that genetically derived color blindness eliminates any preference or favour between undetectable color differences. In another study, Schacter et al. (1977) had argued for individual differences in body chemistry and their attitudes toward cigarettes, while the relationship between genetic differences in body chemistry and the desire for alcohol is frequently discussed (Flaste 1991). Tesser (1993) also suggested that the genetic differences in activity level could easily have an effect on attitudes toward different free-time activities and career options (e.g., Kohnstamm et al. 1989).

Contrary to commonly held views, it is important to note that heritability is not a fixed entity determined solely by certain biological substrates but is also dependent on the social or environment context within the population under study (Cropanzano and James 1990). Tesser (1993, pp. 131–132) described heritability as “a ratio of the phenotypic variance controlled by genetic variance to the total phenotypic variance which is controlled by genetic variance and environmental variance, for a particular population”. In other words, heritability is determined both by nurture as it is by nature (Tesser 1993). Thus, if heritability of attitudes can be influenced as much as by nurture as it is by the operation of genes within individuals, then it stands to reason that a teacher can influence or alter students’ attitudes by ways of changing beliefs, particularly via the principles of effective persuasion (see section on persuasion).

2.2.3 Behavior

It is a commonly accepted notion that attitude can affect behaviour. However, an important and interesting insight provided by social psychology is that an individual’s behaviour can also affect his or her attitude, not just the reverse (Olson and Zanna 1993). An example can be found in two studies conducted by Kellerman et al. (1989). In these two studies, opposite sex strangers were induced to exchange mutual unbroken gaze for two minutes. Results showed that these strangers had increased feelings of passionate love for each other. Subjects who were gazing at their partner’s eyes, and whose partner was gazing back reported significantly higher feelings of liking than subjects in any other condition. In addition, the behaviour of other people can also influence one’s attitude and action (Learning Seed 2007). If many people are doing an action, then the action must be fine or okay, and this could subsequently change an individual’s attitude toward the action.

2.2.4 Beliefs

Whereas attitude refers to an individual’s favourable or unfavourable evaluation of an object, beliefs refer to the information, concepts or knowledge that an individual has about an object or entity (Fishbein and Ajzen 1975; Havelka 2003; McLeod

1992). Beliefs can be described as premises or suppositions about something that is felt to be true (Calderhead 1996).

Beliefs can determine a person's attitude (Bodur et al. 2000; Fishbein 1963; Havelka 2003). In fact, some influential scholars argue that beliefs about an object provide the basis for the formation of attitude toward the object; that attitudes are usually measured by assessing a person's beliefs; and that attitudes are determined by the strength of the beliefs toward the attitude objects (Fishbein 1963). Thus, having a certain set of beliefs toward Singapore (e.g., a knowledge that Singapore is a safer and less polluted place to live compared to other cities or countries), an individual then forms a favorable or unfavorable attitude toward the country (e.g., liking or disliking Singapore), which can ultimately lead to a particular behavior or action being performed (e.g., staying in Singapore or leaving it).

If beliefs are central to attitude formation and change, then it stands to reason that students' beliefs toward Singapore must first be fostered or changed before a positive attitude toward the country can be expected. How, then, is belief change most likely to occur? Many scholars have argued that persuasive pedagogy has the potential to change students' beliefs and attitudes (Alexander et al. 2002; Gawronski and Bodenhausen 2006; Murphy 2001; Sinatra and Kardash 2004). In the following section, the principles of persuasion will be discussed in greater detail.

2.3 Attitude Change: Persuasion Theory

Perhaps, the single most important and largest topic within the literature on attitude change is persuasion (Olson and Zanna 1993). But what exactly is persuasion? The word *persuasion* inevitably evokes different meanings from different individuals. Some of these meanings could be less positive such as how media convince women that a skinny body is desirable, or how politicians win our vote (Fives and Alexander 2001). However, a more positive view of persuasion has been voiced by Alexander et al. (2000), as well as Petty and Cacioppo (1986).

Specifically, from a psychological perspective, persuasion involves "convincing individuals to look differently or more deeply at some concept or subject" (Alexander et al. 2000, p. 2). In other words, individuals are first presented with compelling messages or arguments, factual evidence, as well as the opportunities to question, and are then encouraged to reflect and make their own conclusions about a certain topic at hand (Fives and Alexander 2001). Persuasion supports learners in their effort to reorganize and restructure their schemata (Fives and Alexander 2001). Persuasion thus rejects the notion of a simple transmission of knowledge from a teacher to students, or the assumption that all students will simply accept whatever information that is presented (Murphy 2001).

Research has shown that carefully crafted persuasive messages or arguments can promote attitude change (Hynd 2003; Sinatra et al. 2012). Persuasive messages include any number of written, video, or oral materials such as newspaper articles, books, billboards, television programs, flyers, speeches, and websites. All these materials can be catalysts for promoting students' attitude change.

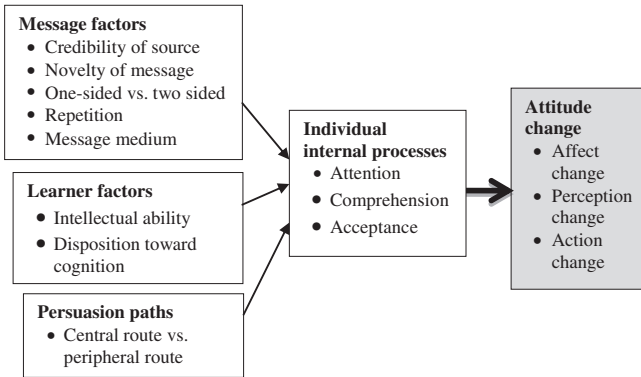


Fig. 2.2 Possible factors affecting persuasion

There are several key factors or conditions that, if present, could help influence the persuasion process of messages. In this paper, we discuss three major factors: message factors, learner factors, and persuasion path factors (see Fig. 2.2).

Message factors include elements or issues such as the credibility of the source, the novelty of the message, whether a message should express only one side of the viewpoint or should it present the opposing view as well, message repetition, and the medium by which the message is conveyed. Learner factors include elements such as the individual's intellectual ability, and disposition toward cognition. Persuasion paths include elements such as the central processing or peripheral processing routes.

2.3.1 Message Factor: Source Credibility

In general, persuasion is generally assumed to increase with credibility (Ajzen 1992). Specifically, the more credible (e.g., trustworthy) the author, the stronger and more persuasive the message is (Petty and Cacioppo 1986). It is also interesting to note that if the issue or topic being considered relates to a subjective preference (i.e., personal choice), individuals tend to prefer the opinion of someone who shares their personal tastes, or way of life (Waites 2002). However, when people make evaluative judgments about facts, such as whether Singapore has a lower crime rate than Iraq, people prefer the opinion of someone with objective credibility (Waites 2002).

2.3.2 Message Factor: Novelty and Familiarity

Persuasion can occur when a credible source of message presents a belief or idea that differs from the beliefs already held by the learner (Chambliss and Garner 1996; Gawronski and Bodenhausen 2006; Waites 2002). Although most people

seem to have an opinion about most topics, a majority of individuals are open to new ideas or beliefs (Waites 2002). The presentation of a new idea or belief will introduce a momentary tension on the part of the learner that produces a kind of dissonance or incongruity (Waites 2002). If consideration of the new belief or idea implies a different evaluation of a given object, then exposure to the new credible message may lead to belief and attitude change (Gawronski and Bodenhausen 2006). Empirical evidence for this proposition can be found in a research on group decision making (Vinokur and Burnstein 1974). The researchers found that members who suggest novel arguments to support a given decision are found to be more persuasive than those who offer ideas that are well known to the rest of the group. If the new ideas fit in with previously held ideas, then no change to the current belief and attitude toward a given object occurs. The new ideas merely confirm the existing belief, and reinforce the current attitude.

It is also important to note that attitude change can occur when additional consideration of already *familiar* messages is carried out (Gawronski and Bodenhausen 2006). This is perhaps best reflected in research on mere thought (Tesser 1978), or introspection (Wilson et al. 1989). Research in these areas has suggested that merely thinking or introspecting about a given entity may lead to belief and attitude change. If mere thought or introspection of already familiar messages imply a different evaluation of a given object (e.g., something that counters the current view held by the individual), additional consideration could lead to belief, and subsequently attitude change (Gawronski and Bodenhausen 2006). However, if additional consideration of already familiar messages confirm the original belief, no change is likely to occur. In this case, the original belief and attitude is reinforced.

2.3.3 Message Factor: One-Sided Versus Two-Sided Messages

Persuasion can be constructed as one-sided or two-sided (Fives and Alexander 2001). Two-sided message can be further classified as either refutational or non-refutational (Hynd 1999). Two-sided refutational messages present both sides of an issue (i.e., the argument for an issue as well as its counter-argument); but one side is generally promoted and the other is refuted (Murphy 2001). In two-sided nonrefutational messages, both sides of an issue are merely presented but none is compared or refuted, while a one-sided message presents only one position of a given issue (Hynd 2001).

Generally two-sided refutational messages appear more convincing or persuasive than two-sided non-refutational, or one-sided messages (Murphy 2001). The very act of comparing and contrasting positions influences our evaluative judgment (Learning Seed 2007). Moreover, the acknowledgment and refutation of the opposite position in two-sided refutational messages seem to make the message fairer, strengthen the credibility of such messages, and even disarming (i.e., tending to allay suspicion or hostility; hence winning favor) (Waites 2002). As Murphy (2001) noted, the persuasion process often begins with a discussion of opposing viewpoints.

2.3.4 Message Factor: Message Repetition

Repeated exposure to a message may also lead to more positive evaluations (Zajonc 1968). For example, Arkes et al. (1991) showed that the mere repetition of a message can cause it to be judged more true, and thus greater chance of attitude change as compared to non-repeated control messages, probably because familiarity is used as one basis to judge the validity of a message (Olson and Zanna 1993). Cacioppo and Petty (1989) found that three versus one exposure to auditory messages increased the effectiveness of appeals based on strong arguments but not on weak arguments, presumably due to greater elaboration on the messages by repeated exposure (Olson and Zanna 1993).

2.3.5 Message Factor: Message Medium

Message medium refers to the channel of communication—how the message is delivered or conveyed to an audience. There are basically three primary means of communication: spoken words, written words, videos. Spoken words can convey emotions and feelings of the communicator well, and thus may stimulate a learner's attention, or enhance a learner's understanding of the message. However, try as one might, spoken words are often fleeting and memories fade (Waites 2002).

Written words, on the other hand, are permanent and thus allow a learner to refer to the message repeatedly. This may help stimulate deeper thought on the meaning of the message. However, not all communicators are able to express their messages well in written words (e.g., authors' whose English is not their first language). In addition, a learner may risk misinterpreting a written message due to the lack of tonal cues (Hew and Hara 2007).

What about videos then? Research has suggested that messages that are simple to understand are most persuasive when supported by video presentations, but complex messages are more persuasive when they are written or illustrated, presumably because they force the learner to think through the message (Waites 2002). Thus, as a general rule of thumb, it is perhaps wiser to use more than one medium to convey messages.

2.3.6 Learner Factor: Intellectual Ability and Disposition Toward Cognition

It is beyond the scope of this chapter to provide an in-depth review of all possible learner factors. We shall discuss only two factors that we believe are more relevant to our paper—learners' disposition toward cognition (discussed in an earlier section), and learners' intellectual ability. Intellectual ability refers to an individual's ability to process a given message. Generally, individuals with greater

comprehension skills are more likely to process the content of a message than those with weak comprehension skills (Dole and Sinatra 1998; Petty and Cacioppo 1986). An individual's intellectual ability therefore affects the likelihood that the message will prove persuasive (Murphy 2001). Certainly a teacher could encourage learner comprehension by choosing messages that are easier to understand (e.g., selecting text that is consistent with a learner's language ability).

2.3.7 Persuasion Paths

There are generally two psychological paths to persuading an individual. The first is the peripheral or superficial route which occurs when a learner is influenced by incidental cues such as the communicator's likeability or credibility or text cues such as the length of the message in order to make decisions about the importance of the message (Murphy 2001; Waites 2002). Ajzen (1992) noted that attitude change produced by the peripheral path is generally of little practical significance. Such attitude change tends to be short lived (Petty and Cacioppo 1986), susceptible to counterpropaganda (McGuire 1964), and have little effect on actual behavior (Ajzen 1992).

The second path is the central or deep route processing which takes place when a learner elaborates on the information presented in the message (Murphy 2001; Petty and Cacioppo 1986). Essentially, a learner is assumed to generate arguments of his or her own to either support the advocated position (pro) or oppose it (con) (Ajzen 1992). If the number of pro arguments exceeds the cons, then the learner will change in the advocated direction (Ajzen 1992). The central path of processing deals with the essence of the persuasion process because persuasion requires that the advocated position be accepted only after careful consideration of the message, and after whatever other information the learner can bring to bear (Ajzen 1992).

2.3.8 Summary

In this section, we have briefly discussed how message, learner, and processing path factors may affect persuasion. At the heart of persuasive communication is the process of reasoning, the evaluation of the merits of arguments in favor as well as in opposition to the advocated position (Ajzen 1992). From this viewpoint, we may therefore conclude that in general, the more credible the message, the more novel the argument presented in a message, the use of two-sided refutational messages, the more the message is repeated via various media, the easier the message is to understand, and having students to actually engage in a discussion of the ideas and arguments, the more likely the student is to be persuaded to the perspective presented in the text. In the following section, we describe a research project that utilized a blended learning approach to promote grade five students' positive attitude toward Singapore.

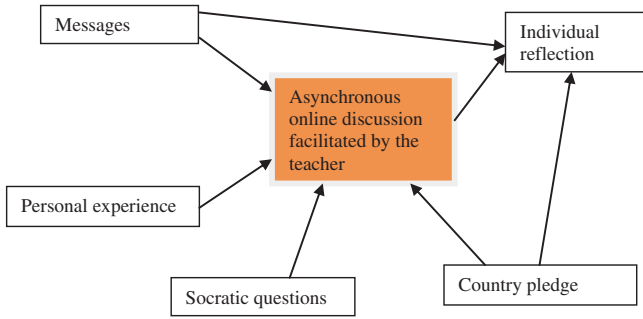


Fig. 2.3 A blended learning model for promoting attitude change

2.4 An Empirical Investigation

The citizenship education project took place at Primary School N, a co-educational elementary school in western Singapore. A majority of the pupils in the school were Chinese Singaporean and came from families of middle to high social economic status. Two grade five classes, each with 30 pupils between the ages of 10 and 11, along with their form teachers took part in the project. Figure 2.3 shows an overview of the blended learning approach that incorporates the use of Socratic questions, messages, asynchronous online discussion forums, and personal reflections.

2.4.1 A Blended Learning Model for Promoting Attitude Change

2.4.1.1 Messages

The messages consisted of cases or narratives (e.g., stories of people concerning what they appreciated about Singapore, why foreigners want relocate to Singapore). To increase the credibility of the messages, all cases or narratives were real-life stories taken from published articles in the mainstream newspapers. We also invited non-citizen students (e.g., foreigners or permanent residents studying in the class) to talk about their views about Singapore. Generally, these students had lived abroad in their own countries before moving to Singapore. They were asked to share what they appreciated about their home countries or cities, as well as what they appreciated about Singapore. They were also asked to compare the pros and cons between living in their home countries and Singapore.

The use of pros and cons is consistent with the notion of two-sided refutational messages which, according to past research, could help make the message fairer, more credible, and even disarming (Waites 2002). As previously mentioned, the process of persuasion often begins with a discussion of opposing viewpoints (Murphy 2001).

The messages used in the research project were primarily conveyed through spoken words and written words. We were not able to find appropriate videos by the time the project commenced. Spoken messages were mainly conveyed by the non-citizen students in the class when they presented their beliefs about Singapore, while written messages were given via mainstream newspaper articles. To encourage learner comprehension, difficult words or phrases were explained by the teacher in class.

2.4.1.2 Individual Reflection

We believe that without meaningful and intentional reflection, students may not fully grasp what is being discussed. According to Boyd and Fales (1983), reflection is a process of creating and clarifying the meaning of experience in terms of self. Hatcher and Bringle (1997) refer reflection to the intentional consideration of an experience in light of particular learning goals or objectives. In this blended learning approach, reflection helps students to explore and construct personal meaning or belief toward country from reading the persuasive messages, reading the postings in the online discussion, and reciting the country's pledge.

2.4.1.3 Asynchronous Online Discussion

Any educational program or project that aims to foster belief and attitude change among students must first require students to make their pre-existing personal beliefs explicit in order to allow other people to examine, or challenge the adequacy of those beliefs (Kagan 1992). In research project, we used an asynchronous online discussion forum. Asynchronous online discussion refers to “the exchange of messages via computer networks where participants need not be online simultaneously” (Cheung and Hew 2006, p. 2). Every participant in an asynchronous online discussion environment can choose to post and respond to messages at any time or from any geographical location, and can view the messages many times and long after the messages have been posted. By having students to engage in online discussions of the messages, instead of being “talked to” by the teacher, more central processing can be encouraged.

Because the discourse that occurs within the forum is not in real time, students thus have more time to reflect and think about new information before contributing to the discussion (Pena-Shaff and Nicolls 2004). This is unlike a face-to-face classroom environment where students are constrained by time to respond (e.g., 30 min for a typical lesson period in Singapore), and where the face-to-face discussion is usually dominated by a few vocal or outspoken students; hence, leaving the shy students as well as those who wish to have more time to think little or no opportunity to participate in the discussion. In addition, since many of the current asynchronous online discussion forums are text-based, students have little choice but to express themselves in writing. The very process of writing in itself encourages students to reflect and make explicit their beliefs and assumptions.

2.4.2 Procedure

There were three main phases of the project: (a) pre-implementation, (b) actual implementation, and (c) post-implementation.

2.4.2.1 Pre-implementation

During the pre-implementation phase, we provided training to the teachers about the use of asynchronous online discussion such as its potential benefits, the challenges of using asynchronous online discussions, possible solutions to overcome these challenges, as well as ways to engage pupils in the discussions. Teachers were also introduced to the use of Socratic questions.

After the completion of the teacher training, a training session for the grade five pupils was carried out. Pupils were taught the definition of discussion. Adopting the work of Bretz (1983) and Henri (1992), we defined discussion as a process of exchanging ideas that involves at least three actions: (a) communication of information, (b) a first response to this information, and (c) a second answer relating to the first. A discussion should not merely involve person A posing a question or comment, and person B responding to the question or comment. Such a process merely leads to a question-and-answer activity, rather than back-and-forth exchange or negotiation of ideas.

Pupils were also introduced to a set of ground rules and guidelines for the online discussion. These include the following: (a) no personal attacks or rude posting, (b) one idea per message posting, and (c) pupils to support opinions with facts or personal experiences. Pupils were introduced to the BlackBoard™ online discussion platform. Essential features of the platform (e.g., creation of discussion threads and messages) were demonstrated. Pupils were also given the opportunity to try out the platform, guided by the teachers and the researchers.

Finally, the pupils completed a 10-item Attitude Toward Country Questionnaire (see Table 2.2). The questionnaire was earlier pilot tested using a sample of 286 grade six pupils from the same school, i.e., Primary School N. The results of factor analyses such as principal component analysis and confirmatory factor analysis showed evidence of construct validity for the 10-item scale, and an overall Cronbach alpha reliability coefficient of 0.91 (Hew and Cheung 2011). To decrease the likelihood of pupils giving inaccurate self-reports of their attitudes due to expected social desirable behaviours (i.e., answering the questionnaire items in ways the teacher would think is desirable), the Attitude Toward Country Questionnaire was not graded in any way, and was anonymous (Gano-Phillips 2010).

2.4.2.2 Actual Implementation Phase

The actual implementation phase ran for about four months. During this time, we focused on the theme *Appreciating Singapore*. A teacher presented cases or narratives (e.g., real-life stories of people concerning what they appreciated

Table 2.2 Attitude toward country questionnaire

Item	
Q1	I would be happy to spend my whole life in Singapore
Q2	I enjoy discussing Singapore with people from other countries
Q3	I feel as if Singapore's problems are my own
Q4	I am proud to tell others that I live in Singapore
Q5	I feel accepted as a member of society in Singapore
Q6	I feel emotionally attached to Singapore
Q7	I feel a sense of belonging to Singapore
Q8	I love Singapore
Q9	I care about the fate of Singapore
Q10	I am willing to work hard to help Singapore be successful

about Singapore, why foreigners should relocate to Singapore) in mass lectures. The teacher also shared what he or she appreciated about Singapore. Pupils, after the teacher presentation, proceeded to participate in an online discussion about the things they appreciated or liked about the country. Pupils were told to comment on one another's online postings. Pupils also visited the *Singapore My Home* website and viewed the competition photographs posted on the web page. They then participated in a separated online discussion thread on what the photographs meant to them personally. In addition, pupils re-visited the *Singapore pledge* and commented on what the pledge actually meant to them in another separate discussion thread. One of the primary five classes participated in the asynchronous online discussion outside of class time (e.g., during their recess, at home), while the other participated within class time. The online discussions were facilitated by the form teachers.

2.4.2.3 Post Implementation Phase

At the end of the project, 54 pupils wrote individual reflections on what they had learned from the online discussions, and cases/materials (photographs, narratives of other people). Pupils also wrote whether they had changed their feelings or attitudes toward Singapore and the reason for it. In addition, pupils wrote about the experience of participating in the asynchronous online discussions. Finally, the pupils also answered the Attitude Toward Country Questionnaire.

2.4.3 Results

Table 2.3 shows the statistical results for the pupils' overall mean pre- and post-questionnaire scores. Altogether, 53 pupils completed the pre- and post- Attitude Toward Country Questionnaire. Although we were disheartened to note that there

Table 2.3 Summary of pupils’ mean pre- and post- *Affective Commitment to Country* questionnaire scores

Scores	Pre-		Post-	
	Mean	SD	Mean	SD
Questionnaire	3.23	0.60	3.31	0.57

was no significant difference between the pre- and post-attitude scores, the results in Table 2.3 reveal that the pupil’s mean scores had improved in terms of their affective commitment to country. The standard deviation had also decreased, indicating that the spread of scores had reduced and that the scores of the pupils varied lesser than before. This suggested that the blended learning approach had narrowed the score differences between pupils.

We also share several insights of the blended learning approach based on the pupils’ reflections. Overall, more than 90 % of 54 pupils reported positive benefits related to appreciating the country more. For example:

- I feel proud to be a Singaporean.
- I learned that Singapore has a variety of things to enjoy and it is a very peaceful country.
- I feel happy that I am a Singaporean.
- I learned about the Singapore identity and I also learned how to use the discussion forums.
- I felt a great sense of belonging as I learnt that Singapore accepts any religion or race.

A majority of the pupils (80 %) reported that they enjoyed the citizenship project more than the traditional teacher-led didactic lessons. For example:

- It was very interesting and exciting. I hope we have another project like this.
- I found that this project was very interesting.
- I felt that it was meaningful and I learnt a lot.
- I felt happy but it was too short.
- I feel that we should have more time for the project.
- I feel happy. It is more interesting than normal lessons.

Eighty percent of the pupils reported that they found the use of asynchronous online discussion forums useful and beneficial to them. For example:

- The use of online discussion forums helped me make my beliefs and ideas explicit. It also helped me question or challenge the beliefs or ideas of my classmates.
- It [the asynchronous online discussion] was very useful. We can look at the postings over and over again.
- I feel that it is better to discuss online because it gives people like me who are shy to speak up in class, to voice out our beliefs.
- The online discussion enabled my classmates to question my opinions in order to challenge or improve it. I can think more in-depth.

- I felt that it is convenient because we can participate in the discussion at any place we like.
- I can see [clearly] what other pupils are thinking or feeling.
- I am able to express more about how I feel and it is easier for me to type out some things instead of saying it directly. We can see other classmates' beliefs clearly and express our beliefs freely too.

Some pupils, however, reported negative statements regarding the use of online discussions. For example:

- Though I was able to share my feeling and ideas, not everybody in my class responded to it.
- We can only type [and not speak to each other].

2.5 Lessons Learned

We acknowledge that fostering a positive student attitude such as affective commitment to country is not an easy task for educators. Many teachers tend to approach this task through didactic teaching using one-way communication such as lectures aided by PowerPoint slide shows. In our personal communication with teachers, we found that the usefulness of such an approach is questionable. Students tend to “switch off” during these lecture sessions because such teacher lectures sounded preachy. Moreover, many of these didactic sessions focus primarily on factual knowledge such as why one should love or be loyal to one's country. Such presentations tend to address the cognitive domain but fall short on dealing with students' affective domain.

In this citizenship education project, we utilized the use of a blended learning approach that combined the use of Socratic question-mediated asynchronous online peer discussion forum, persuasive cases, reflection, face-to-face classroom discussions, and teacher presentations. We offer the following six major lessons learned.

First, the primary five pupils, on the whole, enjoyed the citizenship education project very much. It was also evident from the pupils' reflections, as well as the increase in mean questionnaire scores that some change of attitude toward the country had occurred. Pupils reported that they learned to appreciate their country more. This suggested that our blended learning approach was able to instill a positive student affective commitment to their country. Of course, we cannot claim actual causal-effect as a result of this blended learning approach due to the absence of a control group. Nevertheless, the positive comments of the pupils were an encouraging sign that at least the blended learning approach was well received.

Second, we found the use of asynchronous online discussion a useful technology to help pupils make explicit their pre-existing beliefs and assumptions about their country. Some of these pre-existing opinions and assumptions about the country may be incorrect. This in turn enabled the pupils to examine, question and challenge these different beliefs, as well as to assimilate new information into

their existing belief systems. This is a very important process of fostering attitude change. We believe that if the pupils' pre-existing beliefs had not been explicitly presented as concrete ideas, questioning and examination of these beliefs would not have taken place. However, we realize that some quiet or shy pupils may hesitate to post their views for fear of being attacked or made fun of by their classmates. To overcome this problem, the teacher may consider using anonymity to encourage the pupils to interact and provide critical feedback.

Third, the use of peer online discussion appears to make citizenship education less teacher-centered. Face-to-face classroom discussions often involve teacher-pupil interaction characterized by the Initiate-Respond-Evaluate (IRE) structure. Usually the teacher initiates a question, followed by the pupils answering the question, and the teacher evaluating the response by giving some feedback. In online discussion, however, the IRE structure is usually minimized or eliminated altogether. Interestingly, although the teachers were supposed to facilitate the online discussion, we found that the discussion on the whole was driven mostly by the pupils themselves. Analyses of the discussion posts, for example, revealed that teachers contributed less than 10 % of the posts. One possible reason for this is that facilitating an online discussion is very time consuming. Not all teachers could dedicate the time and effort required to do it. At this juncture, it is important to note that this citizenship education posed an extra workload for the two teachers. They were not given any reduction in their regular teaching duties to do the project. Overall, this finding, therefore, infers that it might be best to allow students to take charge or facilitate the discussion on commitment to country themselves because by doing so they would have a greater sense of responsibility and ownership over the direction of the discussion as well as the opinions and arguments generated. In addition, no one pupil dominated the online discussion. This was because everyone could post any idea any time.

Fourth, teachers may wish to consider using asynchronous voice or audio discussion. We realized that not all pupils were proficient in reading or writing. Some preferred to speak rather than type. Hence, the use of asynchronous text discussion may not be very suitable for these pupils. In order to overcome this problem, we suggest that teachers consider using tools such as the Wimba Voice Board which allows pupils to speak a question or comment into a microphone and record it as an audio clip in the online discussion. Moreover, pupils have the option of typing out their comments or questions to be appended to the audio clip. The clips, along with the accompanying text if any, are then posted into a threaded organization of other audio clips (Girasoli and Hannafin 2008). The use of the Wimba Voice Board could thus potentially meet the needs of both types of pupils—those who prefer speaking to writing and vice versa.

Fifth, there is a need to enforce the ground rules of pupils replying to other individual's postings within 24 h. One of the main complaints of using asynchronous online discussion was the lack or delay in responses. The delay caused some pupils to feel frustrated especially if their questions went unanswered. So in order to overcome this problem, teachers should establish and enforce the rule of requiring the participants to respond to their peers within 24 h. The choice of a 24-h rule

is not an arbitrary one but based on empirical research (Hewitt and Teplovs 1999). Hewitt and Teplovs (1999), for example, analyzed over 4,000 online messages from seven graduate level distance education courses and found that responses posted to a thread within 24 h had the highest chance (0.26–0.68) of eliciting additional responses compared to responses posted after a day of inactivity (0.18–0.41) and after two days of inactivity (0.12–0.31). In other words, responses posted within 24 h have the highest chance of sustaining the online discussion.

Sixth, we found that pupils participated more (e.g., posted more comments) during asynchronous online discussions in class rather than outside class. Recall that one of the primary five classes participated in the asynchronous online discussion outside class time (e.g., at home), while the other within class time. Although previous research has suggested that participants in an asynchronous online discussion environment can choose to post and respond to messages at any time, we found that this may not necessary apply to the primary school students in our context. One of the main possible reasons for this is that some parents were reluctant to allow their children to access the Internet at home during the day without their supervision for fear that their children might visit undesirable websites. Some pupils were also too busy with tuition in the evenings. Due to these reasons, we suggest that teachers conduct asynchronous online discussions in class, at least for young students such as primary school pupils. In fact, conducting online discussions in class has its own benefits. Students appear to concentrate on the discussion task during online discussions in class as found in this study.

2.6 Conclusion

In this study, we explored the use of a blended learning approach that combined the use of asynchronous online peer discussion forum, persuasive cases, student reflection, face-to-face classroom discussions, and teacher presentations in an attempt to foster primary school students' affective commitment to country. Overall, we found that pupils enjoyed this blended learning approach very much and there was evidence that a change of attitude toward the country had occurred. We also described six major lessons that we learned from this citizenship education project. In particular, we believe that the use of new persuasive messages and additional consideration of already familiar messages are especially important lessons. These messages have to be authentic and real-life rather than fictional. We believe that these messages, together with the use of online peer discussions which enabled pupils to make explicit their pre-existing beliefs about their country so that these beliefs can be questioned and examined, helped the pupils appreciate their country more.

What are some possible future research directions? First, it is important to note that even with well-designed materials the success of belief change may be affected by certain individual traits or dispositions (Sinatra et al. 2012). According to Stanovich (1999, p. 157), dispositions are “relatively stable psychological mechanisms and

strategies that tend to generate characteristics behavioral tendencies and tactics". One of these dispositions is what Cacioppo et al. (1996) referred to as people's tendency to engage in and enjoy effortful cognitive endeavors which could be represented in terms of a single factor called *need for cognition*. Scholars (e.g., Cacioppo and Petty 1982, 1984; Cacioppo et al. 1983, 1986) have found that individuals low in need for cognition, as well as those high in need for cognition must make sense of their world but they tend to derive meaning, adopt position, or solve problems in different ways. Individuals who are high in need for cognition tend to approach ideas or suggestions open-mindedly, and tend to engage in critical thinking, while those with low degrees of need tend to be close-minded, and less willing to engage in critical thought or discourse (Sinatra et al. 2012). Previous research has suggested that students with a high need for cognition tend to be more accepting of belief change (Sinatra et al. 2003). Future research should therefore examine the relationship between students' need for cognition and their affective commitment to country.

Second, the results of this study cannot be generalized to other schools. The current study was situated within a local mixed gender Chinese school, using a cohort of 11–12-year-old students. Future research should therefore examine other schools such as single gender primary schools, or secondary schools in Singapore and other countries for comparison purposes.

Overall, we believe that we have contributed to the literature on citizenship education. Perhaps the overall strength of this study lies in the design of a blended learning approach which combined the use of Socratic questions, asynchronous online peer discussion forum, persuasive cases, reflection, face-to-face classroom discussions, and teacher presentations. We intend to further test the effectiveness of this blended learning approach using an experimental research method that utilizes a treatment and control group. Given the importance of citizenship education in today's context, we hope that our blended learning approach will be useful to other researchers and educators who are similarly engaged in efforts to enrich our collective understanding regarding student commitment to their country.

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Chapter 3

Solving Design Problems: A Blended Learning Approach Based on Design Thinking Features

Abstract Individuals encounter various problems every day in their workplaces. The problems might involve decision-making (e.g., Should I use a bell to help my trainees settle down quickly lunch?), trouble-shooting (e.g. How do I get this printer to work with the computer?), or design (e.g. How can I design a weather forecasting lesson activity for a 40-min class period?). One particular concern of many teacher trainees is solving design related problems. Design problems are the most complex and ill-structured type of problem. In this chapter, we first describe the characteristics of ill-structured problems and later discuss how people design, including design thinking. We then describe some limitations of the traditional classroom environment to support design problem solving, and propose a blended learning approach which incorporates design thinking features. We subsequently describe an empirical study that tested this blended learning approach to help students, who took an education elective course, design instructional programs such as web-based learning material and computer-based multimedia learning packages. Overall, we found significantly better students' performance in their final design projects ($M = 18.5$, $SD = 2.21$) compared to previous students ($M = 14.9$, $SD = 3.50$), ($t = -3.525$, $df = 33$, $p < 0.01$) who did not utilize the blended learning approach based on design thinking features. We discuss several important lessons learned that could inform the design of future instructional strategies in implementing blended learning for the purpose of helping students solve design problems.

Keywords Design • Ill-structured problems • Blended learning • Asynchronous online discussion • Reflection • Instructional design • Teacher education • Design thinking

3.1 Introduction

Design may be defined as “a systematic, intelligent process in which designers generate, evaluate, and specify concepts for devices, systems, or processes whose form and function achieve clients’ objectives or users’ needs while satisfying a specified set of

Table 3.1 Summary of blended learning parameters

Parameter	Description
Learning goal	To improve students' design competence
Type of content	Cognitive—remembering, understanding, applying, analyzing, evaluating, and creating
Type of pedagogical approach	Dialogic, constructionist
Specific instructional activity	Design thinking features, self-reflection, online peer discussion, and face-to-face class discussion
Technological tools and resources	Online asynchronous forum, reflection table, design thinking template
Overall blended learning model	See Fig. 3.3

constraints” (Dym et al. 2005, p. 104). Design is a natural and ubiquitous human activity (Razzouk and Shute 2012). It typically begins when an individual perceives certain needs or dissatisfaction with the current state of a situation and is determined to take some action to solve the problem (Razzouk and Shute 2012) (Table 3.1).

In today’s knowledge-based economy, design is no longer restricted to the creation of mere physical products; design now includes the creation of new sorts of processes, services, IT-powered interactions, entertainments, and ways of communicating and collaborating that could better meet consumers’ needs and desires (Brown 2008). Design is increasingly considered as a valuable methodology or tool for dealing with the open and complex problems faced by many contemporary professions, and could lead to dramatic new forms of innovation (Brown 2008; Dorst 2011). This is particularly valued in countries that rely on knowledge work and service delivery such as in Singapore.

Although everyone can design, expert designers exercise certain forms of cognitive skills and methodologies which have been referred to in the literature as design thinking (Cross 2011). More specifically, design thinking may be defined as “an analytic and creative process that engages a person in opportunities to experiment, create and prototype models, gather feedback, and redesign” (Razzouk and Shute 2012, p. 330).

In writing this chapter, our goal has been to explain this notion of design thinking. More specifically, we are interested in exploring how design thinking may be taught to students. In the following sections, we first discuss issues including the traditional step-by-step design process model, design thinking, and limitations of the traditional classroom environment to support solving design problems. Subsequently, we propose our blended learning approach that is built on the core features of design thinking to help students learn design. We then describe a study that attempted to help students design instructional programs such as web-based learning material and computer-based multimedia learning packages. Overall, we found better students’ performance in their final design projects compared to previous students who did not utilize the blended learning approach. We conclude by discussing several important lessons learned that could inform the design of future instructional strategies in implementing blended learning for the purpose of helping students solve design problems.

3.2 Solving Design Problems

Although there may be some geniuses who report the sudden unexpected emergence of ideas, most designers, however, produce ideas only after considerable amount of hard work and thinking (Lawson 2006). In this section, we discuss the traditional step-by-step design process model and the notion of design thinking.

3.2.1 Traditional Step-by-Step Design Process Model

One common method of solving design problems is to use the traditional step-by-step model of the design process. Such a model is founded upon the systems approach where the output of one step becomes the input of the next one (Dick 1996). The common idea behind such a model is that the design process consists of a sequence of distinct and identifiable activities which occur in some predictable and logical order (Lawson 2006). For example, the core activities in instructional design are summarized in the ADDIE model (see Fig. 3.1), an acronym referring to five steps: (a) Analysis, (b) Design, (c) Development, (d) Implementation, and (e) Evaluation (Gordon and Zemke 2000; Reigeluth 2003). The Analysis step often includes a needs assessment to identify the nature of the problem, constraints and criteria, goals and sub-goals formulation, stating performance objectives, and analysing learner attributes. These objectives become the input to the Design step, where they are examined to determine the appropriate instructional strategies, tools and resources to use. These strategies, in turn, are converted into actual instructional materials in the Development step; and they are used by actual learners in the Implementation step. Finally, the learners and instructional materials are examined in the Evaluation step to determine how well they accomplish the performance objectives, and whether revisions are necessary.

Another prominent design venue is product design in engineering. One of the models, suggested by Dym and Little (2004) consists of the following steps: (a) problem definition, in which the designer clarifies the problem objectives, determines user requirements, identifies constraints, and establishes product functions, (b) conceptual design, in which the designer establishes design specifications, (c) preliminary design, in which the designer creates prototypes to test and evaluate the conceptual design, (d) detailed design, in which the designer attempts to refine the chosen design prototype, and (e) final design, in which the designer communicates the final design product, along with its specifications, to the client.

In a similar conception, the RIBA Architectural Practice and Management Handbook (Lawson 2006) described the architecture design process as consisting



Fig. 3.1 Generic steps of instructional design process (ADDIE)

of the four phases: (a) phase 1: assimilation, where the designer accumulates and orders the information needed to the problem at hand, (b) phase 2: general study, where the designer investigates the nature of the problem and examines possible solutions, (c) phase 3: development, where the designer develops and refines one or more possible solutions identified in phase 2, and (d) phase 3: communication, where the designer documents and communicates one or more solutions to people inside or outside the design team.

Despite the different permutations of the traditional step-by-step model, the design process, as conceptualized under this paradigm, can be essentially divided into two distinct phases: problem definition and problem solution (Buchanan 1992). The former involves an analysis activity in which the designer determines all the elements of the problem and specifies the necessary requirements for a successful design solution, while the latter includes a synthetic task where the designer combines and balances the various requirements against one another in order to produce a final design plan for subsequent production (Buchanan 1992).

Proponents of the step-by-step model argue that it presents a nice logical understanding of the entire design process, and that it suggests a methodological precision which, if carried out in sequence, would yield successful solutions (Buchanan 1992; Jonassen 2011). Critics, however, point out that actual design usually does not occur in a simple step-by-step process (Buchanan 1992). While it may seem logical that the steps should be performed in the order shown, the actual reality is much more confused (Lawson 2006). There are, of course, some proponents of the traditional step-by-step model who declare that the steps need not be completed in a linear lock-step fashion (Gustafson and Branch 2002) despite the common depiction of the models in diagrams and flowcharts. Rather, diagrams and flowcharts are used to help novice designers get a bird's eye view of the entire process. In reality, iteratively evaluating and revising each step by going back and forth is an application of the traditional model.

While we acknowledge that many, if not all design projects may pass through the stages described by the step-by-step model, actual studies of the way experienced designers work reveals that the use of the design process model, whether linear or non-linear (iteratively) still does *not* adequately capture how design really happens. Lawson (2006, p. 39) described the use of the traditional step-by-step model in the following manner:

It rather resembles one of those chaotic party games where the players dash from one room of the house to another simply in order to discover where they must go next. It is about as much help in navigating a designer through the process as a diagram showing how to walk would be to a one-year-old child. Knowing that design consists of analysis, synthesis and evaluation linked in an iterative cycle will no more enable you to design than knowing the movements of breaststroke will prevent you from sinking in a swimming pool.

So then, how do we put everything together? How do we progress from knowing the movements of breaststroke to actually swimming? Observations and interviews of experienced designers in various domains of design suggest that they adopt certain approaches and thought processes—what some scholars refer to as design thinking (e.g., Cross 2011; Lawson 2006; Brown 2008, 2009; Brown and Wyatt 2010; Razzouk and Shute 2012; Skaggs et al. 2009).

3.2.2 Design Thinking

As mentioned earlier, design thinking may be defined as “an analytic and creative process that engages a person in opportunities to experiment, create and prototype models, gather feedback, and redesign” (Razzouk and Shute 2012, p. 330). Cross (2011) refers design thinking as the fundamental creative process for any designer. Design thinking may be seen as the ways in which an experienced designer thinks and approaches design issues. The notion of design thinking seems to be spreading, not just in the United States, but in other countries as well including Canada and Europe (Skaggs et al. 2009).

Probably the major impetus behind the expansion is the premise that design thinking can help individuals solve problems and generate better ideas faster and more efficiently. Razzouk and Shute (2012) argued that design thinking holds promise not merely to people who major in design-centric disciplines (e.g., architecture, engineering, fine arts), but also to people in other disciplines such as education and business. A November 2009 special report in Bloomberg Businessweek highlighted how design thinking could impact business (Wong 2009). For example, GE Healthcare adopted design thinking and according to a 2003 report by the Danish Design Center, increased design activity has boosted the company’s revenue on average by 40 % more than other companies over a five-year period (Wong 2009).

Razzouk and Shute (2012) believed that the effort to help students think like designers could help them deal better with difficult situations and solve complex problems in school, in their careers as well as in their lives, because design thinking involves creative thinking in generating solutions for problems.

This sentiment was shared by Roger Martin, dean of the Rotman School of Management (as cited in Skaggs et al. 2009, p. 2), who remarked:

[Design thinking] is characterized by a deep understanding of the user, creative resolution of tensions, collaborative prototyping and continuous modification and enhancement of ideas and solutions. Whether the goal is to develop new products or services, a new way of marketing to customers, or to reinvent an entire business model, design thinking holds valuable clues as to how to get to bigger ideas faster and more efficiently... By incorporating the ‘design experience’ into our curriculum, we offer students a unique and valuable opportunity to learn new ways to tackle complex challenges in deeper and more holistic way (p. ?)

3.2.3 Core Features of Design Thinking

In the last few years, many descriptions and models of design thinking have emerged (Dorst 2011). Although these have created a rich understanding of what design thinking is about, ambiguities still linger over the question of “what exactly is the core of design thinking?” (Dorst 2011). To get to the heart of design thinking, we undertook a critical review of the recent design thinking literature and found five core features that are commonly discussed in the literature (e.g.,

Table 3.2 Core of design thinking

Feature	Description
Ability to adopt or create frames	Framing refers to the creation of a viewpoint from which as problem situation can be addressed. The ability to create frames is considered by Dorst (2011) as probably the fundamental reasoning behind design thinking
Ability to manage constraints	An acceptance of competing constraints is the foundation of design thinking. Constraints may be grouped into three major categories: desirability (what people desire), viability (what is financially viable), and feasibility (what is technically and organizationally feasible). Designers must articulate their rationale for decisions made in the light of these constraints
Human empathy	Understanding people, their concerns, their motives and aspirations
Ability to take a systemic view	Design thinking is holistic, not merely looking at things in isolation or piece-meal, but seeing things in terms of how they relate to one another
Ability to externalize ideas	Visualizing ideas using various media in order to bring a common view to concepts which may otherwise be imagined differently by other people

Brown 2008, 2009; Brown and Wyatt 2010; Cross 2011; Dorst 2011; Dym et al. 2005; Hekkert and van Dijk 2011; Lawson 2006; Owen 2007; Razzouk and Shute 2012; Skaggs et al. 2009). These features include the following: framing, constraints management, human empathy, systemic view, and idea externalization (see Table 3.2). Each of these core features will be discussed in greater detail in the following paragraphs.

3.2.3.1 Creation of Frames (Framing)

A frame refers to a viewpoint or perspective from which a design problem can be solved. The ability to create frames is considered by Dorst (2011) as the fundamental reasoning behind design thinking. Creation of frames is probably the first and most important stage of design thinking. To help us get a sense of what framing is all about, Dorst (2011) proposed the following equation (see Fig. 3.2).

VALUE refers to a particular goal that a designer wishes to attain within the context of a problem situation. An example of a possible value is to achieve the fastest Formula 1 car despite the strict Federation Internationale du Sport Automobile (FISA) regulations (Cross 2011). HOW refers to the specific theories, principles or trends that are relevant to the problem domain or situation (Hekkert and van Dijk 2011). WHAT refers to the specific object, service, or system that will give definition to the design problem and solution (Dorst 2011). Framing encompasses the exploration of a problem situation from a particular perspective in order to stimulate the emergence of a desired VALUE and the consideration of appropriate theories or principles (HOW) (see Fig. 3.2). Dorst (2011) describes framing in the following If-Then statement: “IF we look at the problem situation

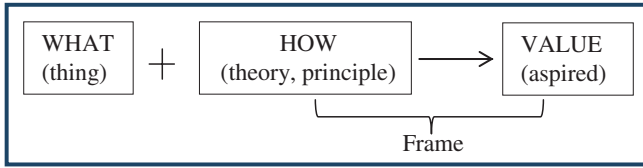


Fig. 3.2 Basic design reasoning (Adapted from Dorst 2011)

from this viewpoint, and adopt the working principle associated with that position, THEN we will create the value we are striving for” (p. 525).

To help create frames, we can perhaps turn to some of the strategies recently proposed by Hekkert and van Dijk (2011). We highlight three particular strategies here: (a) the use of statements, (b) identifying the theories, principles or trends relevant to the problem context, and (c) articulating the product qualities.

Hekkert and van Dijk (2011) suggested that designers articulate their design goal in a statement such as “I want to enable people to find their way home comfortably and safely”, or “I want to help students increase their understanding of materials covered in mass lectures”. Statements reflect the designers’ values, beliefs, morals and views. This is because design problems may be considered amongst the most ill-structured kind of problem (Jonassen 1997, 2000). Oftentimes, solving design problems usually require individuals to express personal opinions and beliefs about the issues involved and to make judgments about solution paths and outcomes (Jonassen 1997; Meacham and Emont 1989).

The use of statements helps make the values and beliefs explicit so that the designer is aware of when and why they take a certain perspective and how this could in turn affect the actual design. It also clearly shows where the design process is going and what the end goal would look like, without actually defining what the final design product is or does. In other words, the statement is the designer’s vision or value.

The designer also needs to identify the various theories, principles or trends that are relevant to the problem domain or situation (Hekkert and van Dijk 2011). A theory or principle may be considered as a type of law or general pattern observed in human behavior or nature (Hekkert and van Dijk 2011). Principles are typically more or less stable, compared to trends which are currently changing or are expected to change in their near future. Principles or trends are typically drawn from various fields such as psychology together with its subfields such as developmental psychology, educational psychology, human perception, and social psychology, as well as technology, and demographics. Principles and trends are very useful because they can really help a designer determine a starting point for design.

The following example helps illustrate how statement, and principles or trends may be put together.

Suppose the focus area that we are dealing with is ‘online education’. The statement that we may have is ‘I want to help my students enjoy their online learning experience’. Some of the relevant useful principles drawn from the field of psychology may include: ‘people like consistency’ (Norman 1988), ‘people like immediate

feedback' (Norman 1988), 'people's capacity to process information seems to be limited to approximately seven chunks' (Miller 1956), and 'people generally prefer colors in the order blue, green or red, and yellow' (McManus et al. 1981). Some of the relevant current technological trends include people's tendency to use Web 2.0 tools such as discussion forums, blogs, and social networking sites.

Product quality refers to a product's character, as well as how the product could be used (Hekkert and van Dijk 2011). Referring to our foregoing example statement of 'I want to help students enjoy their online learning experience' along with its relevant identified principles and trends, we may offer the following product qualities of our desired online learning experience: The product should be 'manageable in content material', 'appealing', 'consistent in look and feel', and 'accessible'. The articulation of the product qualities provides critical information for subsequent design solution (e.g., an object, a service, a system) generation and evaluation.

One possible way to create solutions is to design all kinds of features that give expression to the desired product qualities as the features should lead the designer to determine what main components are required to make desired product (Hekkert and van Dijk 2011).

Returning to our desired product qualities, one possible design solution is a 3D virtual learning platform that contains many different doors. Each door represents a particular topic material to be learned. Each material should contain only about five to seven chunks of information in order not to overload the students' information processing capacity. The look of the virtual interface should be consistent in terms of the location of the navigation buttons and menus. The virtual learning environment also has a group discussion room for students to interact with their peers. In order to minimize delay, students are required to respond to each other's queries within 24–48 h (see Hew and Cheung 2012 for an in-depth discussion of ways to encourage student online participation). The virtual learning environment also facilitates student-instructor interaction by providing a consultancy session where the instructor sets aside a certain virtual consultation hours (e.g., 9 a.m.–11 a.m.) with students through the use of Skype (a technology that allows simultaneous voice-to-voice augmented with video communication). Other possible components to facilitate student-instructor communication include chat tools, emails, discussion boards, and blogs.

3.2.3.2 Recognizing and Managing Constraints

According to Brown (2009), without constraints design cannot happen. Brown (2009) argue that a "willing and even enthusiastic acceptance of competing constraints is the foundation of design thinking" (p. 18). Dym et al. (2005) explained that design "reflects the fact that the designer has a client who in turn, has in mind a set of users for whose benefit the designed artefact is being developed" (p. 104). It is therefore inevitable that the designer has many different constraints to address. According to Jonassen (2011), the goal of most designers is to satisfy the client, rather than finding the optimal solution. Ultimately, the principal role of the designer is to make and justify decisions based

on various constraints as they emerge in order to satisfy (Simon 1955), that is to meet the criteria for *adequacy* such as fulfilling the functional requirements, meeting performance requirements, satisfying design criteria (e.g., maintainability, reusability), and fulfilling restrictions (e.g., cost, time, available technologies) (Jonassen 2011; Mostow 1985). Brown (2009) parsimoniously classified the various constraints into three groups: desirability (what people desire), viability (what is financially viable), and feasibility (what is technically and organizationally feasible).

Designers will then address these constraints in a series of decisions. According to Jonassen (2011), designers need to articulate their rationale for the decision made by associating their choices with empirical research or previous experience. However, Hekkert and van Dijk (2011) suggested that the consideration of constraints be done as late as possible preferably only during the generation of concept ideas after the product qualities are identified. This is to allow greater freedom on the part of the designer to formulate the desired product qualities.

3.2.3.3 Human Empathy

Design thinking essentially focuses on the user (Brown 2008; Brown and Wyatt 2010; Skaggs et al. 2009). To have human empathy means to understand people, their characteristics, concerns, and aspirations (Hekkert and van Dijk 2011). A design thinker needs to differentiate between the needs of two main users—the paying client, and the end user of the final design product. According to Lawson (2006), a great number of design projects today are commissioned by clients who are not the end users of the design. This creates potential problems or barriers because the paying clients may not necessarily be the end users themselves.

How can a designer take a human empathy view? Skaggs et al. (2009) suggested the following some methods including observation, participation, and inquiry, or Look, Do, and Ask, for short. Observation basically involves the designer literally looking at individuals around them in order to understand their lifestyles, needs, and preferences. Participation helps the designer to develop an actual empathy for the user. In participation, the designer gets directly involved in doing something that the user does. It is about putting oneself in someone's shoes in order to make design decisions with their perspective in mind (IDEO hcd toolkit 2012). For example, a designer may blindfold himself for a day in order to experience what a blind individual feels or do. Inquiry is asking questions in order to understand an individual's feelings or emotions. These questions may be in the form of individual or focus group interview.

The users' responses should help the designer understand the users and their contexts better. These responses, however, should not limit the designer's freedom to create possible design solutions. As Hekkert and van Dijk (2011, p. 184) caution: users "tend to reason from 'what is' instead of 'what could be'; their frame of reference is the present, not some future world. This input perspective may allow a designer to improve the situation, the designed environment, but it makes it very difficult to completely reframe and rethink the situation in the first place."

3.2.3.4 Systemic View

Design thinking takes a systemic approach to the problem, instead of accepting narrow problem criteria (Cross 2011). Taking a systemic view means seeing things in terms of how they relate to one another, and not merely looking at things in isolation or piece-meal (Cross 2011). Taking a systemic view helps a designer to anticipate the unintended consequences that may emerge from interactions among the multiple parts of a product being designed (Dym et al. 2005).

3.2.3.5 Ability to Externalize Ideas

Bereiter (1994) suggested the importance of reifying what is in our mind (cognitive artifacts) as concrete ideas, so that the ideas can be worked on and improved. Externalizing ideas also helps bring a common view to concepts which may otherwise be imagined differently by other people. Ideas can be externalized by means of sketches, drawings, storyboards, role-plays, writings, as well as quick and dirty prototypes. Prototypes are tools used throughout the design development process to validate ideas as well as to help generate more ideas because they force the designers to think in realistic terms about how a user would actually interact with the design (IDEO hcd toolkit 2012).

3.3 Teaching Design

The foregoing section presents some of the core features of design thinking. Although it is useful to delineate these features, a more pertinent and important question to tutors and instructors of design is ‘How can we put everything together to teach students?’ Hitherto many, if not all, of the reported previous studies are qualitative focusing mainly on the investigation of experienced designers, or comparisons between novice and expert designers (Razzouk and Shute 2012). Actual empirical findings on the effectiveness of employing design thinking are lacking (Razzouk and Shute 2012). In this section, we propose a blended learning approach that is built on the features of design thinking to help learners learn design. However, before doing that we first discuss some limitations of the traditional classroom environment to support design problem solving.

3.3.1 Some Limitations of the Traditional Classroom Environment to Support Design Problem Solving

First, there is a limited amount of time for students to receive feedback about the progress of their design in class either from the teacher or classmates. Feedback is important to the students because it helps them examine the soundness of their

adopted theories or principles, their possible design solutions, and their management of the various constraints, among other things. Unfortunately, face-to-face classroom discussion is limited by the school time-tabling structure (Hew and Cheung 2012). The imposition of a time table structure limits the amount of discussion students can have in a class. Becker (2000), for example, found that most secondary students have a continuous block of less than one hour's duration to do work in any one class.

Second, teachers may have a mere mechanistic view of how design is to be taught (Lim 2011). For example, the teaching of design as a subject in Singapore secondary schools tend to evolve into a linear lockstep step-by-step manner where students begins by examining the problem situation, before moving on to collecting information on the problem, conceptualizing possible solutions, choosing a particular solution, and finally producing the final product or artefact (Lim 2011). Furthermore, Yau and Ong (2005) found that Singapore students in general perceived that the purpose of the design subject was to train them to be mere craftsmen and technicians. Students who studied design at upper secondary school levels were unfortunately considered as having lower academic ability. Teachers fail to emphasize that the learning of design is much more than that of craftsmanship. The notion of design as a creative problem solving endeavour (design thinking) is not highlighted.

Third, many students are not able to utilize the basic principles in their actual design despite being taught about the principle in class. Students claim that they have learned the design principles and guidelines but they fail to use or apply them in designing their projects (Cheung and Hew 2011). For example, although we teach our students the principle of 'people like consistency' in our multimedia design class, we find, to our disappointment, many students are not able to use this principle in their actual design. There seems to be a performance gap between what they claim to know and what they actually do.

3.3.2 A Blended Learning Approach Based on Design Thinking Features

To address the foregoing limitations we proposed and tested a blended learning approach that involved the use of asynchronous online discussion, face-to-face tutorial, individual project consultation, reflection table, and design thinking template (see Fig. 3.3). This blended model was adapted from one of our earlier models (Cheung and Hew 2011), and was based on the revised Bloom's taxonomy which has the following six levels: remembering (recalling information from memory), understanding (constructing meaning from information), applying (using a certain procedure in a given situation), analyzing (breaking material into its constituent elements and determining how the elements relate to one another), evaluating (making judgments based on certain criteria), and creating (putting elements together to form something new) (Anderson and Krathwohl 2001).

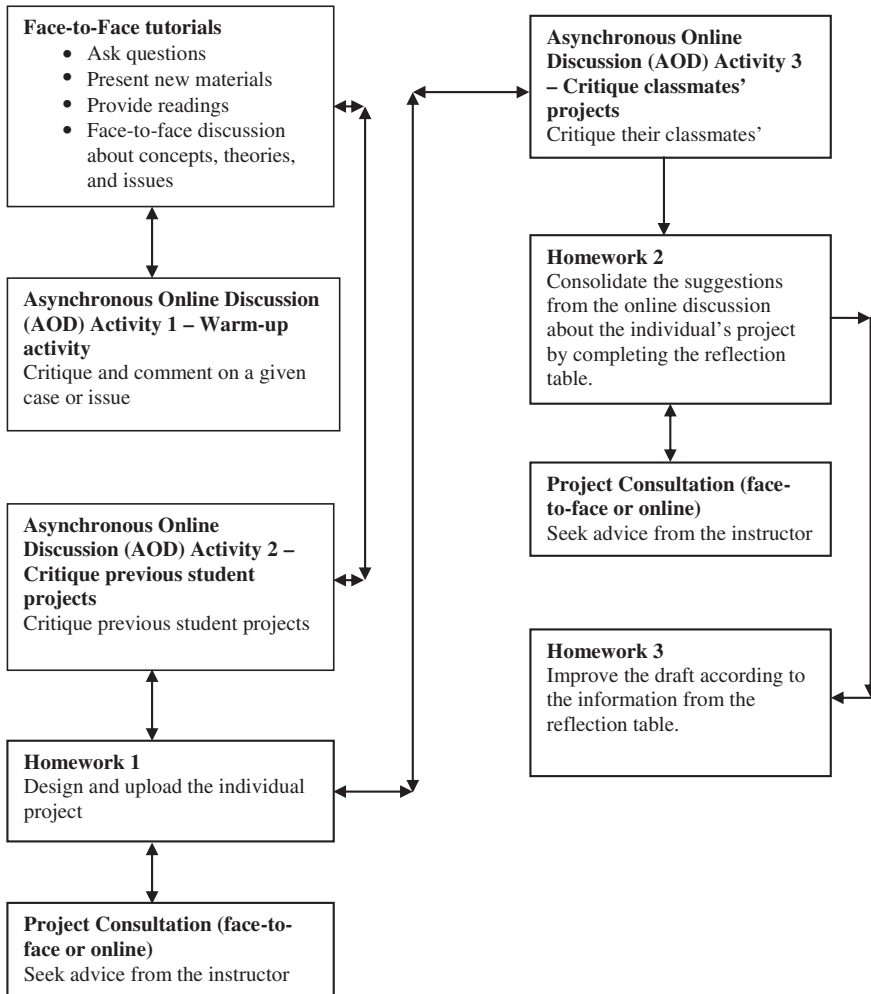


Fig. 3.3 Overview of the blended learning approach for teaching design

To provide a better understanding of the blended learning approach, we summarize the various instructional modes, instructional activities, and their corresponding Bloom’s taxonomy level in Table 3.3. More detailed explanations of the instructional modes and activities are given in the following ‘An empirical investigation’ section.

3.4 An Empirical Investigation

In this section, we describe a study that examined the effectiveness of the aforementioned blended learning approach. The participants were from two intact classes of undergraduate students in Singapore. The control class had 15 students, while the

Table 3.3 Blended model for design problems

Instructional mode	Instructional activities	Revised bloom’s taxonomy
Face-to-face tutorials	Tutor <ul style="list-style-type: none"> • Asked questions • Presented new materials, and • Led the face-to-face discussion about concepts, theories, and previous student projects 	<ul style="list-style-type: none"> • Recalling • Understanding • Applying • Analyzing • Evaluating
Asynchronous online discussion activity 1—warm-up activity	Tutor <ul style="list-style-type: none"> • Posted the issue or case Student • Discussed the issue or case 	<ul style="list-style-type: none"> • Understanding • Applying
Asynchronous online discussion activity 2	Tutor <ul style="list-style-type: none"> • Led the online discussion—critique previous student projects 	<ul style="list-style-type: none"> • Applying • Analyzing • Evaluating
Homework 1	Student <ul style="list-style-type: none"> • Drafted their design projects 	<ul style="list-style-type: none"> • Creating
Asynchronous online discussion activity 3	Student <ul style="list-style-type: none"> • Uploaded their design projects • Initiated the online discussion 	<ul style="list-style-type: none"> • Applying • Analyzing • Evaluating
Homework 2	Student <ul style="list-style-type: none"> • Completed the reflection tables 	<ul style="list-style-type: none"> • Evaluating
Homework 3	Student <ul style="list-style-type: none"> • Used the reflection tables to improve their projects 	<ul style="list-style-type: none"> • Creating

Instructional mode, instructional activities and revised bloom’s taxonomy (adapted from Cheung and Hew 2011)

experiment or treatment class had 20 students. These two classes or groups were taught by the same instructor but in different years. The title of the course was “Facilitating Asynchronous Online Discussion”. Students in both groups had the same course content and requirements. Students were required to design an instructional package that incorporated the use of an asynchronous online discussion forum to achieve a particular learning objective(s). The following paragraphs describe the procedure of the project in more detail. Both groups followed the same procedure with one exception. For the treatment group, the instructor introduced the elements of design thinking during week 6’s face-to-face tutorial. The control group in the previous year was not introduced to it.

3.4.1 Procedure

In week 2 of the course, the instructor introduced the online discussion platform and activities to the students. The purpose of the “asynchronous online discussion activity 1—warm-up activity” was to give students a hands-on experience in

using the asynchronous online discussion platform before they used it during and after class. The instructor was the facilitator of the asynchronous online discussion activity.

In week 3, during the face-to-face tutorial time, the instructor gave feedback to the students regarding their warm-up online discussion activity in the beginning of the tutorial. From weeks 3–5, the instructor also engaged in didactic instructional approach to introduce information, concept, and theories about the topic to the students. Conducting these didactic instructions in face-to-face tutorials allowed students to immediately ask the instructor questions related to the specific content learned.

In week 6, the instructor provided samples of previous student projects for the participants to critique on the asynchronous online discussion forums (i.e., the “asynchronous online discussion activity 2”). This online discussion ran for two weeks (i.e., weeks 6 and 7), and was facilitated by the instructor. The main purpose of online discussion activity was to allow students to apply what they had learned in the previous weeks to critique their other people’s projects. From the discussion, the instructor would know how well students knew about the content knowledge and their ability to apply their knowledge. This also gave the instructor an opportunity to correct the students’ mistakes or misconceptions either in the face-to-face tutorial time or online discussion time. Essentially, the “asynchronous online discussion activity 2” served as a formative evaluation tool of students’ understanding of content.

In addition, for the treatment group in week 6, the instructor introduced the features or elements of design thinking, summarized into a template (see Table 3.4). The instructor explained each of the elements and asked students to use the template as a guide when they design their instructional packages. The control group

Table 3.4 Key design thinking features

Design thinking feature	Description
Framing (a frame refers to a viewpoint or perspective from which a design problem can be solved)	VALUE (referring to a particular goal that a designer wishes to attain within the context of a problem situation)
	HOW (referring to the specific theories, principles or trends that are relevant to the problem domain or situation)
	WHAT (referring to the specific qualities the design solution should have)
Constraints	DESIRABILITY (what people desire?)
	VIABILITY (what is financially viable?)
	FEASIBILITY (what is technically and organizationally feasible?)
Human empathy	Human characteristics, concerns, aspirations?
Systemic view	Any unintended consequences that may emerge from interactions among the multiple parts of the lesson plan being designed?

(previous year) did not learn about design thinking, nor was the group given the template to use. The control group only had “asynchronous online discussion activity 2” as their activity during weeks 6 and 7.

In week 8, students uploaded the draft of their projects onto their online discussion forums. Each student was the facilitator of his or her online discussion forum. Students were given 2 weeks to discuss their projects online with their peers (i.e., “asynchronous online discussion activity 3”). The main purpose of the online discussion activity was to help students identify problems, and propose possible solutions to improve their projects. This discussion also ran for 2 weeks.

In week 10, students were asked to consolidate all the discussion postings in their forums by completing a reflection table (see Table 3.5). Each student had to decide if he or she would accept or reject the various suggestions received by their peers during “asynchronous online discussion activity 3”. Students also had to provide the rationale for their decisions and subsequent follow up actions.

In week 11 and 12, students improved their projects according to the suggestions and decisions from the reflection table. Students could also ask the instructor for advice during the face-to-face tutorial time or through the synchronous discussion technology such as Skype. At the end of the semester, each student had to submit a design plan that explained how they would employ an online discussion forum for instructional purposes. The major criteria to evaluate the design plans were: (a) clear learning objectives, (b) clear student characteristics and background of the target students, (c) whether the facilitation strategies are suitable for that group of students, (d) whether the facilitation strategies are practical for an instructor to implement, (e) whether the instructional strategies support students to achieve specific learning objectives, and (f) whether the instructional strategies are suitable for the target group of students.

3.4.2 Results

An independent sample 2 tailed t -test was used to analyze the mean scores of the two groups. The result showed a significant difference between the mean scores of the two groups of student in terms of their project score ($t(33) = -3.525$, $p < 0.01$) (see Table 3.6). The mean score of the control group was 14.8 and the treatment group was 18.5, out of a possible maximum score of 25. Students seemed to have a wider spread of their scores in the control group ($SD = 3.50$) compared with the treatment group ($SD = 2.21$).

3.5 Conclusion

We believe handling design problems require individuals to take time to think and discuss how such problems can be solved. This is because individuals have to consider various aspects of the design. They may overlook some of the design

Table 3.5 Reflection table with sample students' inputs (adapted Cheung and Hew 2011, p. 1329)

	Suggestions made by others	My opinion	Rationale	Changes that I can/will make
1	Teacher shouldn't be present when web activity is done in school lab	Agree strongly	Correct project guideline. I mistook that the teacher can be present as long as they are not involved in teaching directly	I will remove the presence of the teacher in the lab, in my project report
2	Incentives/rewards (stickers etc.) for good work produced (e.g. for creativity; well-thought concepts etc.)	Agree	I found that giving rewards for activities increases motivation amongst students. (from personal experience)	I could indicate that pupils who provide good understanding in their worksheet answers will be rewarded a sticker
3	Change activity to a revision instead of an introduction to topic (<i>because the purpose is to help students prepare for the final exams</i>)	Disagree	Introduction to topics are a vital part of helping pupils prepare for the final exams as basic concepts learnt in the introduction are also tested	No changes I will still keep the web activity to being an introduction to the P5 science topic of materials
4	Modify worksheet to include more items in addition to "Cup" to test for suitability of materials (e.g. school bag/spectacles)	Agree strongly	By including more appropriate items, pupils are able to clearly understand that more than 1 material can be used to make an item	I will include at least another 1-2 items that require more than 1 material to be made from in my worksheet
5	Combine with idea suggested in (4) to conduct cross-subject teaching • Use art lesson to allow pupils to create drawings of items with materials indicated	Agree	Cross subject teaching, allows total immersion in topic being taught	I could specify in my closing comments that pupils are given time during their art class to draw out their impression of items being made from unsuitable materials

Table 3.6 Independent sample *t*-test of the control group versus treatment group

Group	N	Mean	Standard deviation	t
Control group	15	14.9	3.50	-3.525**
Treatment group	20	18.5	2.21	

Note ** $p < 0.01$

dimensions. They may need others to provide them the feedback to improve their designs. As result, asynchronous online discussion activity may support students well in solving the design problems because students can do it in their own time. It will not be limited by the class time. We also posit that it is important for the participants to understand the five core features (i.e., framing, constraints management, human empathy, systemic view, and idea externalization) before they begin their design projects because this may provide a more systematic approach to improve their design.

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Chapter 4

Improving Social Studies Students' Critical Thinking

Abstract The ability to think critically along with an awareness of local and global issues have been identified as important competencies that could benefit students as they journey through life in the 21st century (Voogt and Roblin 2012). Social studies, as a subject discipline, could serve as a conducive environment for the development of such competencies because it not only aims to equip students with information about important social-cultural issues within and without a country but also to inculcate critical thinking ability whereby students review, analyze, and make appropriate judgments based on particular evidences or ideas presented. This chapter reports a study that examines the effect of using blended learning approaches on social studies students' critical thinking. This study relied on objective measurements of students' critical thinking such as their actual performance scores, rather than students' self-report data of their critical thinking levels. It employed a one-group pre- and post-test research design to examine the impact of a Socratic question-blogcast model on grade 10 students' ability to critically evaluate controversial social studies issues. A paired-samples *t*-test was conducted to determine the potential critical thinking gain using a validated rubric. There was a significant difference in critical thinking between pre-intervention ($M = 2.33$ $SD = 1.240$) and post-intervention ($M = 3.19$ $SD = 1.388$), $t(26) = -3.690$, $p < 0.001$, with an effect size of 0.67. We also reported students' perceptions of the Socratic question-blogcast blended learning approach to provide additional qualitative insights into how the approach was particularly helpful to the students.

Keywords Social studies · Critical thinking · Blended learning · Pedagogy · Socratic question

Table 4.1 Summary of main blended learning parameters

Parameter	Description
Learning goal	To improve students' critical reasoning quality in social studies
Type of content	Cognitive process—remember, understand, analyze, evaluate
Type of pedagogical approach	Dialogic, co-constructive
Specific instructional activity	Socratic questions, think aloud, self-assessment, peer feedback
Technological tools and resources	Blogcast, online sources, political cartoons
Overall blended learning model	See Fig. 4.1

4.1 Introduction

Social studies is defined by the American National Council for Social Studies as “the integrated study of the social sciences and humanities to promote civic competence” (NCSS 1994). The subject of social studies typically involves the integration of a range of topics including history, geography, political science and sociology with the primary aim of equipping students with the knowledge and skills to understand their own physical and cultural surroundings as well as the people with whom they relate with. It also aims to help students develop the ability to make informed and reasoned decisions for the common good (NCSS 1994) (Table 4.1).

The aforementioned aims of social studies clearly demonstrate the need for the development of critical thinking skills in students. This is particularly true in terms of student having to take multiple perspectives and make appropriate judgment when evaluating complex situations before acting especially in today's shared society (Levans 2007). Yet, far too often, social studies is viewed as boring and is usually rated as the least favorite subject of K-12 students (Allen 1994; Black and Blake 2001; Jensen 2001; Zhao and Hoge 2005).

According to Waring and Robinson (2010), much of the distaste for social studies originates from the way it is typically taught. Social studies education for the most part continues to focus on traditional, teacher-directed, lecture-and textbook-based approaches and test taking (Diem 2000; Friedman and Hicks 2006; White 1999). Such method of teaching tends to emphasize memory work and rote-learning (Ng 2012; Waring and Robinson 2010). It is not only boring to students (Fertig 2005) but also ineffective in fostering real critical learning (Waring and Robinson 2010).

Even in classrooms where teachers wish to engage their students in critical thinking, the face-to-face classroom debates and discussions are often limited by the number of students who are actively involved in such discussions. Very often, the more vocal students take centre-stage and dominate the discussions, whereas those who are less vocal or need more time in articulating their thoughts often take a back seat, often ending up as passive listeners. Another setback is that students' arguments tend to be ill developed and shallow due to the short period of time in which students are given to prepare for face-to-face classroom discourse (Wade et al. 2001).

The use of a blended learning approach can offer the possibility of involving every student in the critical thinking process without the constraint of time. In writing this chapter, our goal has been to explain how we could use blended learning to improve students' critical thinking in evaluating controversial social studies issues. In the following sections, we first review the definition of critical thinking, as well as the possible ways to develop student critical thinking in social studies education. Subsequently, we describe a blended learning approach that combines the use of broadcast, Socratic question, self-assessment, and peer feedback. Overall, we found significant student improvement in objective measures of critical thinking after the approach was completed.

4.2 Critical Thinking

Critical thinking has long been a major aim of social studies education (Wright 2002a). Yet, very often rhetoric outstrips actual practice (Case and Wright 1997). One of the reasons for this is due to the teachers' confusion about the very term of critical thinking. According to Wright (2002b), teachers are confronted with a wide range of curriculum materials and programs devoted to the teaching of thinking, including higher-order thinking, reflective thinking, problem-solving, inquiry, and so on, and do not know how to differentiate them from critical thinking. Further compounding the problem is that different scholars may offer different definitions to explain critical thinking (Yang and Chung 2009).

Yet, despite the various definitions of critical thinking, there are similar core notions that underpin it. Based on the analysis of the works by several scholars (i.e., Chaffee 1998; Chance 1986; Ennis 1989; Henri 1992; Newman et al. 1997; Paul 1993; Schafersman 1991; Swartz and Parks 1994), we propose that a critical thinker is one who makes judicious conclusions by weighing alternative or multiple viewpoints, and justifying one's answers with appropriate arguments and valid supporting details.

Scholars believe that critical thinking is teachable, although different views exist between those who stress that critical thinking be taught as a separate specialized course. This may be referred to as the generalist view supported by scholars (e.g., Siegel 1988) who contend that identifying the skills of critical thinking apply across subject domains. On the other hand, some scholars advocate the specificist position which stresses that students should be encouraged to think thoughtfully in the subject (Zohar et al. 1994), aided by explicit teaching of general critical thinking skills (Abrami et al. 2008). We employed the latter approach in our social studies project as it helps students to see critical thinking competencies as an integral, rather than a separate part of learning social studies information (Wright 2002a).

Numerous instructional strategies have been proposed to develop critical thinking skills including drama, Edward De Bono's six thinking hats, Paul's critical thinking model, group debate, peer assessment, written prompts, and questioning (Paul 1993; Schellens et al. 2009; Yang and Chung 2009). Questioning was mainly selected

Table 4.2 Types of Socratic question

Type of Socratic question	Definition
Questions about the question	These questions ask the individual to identify or interpret the question, the main point, or the issue at hand
Questions of clarification	These questions ask for verification or additional information of one point or main idea
Questions that probe assumptions	These ask the individual for an explanation or the validity of an assumption
Questions about viewpoints or perspectives	These questions ask the individual whether there are alternatives to his/her viewpoint or a comparison of similarities and differences between various viewpoints
Questions that probe reason and evidence	This category of questions ask for additional examples, reasons for making statements or process that lead the student to his or her belief
Questions that probe implications and consequences	This category of questions ask the individual to describe the implication of what is being done, or the possible cause-and-effect of an action or a suggestion

for use in our blended learning because of its ability to promote quality discussion (Vogler 2004), as well as its ability to influence students' level of thinking (King 1990). In other words, questions can play an important role in inducing students' cognitive processes, and conceptual change of student misconceptions, all of which are integral to critical thinking (Yang et al. 2005). However, researchers have found that students generally tend to generate factual questions rather than thought-provoking questions (Dillon 1988; Flammer 1981; King 1990).

Although there are numerous types of question method such as Carner's (1963) three levels of questions (concrete, abstract, and creative), Pate and Bremer's (1967), or Enokson's (1973) convergent and divergent questions, Socratic questions is typically viewed as one of the most popular and powerful teaching method to use in guiding students to generate thoughtful questions that will foster their critical thinking (Maiorana 1990–1991; Paul 1993; Yang et al. 2005). There are six types of Socratic questions as listed in Table 4.2.

4.3 An Empirical Investigation

Despite the numerous social studies related articles published in the literature, we found only one article (Salam and Hew 2010) that fulfils the criteria for inclusion in this book: (a) the article addresses blended learning as it is defined in Chap. 1 (i.e., “blended learning is any time a student learns at least in part at a supervised brick-and-mortar location away from home *and* at least in part through the Internet with some element of student control over time, place, and/or pace”), (b) the article uses an intervention-based research design, and (c) the article reports data on

measurable student critical thinking outcome, instead of student self-reported responses. This study was reported elsewhere but in an abridged format due to number of page restriction. In this Chapter, we described the entire (Salam and Hew 2010) study in greater detail, and more importantly distil out the main pedagogical and instructional strategies.

The blended learning social studies project took place at Secondary School A, a co-educational grades 7–11 school in Northern Singapore. This project was set up according to a one-group experimental pre-test and post-test design. The participants in this study were 27 grade 10 students between the ages of 15 and 16 years old. The students were of mixed gender (15 females and 12 males) and ethnicity (17 Chinese, 10 Malays). In terms of ability, students were from the Express stream with a class PSLE T-score Mean of 199. The Primary School Leaving Examination (PSLE) is a placement examination at the end of grade 6. T-score is a number that indicates how well a candidate has done in the PSLE. The T-score of 199 indicated that participants in the study were from the weaker band of Express students in Singapore.

4.3.1 A Blended Learning Approach to Help Grade 10 Students Critically Assess Information Sources

Figure 4.1 shows an overview of the blended learning model that incorporated the use of Socratic questions, political cartoons, blogcast, personal reflection, and peer review.

4.3.1.1 Political Cartoons

Political cartoons are vivid primary sources that offer intriguing and entertaining insights into the public mood, and attitudes toward key events or trends of the times (Burack 2014). They are often satirical and make an observation about a situation by presenting it in a visual and often memorable way. The interpretation of a political cartoon typically requires students to identify the main subject or issue, locate the source, interpret the message or information presented, and evaluate the cartoon's bias (Heitzmann 1998; Steinbrink and Bliss 1988). These cognitive processes are essential to the development of student critical thinking. Figure 4.2 shows one of the political cartoons used in the blended learning social studies project.

4.3.1.2 Blogcast

A blogcast is a combination of a blog and podcast in a single-web application. A blog is a text-based online journaling tool whereas a podcast is an audio recording that is shared via a media player over the Internet. Blogs gained popularity in 2003 during the Iraq war when an Iraqi citizen later dubbed the 'Baghdad blogger'

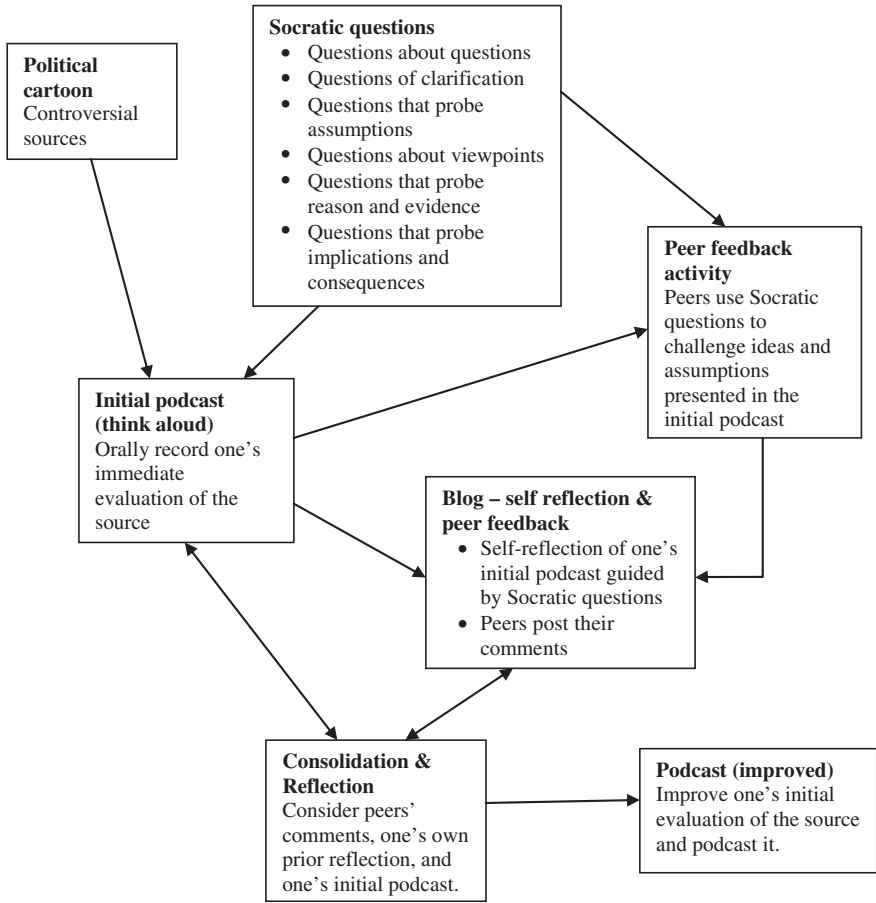


Fig. 4.1 Overview of the blended learning model used to improve student critical thinking

recounted his personal experience of the war. As the compelling drama of the Iraqi war unfolds through the powerful words of the blogger, blogs too gained prominence in the eyes of the American public (Martindale and Wiley 2004) and the world. Educators too realise the significance of blogs as an online journaling tool in the classroom, for students to reflect on their learning. Ellison and Wu (2008), for example reported that students enjoyed the novelty of blogs, the informal writing voice, the interactivity and the social discourse where students read their peers' blogs and have the opportunity to provide feedback. A podcast, on the other hand, is usually an audio broadcast that is downloaded in its entirety before it is play, as opposed to audio streaming (McLoughlin and Lee 2007).

In this particular social studies project, students used the Quick Blogcast application which is a web tool with blogging and podcasting capability. With Quick Blogcast, students could easily create and add web logs and audio files.



Fig. 4.2 A political cartoon utilized in the social studies project (retrieved on 17 Apr 2008 from <http://ethnicminoritiesdafur.blogspot.hk/2007/06/this-is-drawing-of-un-not-caring-about.html>)

Students used the podcasting capability to verbalize their thinking (think-aloud). Thinking-aloud helps students to develop, organize and retain ideas and information (Buckley 1979), as well as a means to promote originality of ideas (Hew and Cheung 2013), and to encourage students to think critically (Kassirer and Kopelman 1991; White et al. 1992). Thinking-aloud clarifies students' mental representations of the situation under consideration, an important element in the process of reasoning and the development of correct judgment (Phaneuf 2009).

Students used the blogging capability for self-assessment and peer-feedback. Self-assessment helps focus the learner's attention on his or her thinking by asking them to delve into their thoughts about specific topics or issues (Colley et al. 2012). Self-assessment also helps individuals to examine the justification for their own assumptions and beliefs (Mezirow 1990) and is an antecedent to building critical thinking (Taylor 1992). However, research has shown that students are not always the best judges of their own performance (Bjork 1999; Falchikov and Boud 1989). One approach to improve self-assessments is to inform students on how to evaluate their own performance by the use of Socratic questions. When students use the Socratic questions to assess their own thoughts, they learn to assess their performance on a greater variety of dimensions, and to assess each dimension with greater accuracy. In addition, through the use of blogs, students were given the opportunity to examine the assessments or feedback from their peers. Peer feedback allowed students to learn from comparing their own assessments with assessments made by others.

4.3.2 Procedure

The data collection was conducted over a period of three weeks. A 15-min pre-test was administered to determine students' level of critical thinking prior to intervention. The 15-min pre-test was carefully crafted to provide content validity in accordance with the social studies formal syllabus and national assessment guidelines. More specifically in the pre-test, students were directed to study some background information on the issue of religious conflict in Northern Ireland, and two other sources of information. Source A was a political cartoon in a website showing an Irish Republican Army (IRA) member flashing his 'license to kill' card. Source B showed the views of a Catholic man praising the IRA for standing for the rights of the Catholic people. Students were informed that they could use any other sources, in addition to these provided ones to answer the following question: "How reliable is the source as evidence to suggest that IRA's involvement worsened the Northern Ireland conflict? Explain your answer."

In the next three weeks, students participated in two main activities (Activity 1 and 2) using the Socratic Questions-Blogcast blended learning approach. Within each activity, students made two posts containing voice recordings, one post containing their self-assessment of their podcast and one post containing their final answer in text. Each Blogcast had an average of two comments from the two assigned peer reviewers. Students were also made to record their thoughts and feelings on reflection sheets after each lesson. A detailed description of the procedure is presented in Table 4.3. The six categories of Socratic questions, along with

Table 4.3 Summary of the procedure

Lesson	Procedure
1	<p>Researcher administered Pre-test</p> <p>Instructor enrolled students in Quick Blogcast (a private web domain with blogging and podcasting capability) guided students on a tour of blogcast to familiarise students with the blog and podcast features, and got students to test their headphones</p>
2	<p>Students were told to access Activity 1 (see Appendix) and proceed to 'think aloud' by recording their immediate evaluation of the source. Students are advised that ideas need not be coherent</p> <p>Students listened to their podcast and guided by Socratic questions reflected on their thinking journey. Students typed and posted their reflections in their own blogs</p>
3	<p>Students invited their peers to critic on their podcast. Peers used Socratic questions to challenge their friends' ideas and assumption. Each student was assigned two peer-reviewers. Comments were posted onto the blog in text</p> <p>Students studied their peers' comments, their own prior self-assessments and listened to their draft podcast again before attempting to revise their evaluation of the source in text</p>
4	Students used their text version as a script and podcasted their final evaluation of the source. Students invite peers to visit their blogs and comment
5–8	Repeat of lesson 2–4 for another activity (Activity 2)
9	Researcher administered a post-test

some examples of questions, were provided to guide students in their self-assessment and in giving peer feedback (see Table 4.4).

At the end of the three weeks, a 15-min Post-test was carried out to determine the difference in students' level of critical thinking after participating in the Blogcast lesson. Students were asked to study some background information on the role of the United Nations (UN) in keeping world peace, and two other sources of information. Source A was a political cartoon in a website showing a heap of bodies piled up. On it were the words *Sudan genocide*. Source B showed the speech by the Iraqi foreign minister accusing the UN for failing to rescue the Iraqi people from Saddam Hussien's reign that lasted more than 35 years. Students were also told that they could use any other sources, in addition to these provided ones to answer the following question: "How reliable is the source as evidence to suggest that UN were ineffective as peacekeepers? Explain your answer." The students were asked to complete both the pre-test and post-test under test conditions. For example, students were seated in their own seat and were told to answer the questions on their own without discussion with their neighbours.

The questions in both the pre-test and post-test were examined by two experienced social studies teachers for construct validity before the questions were given to the students. The questions were checked to make sure that they were in accordance with the social studies syllabus, as well as to ensure that both sets of questions were similar in terms of level of difficulty. A rubric was developed to measure the students' critical thinking ability to evaluate the reliability of information sources. The rubric was designed to categorise students' responses into six different varying levels (see Table 4.5). The teacher of the social studies class and an independent marker scored the students' pre- and post-test scripts. The independent marker has 4 years of teaching experience and 2 years of national examination marking experience. The percentage of agreement between the two markers was 81.4 %.

4.3.3 Results

A Paired Sample t-Test was calculated for each participant between pre-intervention and post-intervention to determine the effect of the intervention on students' level of critical thinking. The test revealed that there was a highly statistically significant difference in critical thinking between pre-intervention ($M = 2.33$ $SD = 1.240$) ($t = -3.690$, $df = 26$, $p = 0.001$, two tailed) and post-intervention ($M = 3.19$ $SD = 1.388$) at the 0.05 level of significance. The effect size, d , was computed to be 0.67, which was a medium effect size. The results suggested that the blogcast with Socratic questioning blended learning approach had improved the students' critical thinking achievement.

In addition to the objective of determining whether the level of students' critical thinking had changed after participating in the Blogcast blended-learning approach, students' perception of the Blogcast lesson and the use of Socratic

Table 4.4 Socratic questions to guide students' self-assessment and peer-feedback

Types of Socratic questions	To facilitate students' self-assessment	To facilitate peer-feedback
Questions about the question	<p>What does this question assume?</p> <p>What do I understand from this question?</p>	<p>I am not sure I understand how you are interpreting the main question?</p> <p>I don't agree with your interpretation of the main question. I think the question is saying...</p>
Questions of clarification	<p>What do I think is the main issue here?</p> <p>What is my main point?</p> <p>Could I have put it another way? If yes, how?</p>	<p>Let me see if I understand you; do you mean ___ or ___?</p> <p>In summary your main ideas are _____. Am I right?</p> <p>Could you explain this point _____ further?</p>
Questions that probe assumptions	<p>Does the source contain a fact, an opinion or both?</p> <p>If the source contains an opinion, is the opinion valid or invalid? Why do I say so?</p>	<p>You seem to be assuming _____. Do I understand you correctly?</p> <p>All of your reasoning depends on the idea that _____. Why have you based your reasoning on _____ rather than _____?</p>
Questions about viewpoints or perspectives	<p>What point of view did the cartoonist take?</p> <p>Is it a one-sided viewpoint? What led me to this belief?</p> <p>Are there any details that are highlighted or left out to give a one-sided viewpoint?</p> <p>Does the source contain generalisations such as ideas that may not always be true?</p> <p>What words or symbols did the artist use to reveal his bias?</p>	<p>You seem to be approaching this issue from _____ perspective. Why have you chosen this rather than that perspective?</p> <p>What would someone who disagrees say?</p>
Questions that probe reason and evidence	<p>What examples/evidence did I provide to support my opinion?</p>	<p>You mentioned _____. Do you have any evidence for that? Can you explain how you logically got from _____ to _____? Do you see any difficulties with your reasoning here _____? What would you say to someone who said _____?</p>
Questions that probe implications and consequences	<p>Is the source trying to influence the reader by using words or symbols, which have hidden meaning?</p> <p>Is the source seeking to please or influence a particular group of people?</p> <p>What effect would that have on the reliability of the source?</p>	<p>When you say _____, are you implying _____?</p> <p>What could be an alternative?</p>

Table 4.5 Rubric used to assess students’ level of critical thinking (Salam and Hew 2010)

Level	Type of response	Description
1	Describing source	Copies information from source or provenance
2	Reliable OR/AND Unreliable, explained but not supported	Valid interpretations with superficial arguments, fails to justify interpretations i.e., cross-reference to specific contextual knowledge or other sources
3	Typicality	Answers based on a reluctance to generalise
4	Reliable OR Unreliable, supported	Valid interpretations which are justified with sound arguments and supporting evidences, i.e., valid cross-referencing to specific contextual knowledge or other sources. But, fails to evaluate alternative viewpoints
5	Reliable AND Unreliable, supported	Evaluates alternative viewpoints which are justified with sound arguments and supporting evidences, i.e., valid cross-referencing to specific contextual knowledge or other sources
6	Level 5 plus evaluate source provenance	Draws judicious conclusions by weighing alternative viewpoints, evaluating purpose of the source and justifying answers with sound arguments and valid supporting details

Questions were also captured through reflection sheets. The reflections sheets were issued at the end of each lesson and students were asked to respond to the open-ended question found in each reflection. They were expected to write at least one paragraph of reflections. The main purpose of capturing students’ reflections was to provide some qualitative insights into how the students felt about the blended learning approach in general as well as to gain some understandings on how the approach was helpful in enhancing the students’ critical thinking.

Table 4.6 provides a listing of the students’ main perceptions about the use of podcast (grouped into relevant themes), the number of times each theme was mentioned, and some representative participants’ comments. 44 % of comments noted that podcasting was a new and interesting learning experience, while 37 % of comments indicated that the use of verbalizing their thoughts through podcast helped students to analyze their thought processes. However, there were some students who reported being uncomfortable of using podcast because they were self-conscious of how they sounded and did not want to being laughed at by their classmates.

Table 4.7 provides a listing of the students’ main perceptions about the use of blogging (again grouped into relevant themes), the number of times each theme was mentioned, as well as some representative participants’ comments. A majority of participant comments (88 %) noted that blogging was a useful method to help students reflect on their initial thoughts that were captured in the earlier podcasts.

Table 4.6 Students' perceptions of using podcast to record their interpretations of sources

Type of comments	No of comments	Percentage of comments	Sample responses
Reflection Question 1: How do you feel about podcasting?			
Podcasting is a new and interesting learning experience	45	44	<ul style="list-style-type: none"> • I enjoyed hearing my voice in the recording. I could record what I think and hear it back. This activity was my first time in my 10 years of study. It was easy to learn this technology • It's fun and interesting and I get to talk and hear my own voice and thoughts like some kind of reporter. Lessons are livelier this way
I learnt to 'think aloud' using podcast	37	37	<ul style="list-style-type: none"> • It was great. At first I wanted to write down my thoughts but then I followed the instructions and just said out what I thought of the source. It wasn't perfect but at least it helped me realise I tend to copy the background information and did not answer the question • I like recording my voice. It helps me understand what goes on in my head. It is useful in helping me analyse the reliability of sources
I need more practice in podcasting	5	5	<ul style="list-style-type: none"> • It was fun. I kept on listening to my voice over and over again. This is the first time I try this so I had a bit of problem starting my podcast. Later I got the hang of it. I had a good time speaking over the microphone and listening to my own voice. I think I sound strange. I had lots of good ideas but they were all jumbled up. I think I need more practice so that my ideas can flow faster
I am not comfortable with using podcast	14	14	<ul style="list-style-type: none"> • It is troublesome. It is difficult to podcast. I am not comfortable with recording my voice. I don't want people to listen to my podcast. I prefer to write rather than record my voice

Table 4.7 Students' perception of using blogs to record their reflections of their podcasts

Type of comments	No of comments	% of comments	Sample responses
<p>Reflection Question 2: How do you feel about using blogs to reflect on your podcast?</p> <p>I find blogging useful because I can listen to my podcast and type my reflections at the same time even when I am away from class</p>	60	88	<ul style="list-style-type: none"> • A fun way to reflect. Blogging made me think more about my podcast. During the podcast activity, I was saying out what came to my mind. My ideas were poorly connected and didn't make much sense. Blogging helps me to reflect on my podcast and expand my ideas. The two activities were useful to me. I don't have to finish everything in that one lesson. I can always go back and type in what I missed out. Everything is saved in my blog and I can go home and look at it • I think I got better at answering reliability questions after podcasting my ideas and using blogger to critique my podcast. It's all in my blog. My entire learning journey • Blogging is fun! It was a good chance for me to post my podcast. I can listen to my podcast. Pause whenever I need to and type what I think is missing from my answer. Since it is on the web, I can also go home and listen and reflect on it again. Blogging is good for reflection. The best part is that my blog is mine and I can design it my way • I think we could have used Microsoft Word instead. Blogging is slow. I had to wait for quite some time to upload and play back my podcast. It was frustrating! • It took 10 min to get me started. I could have done other things if I was not wasting so much time on getting the technology to work
<p>I get frustrated blogging because of the slow internet connection or getting the technology to work</p>	8	12	

Table 4.8 Students' perception of the peer-feedback activity

Type of comments	No of comments	% of comments	Sample responses
Reflection Question 3: What do you think about the peer feedback exercise?			
I find my peers' comments useful in helping me improve my answer	46	88	<ul style="list-style-type: none"> • This is the part that I love most. To me it is somehow hilarious. Their voices are so cute. It also helps me to know how they answer the questions and gain more knowledge. I get different points from their answer, which helps me understand the source better. Their feedback is helpful too. I could answer better after taking down their pointers • Sharing allows me to get feedback. I can also look at other people's blog and get to know their opinion. I get to hear my friends' voices too. It was nice that we learnt from each other. I took down pointers from some of the better ones • By commenting on my peers' blogcast I became more aware of errors I should avoid
I am not comfortable sharing my blogcast	6	12	<ul style="list-style-type: none"> • Scared. I don't think I sound good. My friends will surely laugh at me. I would prefer not to have any peer feedback

However, there were some students who reported being frustrated with the slowness of the blogging software or Internet to upload their reflections.

Table 4.8 provides a listing of the students' main perceptions about the use of the peer-feedback activity which are grouped into relevant themes, the number of times each theme was mentioned, as well as some representative participants' comments. A majority of participant comments (88 %) noted that the peer feedback activity was useful in helping them see other people's perspectives to improve their evaluation of social studies sources of information. Some students, however, reported being uncomfortable in allowing their classmates critic their work mainly due their being too self-conscious about their voice recordings.

Finally, Table 4.9 provides a listing of the students' main perceptions about the use of Socratic questions which are grouped into relevant themes, the number of times each theme was mentioned, as well as some representative participants' comments. All the students reported that using Socratic questions had been useful in guiding them to be more critical in their thoughts both during the self-assessment and peer-feedback stages. The various themes shown in Table 4.9 provide a more detail analyses on how the Socratic questions had helped the students.

Table 4.9 Students' perception on the use of Socratic questioning

Type of comments	No of comments	Percentage of comments	Sample responses
Reflection Question 3: What do you think about using Socratic Questions for self- and peer-critic?			
The use of Socratic questions helped me develop my ideas	14	23	<ul style="list-style-type: none"> Useful. The more I questioned the more I learnt and became more daring to show different viewpoints. I used to want the right answers but now I am more confident in expressing my views and providing evidence to support them. This was something I was not used to doing before. I think the use of Socratic questions is useful
It helped me spot weaknesses in my arguments	12	20	<ul style="list-style-type: none"> I have not done this before. Usually the teacher just asks us to reflect without asking us to look at such questions. It is good because after going through the questions, I made more changes to my draft. I re-ordered my points and provided more evidence to support my answer. I even mentioned the government's role in the Northern Ireland conflict, which I did not think of before
It made me challenge my assumptions	8	13	<ul style="list-style-type: none"> It helps me understand more of how to answer reliability questions. I think most us tend to give one-sided answers. The source is reliable because we can cross-reference to something negative. But through Socratic questioning I realise nothing is black or white. A source can be reliable and not so reliable at the same time. It depends on whose point of view, the target audience and the purpose
It made me look for more evidence to support my arguments	10	16	<ul style="list-style-type: none"> We used it to reflect and give comments. It made me re-look my answers and fill in what was missing. I feel my comments were more useful as I could provide more specific examples with the question
It made my answers more coherent	11	18	<ul style="list-style-type: none"> I finally know the right way to think and how to answer the reliability Qn. It is a good way to score better. My answers sound better and my ideas seem to flow. I also know what type of evidence to pick to support my answer
It helped me provide more constructive feedback to my friends	6	10	<ul style="list-style-type: none"> The teacher told us to use the Socratic questions for our own reflection and peer review. They help me to link my points and improve my arguments and expand my ideas. I realized that initially I had not provided enough justification. During peer-review I gave some useful pointers based on the questions. One of my friends had given a lot of evidence but did not answer the question that is "Tamil students formed Tamil Tigers because of unfair University admission." So, I pointed this out to him

4.3.4 Conclusion

The results of the blended learning approach suggested that when think-aloud (via podcast), self-assessment and peer-feedback (via blog) and Socratic questions were integrated in lessons, students achieved higher levels of critical thinking (i.e., forming substantiated reasons and judgments) when assessing social studies sources. Students' excitement in using the technology (blogcast) and their desire to improve their blog and podcast contents were also evident in their reflections. We cannot, of course, determine actual causal effects of the blended learning approach on students' critical thinking because the research did not utilize any control treatment. Nevertheless, the results of the research provides a glimpse to the potential of using blogcast with Socratic questions to stimulate social studies students' critical thinking through written and oral discourse.


Based on these results, we encourage other social studies teachers to replicate this research to determine whether critical thinking ability can be improved in their own classrooms. We also urge that teachers conduct an experimental research design involving two groups of students—one group utilizes the blogcast with Socratic questions blended learning approach, while the other does not.

Appendix

Activity 1

1. Instructions

A. Getting started:

Click on this icon  and set up your Podcast. Remember to test your headphone and the Audacity software. Proceed only when everything is in working order. Raise your hand if you need assistance.

B. Podcast your answer:

Study the background information, sources and question. Then answer the question orally and record it to audacity. Just say out whatever comes to mind. Do not worry if your ideas do not flow. This is only your first draft. You will be given a chance to improve on your answers later. Upload your podcast onto your blogcast account, which have been created for you. Do not spend more than 15 min on this activity!

2. The Question

Study this question carefully.

Study Source A

How reliable is the source as evidence to suggest that the Tamils formed a militant group due to the unfair university admission criteria? Explain your answer.

3. The Background Information

Read this carefully. It may help you to answer the questions.

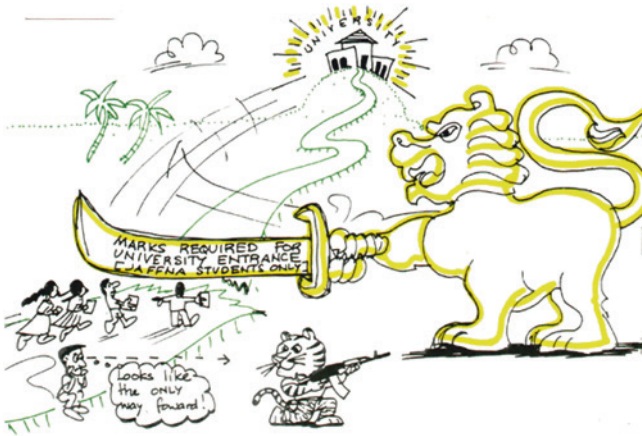
After 1970, the government introduced new university admission criteria. Tamil students had to score higher marks than the Sinhalese students to enter the same courses in the universities. A fixed number of places were also reserved for the Sinhalese. Admission was no longer based solely on academic results. This became the main point of the conflict between the government and Tamil leaders. Tamil youths, resentful by what they considered discrimination against them, formed a militant group, the Liberation Tigers of Tamil Eelam (LTTE), more popularly known as Tamil Tigers, and resorted to violence to achieve its aim.

4. The Sources

Source A:

A cartoon about university admission in Sri Lanka by a Tamil artist.

<http://www.slideshare.net/khooky/srilanka-conflict-v09>



Source B:

A view expressed by a Sinhalese about the Tamils in Sri Lanka, 1995.

The LTTE terrorists complain that the Tamils have been treated unfairly. This is unfair. This is no longer true. They say they have been the victims of discrimination in university education, employment and in other matters controlled by the government. But most of their demands were met long ago. Discrimination exists in every society but in Sri Lanka it is less serious than in some countries. It certainly does not give them the right to kill people. The Tamils do not need to be freed by a group of terrorists. Discrimination is not the real reason for terrorism, it is just an excuse.

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Chapter 5

Improving Students' Argumentative Writing and Oral Proficiencies

Abstract Argumentative writing and oral proficiencies are two skills many students around the world are required to develop in their learning of the English language. However, these are two areas where not all students excel in. This chapter reports two studies that examined the effect of using blended learning approaches to improve students' argumentative writing and oral proficiencies. The two studies relied on objective measurements of students' performance outcomes such as their argumentative essay test scores, and oral proficiency scores determined by the Analytic Oral Proficiency Assessment Rubric, instead of students' self-report data of their perceived writing or oral proficiencies. The first study employed a one-group pre- and post-test research design to examine the impact of a blended learning approach on grade 9 students' ability to make claims, challenge them, and back them up by producing valid reasons. The results from a Wilcoxon Matched-Rank test showed a significant improvement of the students' performance in their overall score in the post-test essays. The second study utilized a pre-test and post-test quasi-experimental design to investigate the use of a blended learning approach utilizing a Voice-Over-Instant-Messaging tool (Skype) on freshman's English oral proficiency. The results from an ANCOVA test suggested that students in structured online discussions with the facilitation of English teaching assistants (ETAs) scored significantly higher in their oral proficiency tests compared to their counterparts in unstructured online discussions or structured online discussions without the facilitation of ETAs.

Keywords English language • Argumentative • Oral communication • Writing • Blended learning • Skype • Online discussion

5.1 Introduction

One of the most important 21st century competences that could benefit students as they progress through schools into the workforce is the ability to communicate well (Voogt and Roblin 2012). With respect to communication skills, two language

Table 5.1 Summary of blended learning I parameters: improving argumentative writing

Parameter	Description
Learning goal	To improve students' argumentative writing proficiency
Type of content	Cognitive process—remember, understand, apply, analyze, evaluate
Type of pedagogical approach	Dialogic, constructionist
Specific instructional activity	Teacher feedback, TASK (thesis, analysis, and synthesis key) strategy, modelling (e.g., examples of good and poor argumentative writings), online message labelling
Technological tools and resources	Asynchronous online discussion forum, samples of well-versus poorly-written essays, competency rubrics for writing arguments
Overall blended learning model	See Fig. 5.1

Table 5.2 Summary of blended learning II parameters: improving oral proficiency

Parameter	Description
Learning goal	To improve students' oral proficiency
Type of content	Cognitive process—remember, understand, apply
Type of pedagogical approach	Dialogic
Specific instructional activity	5 types of online activities—(a) self-introduction task, (b) question and answer task, (c) topical discussion task, (d) debate task, (e) role play task; online facilitation by trained mentor—(a) modeling, (b) giving correction, (c) providing encouragement
Technological tools and resources	Voice-over-instant-messaging (Skype)
Overall blended learning model	See Fig. 5.2

learning functions may be distinguished: one is language input which includes listening and reading, while the other is language output which includes writing and speaking (Harmer 1991). Harmer (1991) argued that in order to improve students' communication ability, exposing students to language input is insufficient; students need to activate the knowledge they have received by producing language through actual writing and oral activities (Tables 5.1, 5.2).

In this chapter, we report two studies that examined the effect of using blended learning approaches to improve students' argumentative writing and oral proficiencies. In the following immediate section, we first describe the purpose of argumentative writing, and some possible main reasons why students do poorly in it. We then describe a one-group pre- and post-test empirical research study to examine the impact of a blended learning approach on grade 9 students' ability to make claims, challenge them, and back them up by producing valid reasons.

5.2 Writing

There are many types of writing genre in the English Language and among the genres most often considered central in schools include descriptions, narrations, procedural instructions, hypotheses, and arguments (Lemke 1988). An argument may be defined as “a set of propositions about a topic ordered in a coherent sequence with each proposition supported by the appropriate form of evidence, depending on whether the claims are empirical, conceptual, or normative” (Morgan and Beaumont 2003, p. 147). According to the British Esmee Fairbairn research project into argumentative writing, the best written argument uses supporting evidence such as fact, personal experience, and reference, weighs and evaluates evidence, explains opposing views and qualifies contentions, and is assertive but not aggressive (Andrews 1995).

At its core, the purpose of argumentative writing is for the writer to present his thoughts or conclusions in order to persuade an audience to accept or seriously consider his particular viewpoint. Scholars have found that children have difficulty with both oral and written arguments, especially the written ones (Applebee et al. 1986; Bereiter and Scardamalia 1982). More specifically, Koh (2004) identified three main reasons for students’ poor performance in argumentative writing. First, students lack lexical ability and depth in expressing their thoughts and arguments such as having inadequate vocabulary, incorrect use of words, and grammar inaptitude. Second, students do not know what makes a good argument and are therefore unable to organize facts, results and opinions, into a coherent piece of argumentative essay. Finally, students display an absence of content knowledge, resulting in the positing of illogical arguments.

Past research has suggested that writing an argument is very different from other modes of discourse, and hence instructional strategies that are effective with narrative, descriptive, and informational writing may not be effective with argumentative writing (Knudson 1988, 1989, 1991). Moreover, given the tight curriculum structure, some English teachers use a didactic approach in teaching argumentative writing: the setting of the lexical standards and tone, and the organization of the argumentative writing (Koh 2004). Such a didactic approach gives students little time to gather differing information or to examine the alternative viewpoints thoroughly. Typically, at the end of a teaching session, the students are simply instructed to write about a topic by making a stand or validate a certain given statement such as “War is necessary in resolving conflict” (Koh 2004).

Some scholars have argued that the mere use of a didactic approach does not always lead to improvement in argumentation skills (Cho and Jonassen 2002). Cho and Jonassen (2002) proposed the use of scaffolding to help students acquire the argumentation skills. However, there is a large bewildering variety of scaffolds available in pedagogical studies such as tables of information, mind-maps, concept maps, reasoning charts, flow charts, and others. Specifically, what kind of scaffolding may improve grade 9 students’ learning of English argumentative writing, particularly in a blended learning context?

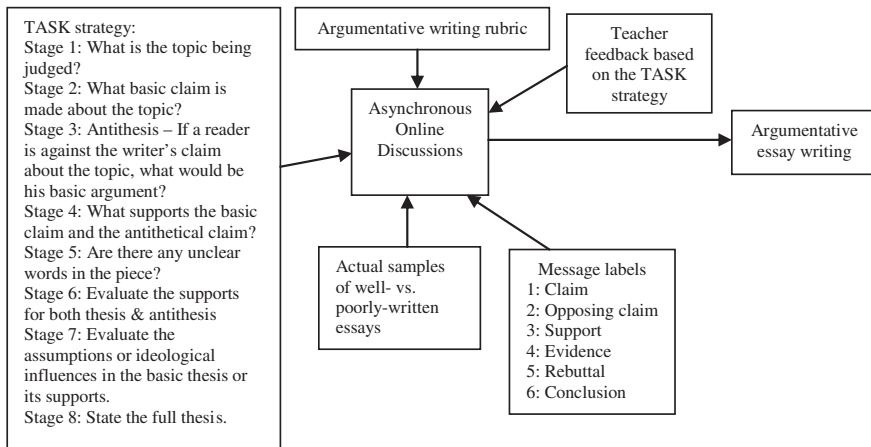


Fig. 5.1 A blended learning approach to improve student argumentative writing

5.3 An Empirical Investigation I: Improving Argumentative Writing

In this section, we describe an unpublished master thesis, conducted by Koh (2004) and supervised by the second author of this book, which investigated the use of a blended learning approach that involved asynchronous online discussion, the Thesis Analysis and Synthesis Key (TASK) strategy, samples of well-written versus poorly-written essays, assessment rubric, online message labels, and teacher feedback. The blended learning approach is illustrated in Fig. 5.1.

5.3.1 A Blended Learning Approach to Improve Grade 9 Students' Argumentative Writing

Basically, the various scaffolds used in the study could be parsimoniously grouped into two main categories: modelling of writing and writing support, as shown in Table 5.3.

5.3.1.1 Modelling of Writing Scaffold

Two specific resources were used to model good argumentative writings: examples of good versus poorly written essays, and an assessment rubric for grading argumentative writing. The decision to use both types of resources to support argumentative writing was partly based on existing literature (MacElvee 2002; Pittenger et al. 2006) who showed that sharing scoring rubrics with students

Table 5.3 Summary of scaffolds used (adapted from Koh 2004)

Type of scaffold	Description of activity
Modelling of writing	• Teacher showed and discussed examples of good and poorly written argumentative essays with the students
	• Teacher showed and explained the argumentative writing assessment rubrics to the students
Writing support	• Giving students training on the use of asynchronous online discussion forum
	• Encouraging the use of a message ‘labeling’ or ‘tagging’ system to guide students’ thinking
	• Use of key steps in the TASK strategy to guide student thinking
	• Intervention by subject teacher to facilitate the argumentative skills when necessary

helped to improve students’ writing. Moreover, when students become familiar with the scoring rubrics, their writing anxiety often decreases (Wyngaard and Gehrlice 1996), and they have a clearer notion on what areas they need improvement (Bergdahl 1999).

More precisely, the assessment rubric indicators used in Fig. 5.1 for the key components of a quality argumentative essay were adapted from several sources including Greenlaw and DeLoach’s (2003) taxonomy for critical thinking, Facione and Facione’s (1996) holistic critical thinking scoring rubric, Kuhn’s (1991) components of an argument, and Toulmin et al.’s (1990) skills for a sound argument. These components include: the ability to state a stance and provide evidence for one’s own thesis, the ability to envision anti-thesis and their supports, the ability to evaluate points of views, supports and questionable inferences, the ability to provide rebuttals and the ability to support a conclusion using both thesis and anti-thesis. The components and their indicators are summarized in Table 5.4.

5.3.1.2 Writing Support Scaffold

Four types of writing support scaffold were utilized: asynchronous online discussion forum, message labelling, TASK strategy, and teacher feedback during the online discussion. An asynchronous online discussion forum is a text-based non real-time computer-mediated communication that allows student-teacher and student-student interactions to take place without the constraint of time and location (Hew and Cheung 2012). A text-based, non real-time online tool enables participants to focus and reflect on the grammatical form as well as the accuracy of their contents as they type; when they find an error they can revise it before posting their messages on the forum (Yamada 2009). Furthermore, the very process of typing out their ideas as concrete messages could help participants construct their thoughts more carefully (Vonderwell 2003), and also hone thinking skills such as analysis, synthesis, and evaluation (Newman et al. 1997).

Message labels or tags are certain classifications that are added to participants’ online messages (Ng et al. 2010). In the blended learning approach shown

Table 5.4 Assessment rubric for argumentative writing (adapted from Koh 2004)

Component of an argumentative writing	Assessment indicator
State stance and providing evidence for one's own thesis	4—Make assertions with explicit evidence offered
	3—Make assertions based on superficial evidence
	2—Take a side but make unsupported assertions
	1—No clear stand
Envisioning anti-thesis and their supports	4—State major alternatives points of view with explicit evidence offered
	3—State alternative points of view based on superficial evidence
	2—State obvious alternative points of view without providing evidence
	1—Ignores alternative points of view
Evaluating points of view, supports and questionable inferences	4—Evaluates major points of view, supports and questionable inferences
	3—Evaluates alternative points of view, supports and/or questionable inferences
	2—Superficially evaluates obvious points of view, supports or questionable inferences
	1—No evaluation of points of view, supports or questionable inferences
Providing rebuttals	4—Provides salient rebuttals
	3—Provides relevant rebuttals
	2—Fails to provide relevant rebuttals
	1—Fails to identify strong, relevant rebuttals
Support conclusion using both thesis and anti-thesis	4—Able to defend conclusion using supports from both thesis and anti-thesis
	3—Able to defend conclusion using supports from thesis and/or anti-thesis
	2—Able to defend conclusion using supports from thesis
	1—Superficially defend conclusion

in Fig. 5.1, students were told to label their online messages in the asynchronous discussion forum with the following tags: “claim”, “opposing claim”, “support”, “evidence”, “rebuttal”, or “conclusion”. The main purpose of requiring students to label their online posts was to direct the student’s thinking to the nature of his or her intended contribution. It also allowed the teacher as well as their peers to easily identify the purpose of their contributions and evaluate their accuracy.

TASK, an acronym for Thesis, Analysis, and Synthesis Key, is a strategy first espoused by Unrau (1992) to help students think through the elements of an argumentative writing. It can be used both as a reading and writing guide to help students develop thinking skills and construct a meaningful and coherent text representation (Unrau 1992). An earlier study by Unrau (1989) revealed TASK’s

effectiveness as a strategy for reading arguments. High school students who used TASK exhibited significant gains in their ability to read and evaluate arguments as measured by the Ennis-Weir Critical Thinking Essay Test, while significant improvements in writing arguments as measured by pre- to post-gain scores also occurred. Table 5.5 shows in greater detail the TASK strategy, as well as the corresponding message labels used to tag students' contributions.

During the entire online discussion, the teacher would scaffold the students' thinking by posing questions and comments based on the TASK strategy. Table 5.6 show some actual examples how the teacher guided the students' thinking through her feedback.

5.3.2 Procedure

The blended learning argumentative writing project took place in a government funded co-educational secondary school in Singapore. The entire project, which was based on a one-group pre-test and post-test design, extended over a period of 6 weeks. It utilized a set of pre- and post-test in the form of writing argumentative essay administered to the participants to gauge if there was a difference in their ability to write quality argumentative essays after the blended learning approach was completed.

A total of 40 grade nine students were invited to participate in the study. However, only 17 students (10 boys and 7 girls) between the ages of 14 and 15, together with their English teacher, eventually signed up voluntarily. A pre-test was conducted prior to the commencement of the project. The 17 students were then briefed on the study and its objectives. Students were also briefed on the assessment rubric for argumentative writing (see Table 5.4), learned the genre of an argumentative essay explicitly during face-to-face tutorials in a classroom, and were introduced to the TASK strategy to help them think through the key components of an argumentative essay. They were also shown samples of well-written and poorly-written argumentative essays, followed by a hands-on session to familiarise the students with the asynchronous online discussion forum. The expectation of the online discussion protocol, notably the use of proper English words and terms, was also explained and communicated to the students.

The participants and the teacher participated in the online discussion for 2 weeks. The online discussion started with the teacher posting the topic in the discussion platform followed by the students participating in the discussion of the topic with the guide of the TASK strategy. Students were required to log on to the discussion forum and contribute for at least 30 min after school every day. The students were also requested to tag their posted statements in the online discussion to explicitly identify or classify their messages with the following tags: "claim", "opposing claim", "support", "evidence", "rebuttal", or "conclusion". During the online discussion sessions, the teacher guided the students' thinking by posing questions and comments based on the TASK strategy. However, in the second week of discussion, the teacher gradually faded her level of guidance. After the completion of the online discussion, the post-test was administered.

Table 5.5 TASK strategy (adapted from Koh 2004)

Features of critical thinking	Key component of argumentative writing	TASK strategy	Message label
Forming an opinion about an issue	Stating stance and providing evidence for one's thesis	Stage 1: What is the topic being judged? Stage 2: What basic claim is made about the topic? Stage 4: What supports the basic claim and the antithetical claim?	Students tag their posts according to "claim", "opposing claim", "support", or "evidence"
Exploring alternatives	Imagining antithesis and their support/evidence	Stage 3: Antithesis—if a reader is against the writer's claim about the topic, what would be his basic stance? Stage 4: What supports the basic claim and the antithetical claim?	Students tag their posts according to "claim", "opposing claim", "support", or "evidence"
Engaging in reflective scepticism and identifying and challenging assumptions	Evaluating points of view, supports, evidence, and questionable influences Providing rebuttals	Stage 5: Are there any unclear words in the piece? Stage 6: Evaluate the supports for both thesis and antithesis. Identify any questionable inferences, irrelevant supports, fallacies, or other weaknesses in arguments Stage 7: Evaluate the assumptions or ideological influences in the basic thesis or its supports. Do any of them shake the validity of the claim?	Students tag their posts according to "support", "evidence", "rebuttal", or "conclusion"
Inference	Support conclusion using both thesis and antithesis	Stage 8: State the full thesis in the following form: "Although (the antithesis or one of its strongest supports)..., (the basic claim)... because C (a major cause for belief in the basic claim)..."	Students contribute a final conclusion using the sentence structure in Stage 8 as a guide

Table 5.6 Examples of teacher's guiding students' thinking (adapted from Koh 2004)

Stages in TASK strategy	Abstracts from teacher's postings
Stage 1	Quote from teacher's posting:
• What is the topic being judged?	<i>Topic:</i>
Stages 2, 3, 4	<i>"Scholarship holders should be free to choose whether to serve the bond." Discuss</i>
• What basic claim (B) is made about the topic?	<i>Please make your stand clear and let us know of the supporting evidence if you have any.</i>
• Antithesis (A): What would a reader most likely be for or against if s/he were opposed to the writer's claim about the topic?	<i>Explore as many points of view as possible. Also, do evaluate and reflect on your peers' points of views and their evidence</i>
• What supports the basic claim and the antithetical claim?	<i>Do remember to "tag" your contributions with "claim", "opposing claim", "support", "evidence", "rebuttal" or "conclusion". Let's have a fruitful discussion</i>
Stage 3	Quote from teacher's posting:
• Antithesis (A): What would a reader most likely be for or against if she/he was opposed to the writer's claim about the topic?	<i>So far, most of you seemed to be in favour of company's benefit. Anybody supporting the stand? What if you are caught in this situation? What if while pursuing your U education, you are offered a rare, prestigious opportunity to work under a world-famous professor. You may be even included in a project worthy of the nomination of a Nobel prize. However, you need to stay on beyond your formal study years and therefore into the bond period. You appeal to the company to delay your years of bond but they refused. How?</i>
Stage 5	Quote from teacher's posting:
• Are any unclear, complex, or "loaded" words in the piece? (If so, identify and clarify them.)	<i>Actually, what's the definition of scholarship? Who really deserves to be awarded a scholarship? What's the criteria? The 'bright'/ smart people or must they both be 'bright' and financially unable?</i>
Stage 6	Quote from student's posting:
• Evaluate supports for both thesis and antithesis. Identify any questionable inferences, irrelevant supports, fallacies, or other weaknesses in arguments	<i>A scholarship is meant to help financially disable people, if some scholar apply it merely for the sake of prestige or honour then it is not right. The opportunity to win a scholarship should be left to someone else</i>
	Quote from teacher's posting:
	<i>Is a scholarship meant to help 'financially-disabled' people? Then why are the top 20 % of the pupils in each school awarded the ESSS scholarship regardless of their home financial status? Can anyone provide a valid definition of 'scholarship'?</i>

(continued)

Table 5.6 (continued)

Stages in TASK strategy	Abstracts from teacher's postings
Stage 7	Quote from student's posting: <i>Compensation is only to prevent the scholar from breaking the bond. It is just like laws that prevent others from breaking it or else they will have either fines or jail sentences. What if the compensation is so harsh that you will not be able to pay for it like \$10 million? Will you break bond for the sake of wanting to try out many jobs when you are young? The answer is surely 'No'</i>
• If you recognise any assumptions, values, or ideological influences in the basic thesis or its supports, what are they? Do any of them shake the validity of the claim?	Quote from teacher's posting: <i>I agree with you to a certain extent. It is not just a monetary contract but also a moral obligation. But not everyone will think like us. Some will just see the scholarship as solely a monetary contract and they are probably not wrong in saying that</i>
Stage 8	Quote from teacher's posting: <i>We are coming to an end of the discussion. To round off, I would like every one of you to browse through our discussions and put in your own final conclusion</i> <i>The following is a suggested form:</i> <i>"Although A (the opposite claim/one of its strongest supports), B (your claim) because C (a major cause for belief in your claim)"</i> <i>For example:</i> Basic claim is "It's time to explore the potential of a universal national service and to adopt such a system" Support for claim: "A universal national service would help meet vital needs such as tutors, health workers, day care, etc." Opposite claim/support is "Cost of program would be enormous" Final conclusion: "Although the cost of developing a universal national service would be great, the time has come to explore its potential and to adopt such a system because it would help us meet many vital needs"
• State the full thesis in the following form: "Although A (the antithesis or one of its strongest supports), B (the basic claim) because C (a major cause for belief in the basic claim)"	

5.3.3 Results

A Wilcoxon Matched-Ranks test (two-tailed) was used to analyse the total scores for the pre- and post-argumentative essay tests. The Wilcoxon Matched-Ranks test, rather than a paired-sample *t*-test was used because the sample size in the

blended learning project was small, involving only 17 students. The two-tailed test was preferred over the one-tailed test as the post-test scores could be better or worse than the pre-test scores.

Results suggested that all students showed an improvement in the overall score of their post-test essays as compared to their pre-test essays (Koh 2004). More specifically, the Wilcoxon Matched-Rank test showed a significant improvement of the students' performance in their overall score in the post-test essays ($p = 0.003$ with the ranks for increases totalling 17 and the ranks for decreases totalling 0, two-tailed). The mean of the overall score improved from 9.5 to 14.4 out of a possible maximum score of 20. Further analysis of the data showed that the greatest gains were in the components in which the students were the weakest in the pre-test. For example, the pre-test results revealed that the students were especially weak at providing rebuttals and supporting their conclusion using both thesis and anti-thesis, with the average sub-scores of 1.5 for both components. After the completion of the blended learning approach, there was a gain of 1.3 in the average sub-scores from 1.5 to 2.8 for both components.

5.3.4 Conclusion

The results, on the whole, suggested positive effects of using the blended learning approach as shown in Fig. 5.1. Students' ability to write better argumentative essays had improved significantly. Students also expressed positive feelings towards the use of this blended learning approach, including the asynchronous online discussion forum. The online discussion session had specifically helped students to gain access to a wider range of views and also learn from their peers how to engage in rebuttals and to substantiate their own claims. What are some important lessons that we learned from this project?

First, it is very important to provide students with a suitable scaffold to help them write better. Although there are many different scaffolds available in the literature, the TASK strategy had been specifically tested in this project and found helpful because it specifically pushes students to think critically.

Second, it is helpful to show students real samples of well-written and poorly-written argumentative essays. The well-written essays included all the criteria of a quality argumentative writing such as making assertions with explicit evidence, stating the major alternative viewpoints with explicit evidence, evaluating the major viewpoints, providing salient rebuttals, and the ability to defend the conclusion with supports from both thesis and antithesis. The poorly-written essays, on the other hand, did not include all the criteria. Using examples and non-examples helps the students to fully understand the concept of argumentative writing, including all its rules and important attributes.

Third, the labelling of the students' online contributions according to the various argumentative labels helped create an awareness of the nature of their contributions. This specifically helped students to focus their thinking, and force them to reflect before posting their statements. This probably helped improve the students' writing skills on the more difficult tasks such as the provision of rebuttals.

However, teachers need to make sure that students understand clearly the meaning of each message label used. There were some students in the project who were confused about the meaning of the tag “conclusion”. Teachers should explain the meaning of inference, as well as provide students with examples of message posts that fall under each message label category. Providing students with examples will give them a better picture of what the message labels actually mean.

5.4 Oral Proficiency

In addition to writing argumentations well, the ability to speak proficiently is another important aspect of good communication. However, there are several barriers that hinder the acquisition of oral competence; one of which is inadequate time and opportunity for students to practise oral communication in the regular classroom (Yang et al. 2012). This is due to the tendency for a small number of students, who possess superior English oral competence, to dominate spoken activities in the classrooms, resulting in a lack of chance for other students to speak (Fitze 2006).

The use of computer-mediated communication (CMC) tools could help overcome the aforementioned problem. CMC tools may be grouped into two major categories: asynchronous tools such as e-mail and the online discussion forum, and synchronous tools such as text-based chats and audio conferencing. Asynchronous tools do not require participants to log on to the platform at the same time to communicate; the communication is not real-time. Synchronous tools, on the other hand, require participants to access the platform simultaneously in order to communicate. Therefore, the use of synchronous tools, in particular audio conferencing, could be a useful tool to enhance students' oral proficiency because it provides a mode similar to face-to-face oral communication which occurs real-time (Yang et al. 2012), and it emphasizes the use of voice rather than text as the main mode of communication.

In the following section, we describe a study by Yang et al. (2012) that empirically tested a voice-over-instant-messaging (VOIM) tool for improving students' English oral proficiency. Specifically, a VOIM tool allows a user to make calls using an instant messaging software. Popular examples of VOIM tools include Skype and Yahoo Messenger. VOIM tools offer synchronous group interaction along with the option of giving private feedback through the instant messaging function (Yang et al. 2012). The study by Yang et al. (2012) is highlighted as a blended learning example in this chapter because it used a relatively emerging tool (VOIM), it employed a pre- and post-test experimental research design that was based on measured students' oral skills scores, and it provided a clear description of the project procedure including the facilitation methods and online activities used.

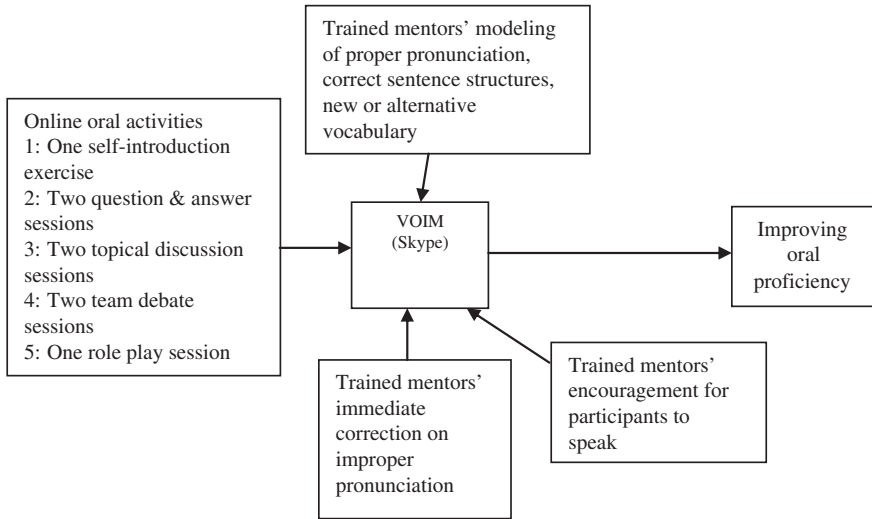


Fig. 5.2 Blended learning approach used to improve students' oral proficiency

5.5 An Empirical Investigation II: Improving Oral Proficiency

The blended learning approach used in the VOIM study is illustrated in Fig. 5.2.

5.5.1 A Blended Learning Approach to Improve Undergraduate Students' Oral Proficiency

There were five specific types of online activities (Yang et al. 2012, p. 457):

- (a) Student self-introduction session where participants made a 2- to 3-min introduction of themselves, followed by taking turns to introduce one group member to other groups.
- (b) Question and answer session where participants discuss particular topics such as "Crime doesn't pay".
- (c) Topical discussion where participants spoke in turn about a given topic such as "Ideal boyfriend or girlfriend. Which characteristics is more important—personality or appearance?"
- (d) Team debates where two sides, the pro and con, stated their opinions in turn.

- (e) Role play where participants took on a specific role based on the assigned task such as playing the role of a tour guide to design and introduce different trip itineraries.

Trained mentors (English teaching assistants) facilitated the online activities. Specifically, three main forms of facilitation strategies were employed:

- (a) Providing immediate feedback by correcting students' wrong or inaccurate pronunciation.
- (b) Modeling proper pronunciation, correct sentence structures, as well as new or alternative vocabulary.
- (c) Providing encouragement to students to speak.

5.5.2 Procedure

Ninety students who enrolled in freshman English courses at a Taiwanese university took part in the oral proficiency project (Yang et al. 2012). These 90 students were in three intact classes, with 30 students in each class. These classes were assigned to the following three groups:

- (a) Treatment I—peer online discussion without the facilitation of a trained mentor and without the five types of online activities. In this group, students were encouraged to use Skype to practise their oral communication after class.
- (b) Treatment II—peer online discussion with the use of the five types of online activities involving one self-introduction exercise, two question-and-answer sessions, two topical discussion sessions, two team debate sessions, and one role play exercise. Students in this group were not given the online facilitation of a trained mentor during the discussion. However, the mentors listened to the recordings of the discussions after the completion of each task and provided written feedback to the participants.
- (c) Treatment III—peer online discussion with the use of the five types of online activities involving one self-introduction exercise, two question-and-answer sessions, two topical discussion sessions, two team debate sessions, and one role play exercise. In addition, Students in this group were provided with the facilitation of a trained mentor *during* the discussion, in addition to written mentor feedback after each discussion had ended.

Prior to the commencement of the project, students in all treatment groups were trained how to use Skype and PowerGramo, a software used to record the online discussions. The students also completed an oral proficiency pre-test which was based on 5-min recorded interviews consisting of five open-ended questions: “What are your interests?”, “What do you usually do on weekends?” and “What did you do during last summer vacation?” The recordings were evaluated by two trained mentors, with the average of the two scores being used for the oral proficiency scores. The oral proficiency scores were determined in accordance with the

Table 5.7 Sample criteria for AOPAS subscales (Yang et al. 2012, p. 454)

Subscale	Operationalization criteria
Pronunciation	<ul style="list-style-type: none"> • Use of correct pronunciation and intonation so that the words spoken can be clearly understood by the listener without any confusion of meaning • Words are pronounced without a strong influence from the native language
Fluency	<ul style="list-style-type: none"> • Use of complete sentences without unnatural pauses and at a suitable pace • Fluent speakers offer information freely and are open and responsive to conversation partners
Comprehension	<ul style="list-style-type: none"> • Clear understanding of what is spoken • Use of communication strategies (such as paraphrasing or asking questions) to sustain conversation when responding to unfamiliar content
Vocabulary	<ul style="list-style-type: none"> • Oral proficiency is also characterized by a rich vocabulary • Terms are used accurately in the appropriate context and are not influenced by direct translation from the native language
Accuracy/ structure	<ul style="list-style-type: none"> • Use of complete sentences and appropriate grammar (e.g., tenses and verb conjugations) to accurately convey the intended meaning • Higher levels of oral proficiency require the creation of more complex sentences

Analytic Oral Proficiency Assessment Scale (AOPAS, see Table 5.7), which was adapted from Kost (2004).

5.5.3 Results

The students' scores for oral proficiency were analyzed using ANCOVA to determine any differences among the three treatment groups. Results revealed that students' post-test oral scores in Treatment III ($M = 65.07$, $SD = 7.52$) were significantly higher than the scores of students in Treatment II ($M = 59.67$, $SD = 7.53$, $p = 0.00$), and Treatment I ($M = 59.80$, $SD = 9.32$, $p = 0.00$). No significant difference was found between Treatments I and II ($p = 0.90$).

5.5.4 Conclusion

The main conclusion we can draw from the VOIM oral proficiency project (Yang et al. 2012) is the importance of providing online facilitation by trained mentors to students *during* the course of the discussion. Having students participate in online activities such as the self-introduction, question-and-answer, topical discussion, debate, and role play tasks, without mentor facilitation, is insufficient to help students improve their oral competency. Nor is it sufficient for the mentors to give their

feedback only after the online activities have ended because such feedback is not immediate; students cannot possibly remember what specific mistakes they make.

There are actually many responsibilities that a facilitator may take on in an online discussion. Hew and Cheung (2012) summarized the different online facilitation responsibilities into four major categories: organizational, social, intellectual, and technical. The findings of the VOIM project suggest that of these four categories of facilitator responsibilities, the most important ones are those related to organizational and intellectual. More specifically, online facilitators need to encourage students to participate when it is lagging (organizational) (e.g., prompting them to speak out), and to immediately correct pronunciation errors, and model correct sentence structures or introduce new vocabularies (intellectual). Doing both types of facilitation not only motivates students to practise speaking more often, but also helps them learn new words to improve their oral proficiency.

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Chapter 6

Enhancing Students' Learning of Factual Knowledge

Abstract Factual knowledge is one of the most common types of knowledge that students are expected to learn. Factual knowledge may be described as the basic information about a particular subject or discipline that students must be acquainted with. This may include the terminology and the specific details or elements of a subject (Anderson and Krathwohl in *A taxonomy for learning, teaching and assessing*. Longman, New York, 2001). Acquiring factual knowledge is important to students because it serves as basic building blocks to understand the larger relationships among important information that define a subject. This chapter reports two recent empirical studies that examined the effect of using blended learning approaches on the learning of a particular factual knowledge—English vocabulary. The first study (Jung and Lee in *Multimedia Assist Lang Learn* 16(4):67–96, 2013) employed a one-group pre- and post-test design to investigate the impact of a blended learning approach that utilized Internet video clips on 21 Korean students' vocabulary development. Overall, students showed a significant increase in test scores. The second study (Jia et al. *Comput Educ*, 58:63–76, 2012) employed a quasi-experiment design to study the effects of a blended learning approach utilizing individualized vocabulary review and assessment in Moodle on 47 Chinese students' vocabulary knowledge. The results from an independent *t*-test revealed that students who used the blended learning approach performed significantly better in vocabulary tests compared to the control class which did not use the approach. We summarize the main lessons learned by cross comparing the key pedagogical and instructional strategies used in the two studies, and present these in the Conclusion section.

Keywords English language · Vocabulary · Factual knowledge · Blended learning · Blog · Video · Moodle

6.1 Introduction

Knowledge has been widely recognized as a critical resource regardless of economic sector or organization type (Davenport and Prusak 1998). Previously scholars have attempted to classify the types of knowledge. Some, for example, have commonly differentiated between tacit and explicit knowledge; the former is the implicit, semi-conscious and unconscious knowledge held in people's head (Leonard and Sensiper 1998), while the latter is knowledge that is expressed (Biggam 2001). Anderson and Krathwohl (2001), on the other hand, proposed a knowledge taxonomy that consists of four knowledge types: factual knowledge, conceptual knowledge, procedural knowledge, and metacognitive knowledge. Factual knowledge refers to the basic information that students must know to be acquainted with a discipline or solve problems with it; for example knowledge of terminology or specific details. Conceptual knowledge refers to the patterns or relationships among the basic elements (factual knowledge) which enable them to function together such as knowledge of classifications and principles. Procedural knowledge refers to methods or algorithms of doing certain tasks such as knowledge of installing a wireless Internet connection. Finally, metacognition knowledge refers to an awareness of cognition in general, as well as awareness of one's own thinking (Tables 6.1, 6.2).

In this chapter, we adopt Anderson and Krathwohl's (2001) conceptualization of knowledge types, rather than the tacit-explicit knowledge categorization because the former merely describes that knowledge can either be expressed or not (Biggam 2001). Specifically, we focus on factual knowledge—the learning of English vocabulary. Learning vocabulary well is essential to master a language. A good knowledge of vocabulary helps students comprehend a particular subject; if students are not familiar with most words they encounter, they will not be able to understand what they read (Vacca and Vacca 2005).

But how does vocabulary learning occur? According to Hatch and Brown (1995), vocabulary learning may be grouped into two broad categories: intentional vocabulary learning, and incidental vocabulary learning. The former refers to vocabulary

Table 6.1 Summary of blended learning I (Jung and Lee 2013) parameters

Parameter	Description
Learning goal	To improve students' vocabulary acquisition
Type of content	Cognitive process—remember, understand
Type of pedagogical approach	Dialogic, transmissive
Specific instructional activity	Teacher feedback; offline activities: (a) short answers, (b) multiple-choice questions, (c) true/false statements, (d) check the word list, (e) guess the meaning; online activities: (a) fill gaps while watching clips, (b) fill out summary, (c) watch clips with script, (d) match a definition or synonym, (e) write summary
Technological tools and resources	Internet video clips
Overall blended learning model	See Fig. 6.1

Table 6.2 Summary of blended learning II (Jia et al. 2012) parameters

Parameter	Description
Learning goal	To improve students' vocabulary acquisition
Type of content	Cognitive process—remember, understand
Type of pedagogical approach	Transmissive
Specific instructional activity	Individualized vocabulary review and assessment with automated prompt feedback
Technological tools and resources	Moodle course management system
Overall blended learning model	See Fig. 6.4

learning that is deliberately planned such as setting a number of specific words to be learned, texts to be read, and exercises to be completed. Incidental vocabulary learning, on the other hand, refers to learning words as a by-product of reading without any willful intention or prior deliberate arrangement by the teacher.

We review and present two previous empirical studies that examined the effect of using blended learning approaches on students' ability to remember the meaning of English vocabulary. All two studies reviewed and presented in this chapter were conducted in blended learning settings where the emphasis was on intentional learning. The first study (Jung and Lee 2013) employed a one-group pre- and post-test design to investigate the impact of a blended learning approach that utilized Internet video clips on 21 Korean students' vocabulary development. The second study (Jia et al. 2012) employed a quasi-experiment design to study the effects of a blended learning approach utilizing individualized vocabulary review and assessment in Moodle on 47 Chinese students' vocabulary knowledge. We extract the types of pedagogical approaches and specific instructional activities used, as well as construct the blended learning models from the two studies. We then summarize the main lessons learned by conducting a cross-comparison of the findings, and present these in the Conclusion section.

6.2 An Empirical Investigation: Improving Student Vocabulary Learning I

The first study by Jung and Lee (2013) utilized the use of Internet video clips, offline sessions (giving short answers, answering multiple choice questions and true/false statements, checking word list, guessing the meaning), and online sessions (filling the gaps while watching video clips, filling out the summary, watching video clips with script, matching a definition/synonym, and writing a summary), as shown in Fig. 6.1. These various activities or exercises may be grouped into three distinct categories—selective attention, recognition, and construction.

Selective attention exercises attempt to draw the student's attention to the target word. An example of such exercise is the *check word list* activity during the 1st viewing when the students are required to look up the particular word upon hearing it spoken in the video clip. Selection attention exercises are often used as an

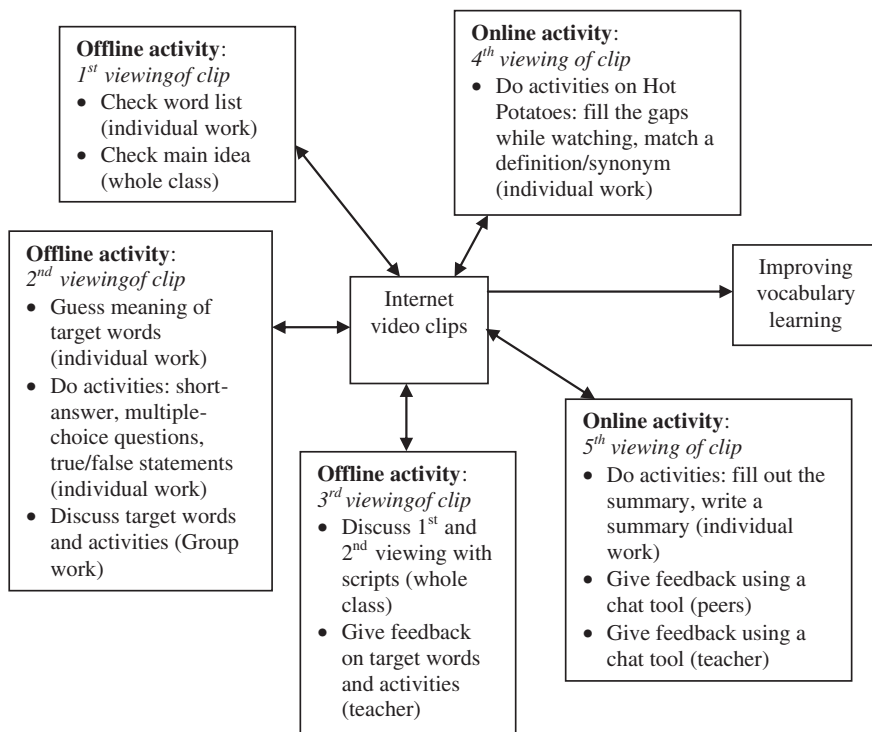


Fig. 6.1 Blended learning approach used to improve students' vocabulary learning (adapted from Jung and Lee 2013)

advance organizer to help students notice the target word (Paribakht and Wesche 1997). In recognition exercises, students are provided all the necessary information and they are only required to recognize the target words (Paribakht and Wesche 1997). Examples of such exercises include answering the multiple-choice questions during the 2nd viewing activity, and matching the target word with a definition or synonym during the 4th viewing activity. In construction exercises, students are required to create sentences using the target words. An example of this is the write-a-summary task during the 5th viewing activity.

6.2.1 Procedure

The blended learning approach took place in an intact class of 21 students at a university in Seoul, Korea. The 12-week long project focused on intentional vocabulary learning with recall of words as its main objective. We extract and summarize the main procedure of the project in Table 6.3.

The students' pre-test and post-test target words scores were measured using a modified version of the Vocabulary Knowledge Scale (VKS). The original VKS

Table 6.3 Procedure of the internet video clip blended learning approach (summarized from Jung and Lee 2013)

Week	Activity	Session and mode
Week 1	<ul style="list-style-type: none"> Students completed a pre-test. The test consisted of 70 target words (see weeks 2–8 of this table), and 10 non-words, devised by Meara (1992), as distracters (bance, buttle, degate, descript, hubbard, lauder, overend, snell, stace, wray). Students were also given an orientation on the blended learning approach 	Offline, individual
Week 2	<p>For the next 7 weeks (week 2–8), each activity took place for an hour. The Internet video clips were taken from <i>Modern Family</i></p> <ul style="list-style-type: none"> Students first viewed a video episode <i>Pilot</i> (1st viewing) and checked the word list on hearing the target words from the clip. They also tried to understand the main idea of the clip. The target words consisted of the following: adopt, surrogate, orphanage, adorable, race, float, judgmental, announcement, uptight, insult Teacher then discussed the main idea in the video clip <i>Pilot</i> Next, students guessed the meaning of the target words in the <i>Pilot</i> episode (2nd viewing) and completed activities such as short answers, multiple-choice questions, and true/false statements Students then shared their ideas on the meaning of target words in groups of 4 and discussed answers to the individual activities Next, teacher replayed the <i>Pilot</i> episode scene by scene (3rd viewing) and discussed the meaning of target words and answers of activities Students then re-watched the <i>Pilot</i> episode (4th viewing) and completed activities on Hot Potatoes: fill the gaps while watching, match a definition/synonym exercises. Hot potatoes is a freeware that allows users to create interactive multiple-choice, short-answer, jumbled-sentence, crossword, matching/ordering and gap-fill exercises for the World Wide Web Students did a final viewing of the <i>Pilot</i> episode (5th viewing) and completed activities such as fill out the summary, write a summary exercises Provision of peer and teacher feedback using a chat program 	Offline, individual work
Week 3	<ul style="list-style-type: none"> Students viewed <i>The Incident</i> clip five times. Students completed the same activities for each viewing session as in week 2. The only difference was different target words were used in week 3: make a toast, exhausted, prank, revenge, errand, moustache, apologize, struggle, bride, groom 	<p>Offline, whole class discussion</p> <p>Offline, individual work</p> <p>Offline, group work</p> <p>Offline, whole class discussion</p> <p>Online, individual work</p> <p>Online, individual work</p> <p>Online, group and teacher</p> <p>– Sessions and modes were similar to those in week 2 according to the various activities involved</p>

(continued)

Table 6.3 (continued)

Week	Activity	Session and mode
Week 4	<ul style="list-style-type: none"> Students viewed the <i>Coal Digger</i> clip five times. Students completed the same activities for each viewing session as in week 2. The target words were used in week 4: name-calling, shove, mature, huddle up, patch up, goal digger, protective, loyal, willingness, even 	<ul style="list-style-type: none"> Sessions and modes were similar to those in week 2 according to the various activities involved
Week 5	<ul style="list-style-type: none"> Students viewed the <i>Great Expectations</i> clip five times. Students completed the same activities for each viewing session as in week 2. The target words were used in week 5: related, commitment, torture, deaf, walking distance, deserve, light bulb, theory, slumber party, tradition 	<ul style="list-style-type: none"> Sessions and modes were similar to those in week 2 according to the various activities involved
Week 6	<ul style="list-style-type: none"> Students viewed <i>Under the Halls</i> clip five times. Students completed the same activities for each viewing session as in week 2. The target words were used in week 6: chimney, ornament, couch, confess, match, admit, come forward, sacrifice, be grounded, blame 	<ul style="list-style-type: none"> Sessions and modes were similar to those in week 2 according to the various activities involved
Week 7	<ul style="list-style-type: none"> Students viewed the <i>Up all night</i> clip five times. Students completed the same activities for each viewing session as in week 2. The target words were used in week 7: reputation, kidney, gravel, swear, deport, convulse, agony, throw on, suck, pin number 	<ul style="list-style-type: none"> Sessions and modes were similar to those in week 2 according to the various activities involved
Week 8	<ul style="list-style-type: none"> Students viewed the <i>Family portrait</i> clip five times. Students completed the same activities for each viewing session as in week 2. The target words were used in week 8: portrait, closet, stand out, cooperate, obsess, freak out, awkward, pimple, fireplace, flaw 	<ul style="list-style-type: none"> Sessions and modes were similar to those in week 2 according to the various activities involved
Week 10	<ul style="list-style-type: none"> Students completed a post-test. The items were similar to those in the pre-test 	<ul style="list-style-type: none"> Offline, individual

Table 6.4 Original VKS elicitation scale (adapted from Paribakht and Wesche 1997)

	Category				
Target word	I—I don't remember having seen this word before	II—I have seen this word before, but I don't know what it means	III—I have seen this word before, and I <i>think</i> it means _____ (write a synonym or translation)	IV—I <i>know</i> this word. It means _____ (write a synonym or translation)	V—I can use this word in a sentence: _____ (write a sentence. If you do this section, please also do section IV)
...					
...					

was developed by Paribakht and Wesche (1997) and it measures learner productive vocabulary knowledge. The target words appear vertically in a column and five categories of vocabulary knowledge are listed horizontally at the top of the table (see Table 6.4). The participants are required to indicate their knowledge of the target words in the appropriate cell performance tests.

To score the original VKS, a participant will receive 1 point if he chooses category I, and 2 points by selecting category II. A score of 3 will be given if a correct synonym or translation is provided for either category III or IV. A score of 4 is awarded for category V if the word is used with semantic appropriateness in a sentence. A score of 3 is also given for category V if a correct synonym or translation is provided for the target word in a sentence. A score of 5 is awarded when the target word is used correctly, both semantically and grammatically in a sentence. However, if a participant provides an incorrect definition or synonym for categories III or IV, or writes a sentence with an incorrect meaning for category V, he will receive only 2 points. Figure 6.2 shows the scoring procedure of the original VKS.

The study by Jung and Lee (2013) used a modified version of VKS by adding two scoring categories and revising some of the scale ratings. Figure 6.3 shows the modified VKS used.

6.2.2 Results

A paired-samples *t*-test was conducted to determine the potential vocabulary learning gain. There was a significant difference in test scores between pre-intervention ($M = 158.62$, $SD = 21.13$) and post-intervention ($M = 268.86$, $SD = 39.73$), $t(20) = -15.652$, $p = 0.000$. This suggests that the blended learning approach as depicted in Fig. 6.1 had a positive impact on the students' vocabulary learning. In addition, concerning the offline activities, questionnaire data revealed that students preferred guessing the meaning of the words activity most, followed by short answers. Students expressed equal preference for both checking the word list and true/false statements activities, while multiple choice questions was ranked fourth. With regard to the

<i>Self-Report Categories</i>	<i>Possible Scores</i>	<i>Meaning of Scores</i>
I →	1	The word is not familiar at all.
II →	2	The word is familiar, but its meaning is not known.
III →	3	A correct synonym or translation is given.
IV →	4	The word is used with semantic appropriateness in a sentence.
V →	5	The word is used with semantic appropriateness and grammatical accuracy in a sentence.

Fig. 6.2 Original VKS scoring procedure (Paribakht and Wesche 1997, p. 181)

Self-report Categories	Possible scores	Meaning of scores
	-1	Students recognizes a non-word
	0	Students does not recognize a non-word
I →	1	The word is not familiar at all.
II →	2	The word is familiar but its meaning is not known.
III →	3	A vague or partial meaning is given.
IV →	4	A correct synonym or translation is given
V →	5	The word is used with semantic appropriateness in a sentence.

Fig. 6.3 Modified VKS and its scoring procedure (Jung and Lee 2013, p. 75)

online activities, the most preferred online activity among the students was filling out the summary, followed by filling the gaps while watching video clips, watching video clips with scripts, writing a summary, and matching a definition or synonym.

6.3 An Empirical Investigation: Improving Student Vocabulary Learning II

The second study (Jia et al. 2012) employed a blended learning approach utilizing individualized vocabulary review and assessment in Moodle on 47 Chinese students' vocabulary knowledge. Specifically, the blended learning approach focused

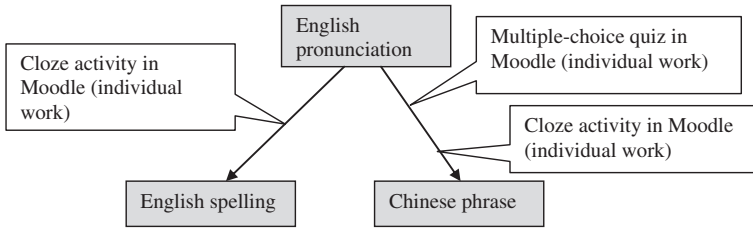


Fig. 6.4 Blended learning approach used to improve students' vocabulary learning (adapted from Jia et al. 2012)

on mastering the associations among English spelling, English pronunciation, and Chinese phrase, as illustrated in Fig. 6.4. The first relationship is the link between English spelling and its Chinese phrase. The second is the relationship between English pronunciation and English spelling, while the third is the link between English pronunciation and Chinese phrase.

The main instructional strategy consisted of individualized vocabulary review and assessment with automated prompt feedback in Moodle. Specifically, two types of questions were formulated within Moodle: multiple-choice question and the cloze. The multiple-choice question used an MP3 sound file that pronounced a certain English word or phrase. Students were required to select one correct Chinese phrase from four alternative items. The cloze also used MP3 sound files to generate the pronunciations of English words or phrases, and the students had to spell out the word or phrase, as well as write its correct Chinese phrase. In addition, all the errors that each student made during the multiple-choice and cloze activities were recorded so that every student had his or her own error set. The purpose of the error set was to enable students to review the words that they had incorrectly answered.

6.3.1 Procedure

Two classes of secondary school students in China were recruited for the study (Jia et al. 2012). The experiment or treatment class consisted of 47 students with ages between 13 and 15 years old participated in the blended learning approach, while the control class, consisting of 49 students, did not. Altogether there were 20 weeks in the experiment school, as well as the control school term. Each week consisted of 9 school hours for English lessons. The experiment class held one school hour among the nine school hours in the computer lab every week (except for the first two weeks of when school started). Each student worked individually on a computer using the Moodle-integrated blended learning approach (see Fig. 6.4).

There were a total of 14 English teaching lessons or units in the school term. Each unit contained certain English words or phrases to be learned, amounting to 398 required words and phrases for the entire term. For the experiment class, 398

cloze questions and 398 multiple-choice questions were generated for the students to use on Moodle. The control class, on the other hand, did not use the blended learning approach. They had their English lessons in a regular face-to-face classroom taught by a teacher.

6.3.2 Results

To determine if there was a difference in terms of vocabulary acquisition between the experiment and control classes, a vocabulary test was conducted. Results of an independent *t*-test revealed significant difference in test scores between the experiment group ($M = 92.09$, $SD = 12.93$) and control group ($M = 82.12$, $SD = 30.98$), $t(64.78) = 2.071$, $p = 0.042$. This suggests that the blended learning approach as depicted in Fig. 6.4 had a positive impact on the students' vocabulary learning.

6.4 Conclusion

The aforementioned two studies employed the use of blended learning to improve student vocabulary learning. So, what can we learn from these two blended learning approaches? A cross-comparison of the procedures suggests some interesting insights concerning the use of certain instructional strategies for learning vocabulary.

First, both blended learning approaches relied heavily on two types of cognitive processes—recognition and recall. The former process is usually activated when a participant is presented with a question such as multiple-choice or matching items where the questions, distracters, and correct answers are all provided, and he or she must recognize and select the correct answer (Clariana and Lee 2001). Recall, on the other hand, refers to a participant's ability to retrieve a correct answer from memory when he or she is presented with a cue or question such as fill-in-the-blank activities, fill-up-the summary (Clariana and Lee 2001). McDaniel and Mason (1985) theorized that recall-related activities elaborate existing memory traces, while recognition activities merely strengthen existing traces. This hypothesis was tested by Glover (1989) who found that recall activities were more instructionally effective than recognition tasks for both recognition and recall learning outcomes.

Second, giving continuous feedback is often a key strategy in helping students remember what they have learned. Students desire and value the teacher's feedback on the accuracy of the meaning of the words. The two blended learning approaches reported in this chapter provided continuous feedback through the teacher and peers (Jung and Lee 2013), and automated graded quizzes (Jia et al. 2012). However, continuous feedback by itself may not be sufficient. Students also desire prompt feedback. Of the two studies reported in this chapter, the use

of automated quizzes in Moodle (Jia et al. 2012) provided more instantaneous feedback compared to the teacher feedback in Jung and Lee (2013), as answers were given just before the next offline session in the latter study. Further analyses of students' data revealed that students prefer more immediate feedback on the online activities such as filling out the summary, and write a summary.

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Chapter 7

Future Research Directions for Blended Learning Research: A Programmatic Construct

Abstract In this chapter, we develop a programmatic research construct for blended learning based on an earlier framework proposed by Meyen et al. (*J Special Educ Technol*, 17(3):37–46, 2002). The use of this programmatic research construct will not only inform researchers of future possible research related to studying learner outcomes, but also expand the scope of blended learning research to other dimensions that are hitherto not yet investigated. This research construct consists of three categories of variables—-independent variables, in situ variables, and dependent variables. Independent variables include variables such as the level or type of interaction, pedagogical approach, media attributes, and human computer interface design elements. In situ variables may be considered variables that are situated in the existing blended learning environment. They may include variables such as learner attributes, instructor attributes, learning environments, nature of content, and technology infrastructure. Dependent variables are the various outcomes that a researcher may measure in an experiment. They include variables such as learner outcomes, policy implications, and economic implications. In this final chapter, we will describe each of these variables and then propose several possible research questions to illustrate how the programmatic research construct for blended learning could be utilized in practice.

Keywords Blended learning • Future research • Research construct

7.1 A Programmatic Research Construct for Blended Learning

The programmatic research construct for blended learning (see Fig. 7.1) was adapted from an earlier framework that was proposed by Meyen et al. (2002). The research construct consists of three key variables—dependent or outcome variables, in situ variables, and independent variables.

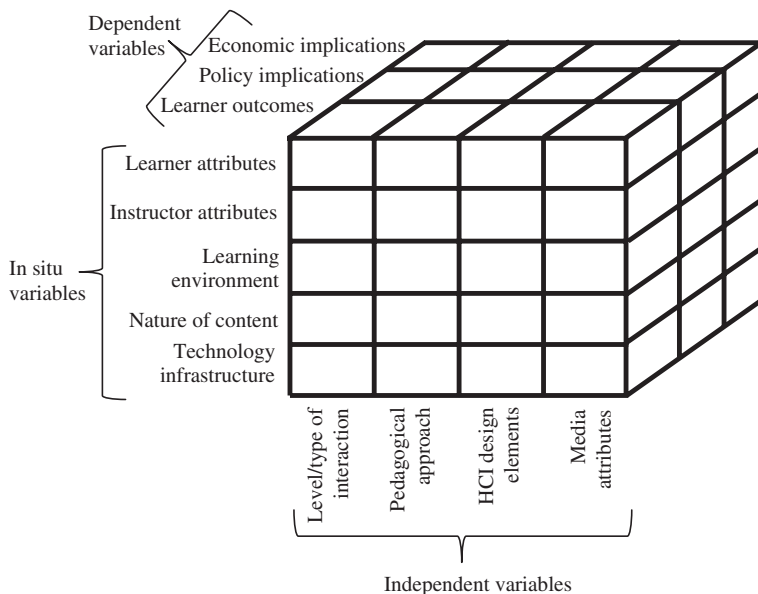


Fig. 7.1 A programmatic research construct for blended learning research (adapted from Meyen et al. 2002)

7.1.1 Dependent Variables

Dependent variables are variables associated with the consequences of implementing a blended learning model that can be assessed and measured. They may include variables such as economic implications, policy implications, and learner outcomes (Meyen et al. 2002). Economic-related variables focus on all economic elements such as the amount of time needed, cost of equipment, human resource needs to develop and implement a blended learning course. Policy implications involve measures of how the implementation of blended learning may affect an institution’s policy particularly related to three key areas: management and organizational policy, faculty policy, and student policy (Wallace and Young 2010). Table 7.1 identifies some of the policy issues pertaining to each of these areas.

Learner outcomes are variables pertaining to the performance or learning of students as a result of blended learning. Learner outcomes may include measures of student affective and cognitive learning (Anderson and Krathwohl 2001; Krathwohl et al. 1973). For example, in this book, we have focused on the following learning outcomes—promoting students’ attitude change toward country (affective learning), helping students solve design problems (cognitive learning), improving students’ critical thinking in assessing sources of social studies information (cognitive learning), improving students’ argumentative writing and oral proficiencies (cognitive learning), and enhancing students’ learning of factual knowledge (cognitive learning).

Table 7.1 Possible policy issues related to blended learning development and implementation (Wallace and Young 2010)

Policy area	Issues
Management and organizational	• Determining the fit of blended learning within the stated goals and priorities of the institution, faculty, and department
	• Establishing approval processes and criteria regarding moving a course/program to blended delivery
	• Support for development and delivery of blended learning
	• Establishing appropriate ownership of intellectual property
Faculty	• Establishing criteria to assess parity/equivalency of blended courses
	• Establishing criteria to determine faculty workload for blended course development and teaching
Student	• Identifying and addressing access issues
	• Orienting and supporting students in using technology in blended courses

7.1.2 *In Situ Variables*

In situ variables may be considered variables that are situated in the existing blended learning environment. Meyen et al. (2002) originally proposed four in situ variables—learner attributes, learning environments, nature of content, and technology infrastructure. We have added a fifth variable—instructor attributes to our blended learning programmatic research construct.

Learner attributes include characteristics such as gender, age, socio-economic status, learner’s ability, and educational history (Meyen et al. 2002). They may also include the learner’s habits of mind, learning and personality styles. Learner’s habits of mind may be described as an individual’s natural disposition or tendency to employ one’s skills or knowledge in deciding what to do in any circumstance (Hew and Cheung 2011). Although an individual may have the necessary skills or knowledge to act, he or she may not be disposed to do so (Facione et al. 1997).

We define instructor attributes as the characteristics that an instructor possesses such as teaching experience and educational qualification. Instructor attributes may also include qualities that an instructor brings into the learning environment, including the instructor’s commitment to work, ability to encourage and appreciate diversity, ability to interact and communicate respect or motivate students, commitment to continuously improve teaching, and so on (Azer 2005).

Learning environments include the settings and natural environments in which teaching and learning occur (Meyen et al. 2002). Learning environments may include dimensions such as (a) space, which describes the physical and digital places that house the learning experience, (b) time, which describes the format of class scheduling, student grouping, and access to learning outside of school hours, and (c) tools, which describe the learning resources used by teachers and students (Community Review 2012–2013).

Nature of content refers to the body of information that pertains to a particular subject matter. Content may range from simple to complex, or low shelf-life that gets dated quickly to long shelf-life that stays more or less the same for longer periods of time (Omer 2011).

Technology infrastructure refers to the configuration, compatibility, as well as the adequacy of the tools such as software, hardware, and bandwidth within a learning environment (Meyen et al. 2002).

7.1.3 Independent Variables

Independent variables are variables that can be manipulated or varied by the researcher for blended learning research purposes. Independent variables may include variables such as the level or type of interaction, pedagogical approach, media attributes, and human computer interface design elements. The original framework by Meyen et al. (2002) consists of level or type of interaction, instructional design, learner interface, and instructional environments. We have retained the first variable (interaction level or type) in our blended learning programmatic research construct, and renamed learner interface to human computer interface design elements to give more specific focus on the human computer interaction aspect. We replace the variable of instructional design with pedagogical approach as we felt that the former is too broad a term. Finally, we replace instructional environments with media attributes because although the physical characteristics of the media are not causal factors (Clark 1983), they can enable or constrain particular pedagogical models.

Levels or types of interaction include the frequency and/or nature of the interaction between students and students, and students and instructors (Meyen et al. 2002). Examples of level of interaction include Gunawardena et al.'s (1997) level of discourse—phase I—sharing and comparing information (which includes observations, opinions, statements of agreement, and identifications of problems); phase II—discovering dissonance or inconsistency of ideas, concepts, or statements; phase III—negotiation of ideas, and suggesting new construction on issues where conflict exists; phase IV—testing of proposed synthesis or co-construction against existing cognitive schema, personal experiences, or literature; and phase V—statements of agreement or application of newly constructed meaning or ideas.

Pedagogical approach refers to the methods used by an instructor to teach, or by students to learn. Pedagogical approaches may be described by the degree of negotiation and production they foster (Bower et al. 2010; see Table 1.6).

Variables related to human computer interface design is a critical area to focus on because of the added online component in a blended learning course. Essentially, the purpose of designing for human computer interface is to “ensure system functionality and usability, to provide effective user interaction support, and enhance a pleasant user experience” (Carey et al. 2004, p. 358). One key area is usability design with includes elements such as physical or safety concerns, usability concerns, pleasing and enjoyable attributes, and usefulness attributes (Zhang et al. 2005).

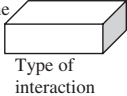
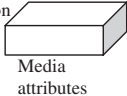
Programmatic research construct	Example of possible future research
<p>(a) Learner outcome Learner attributes</p>  <p>Type of interaction</p>	<ul style="list-style-type: none"> • What level of interaction (e.g., Gunawardena et al., 1997 knowledge construction discourse) most significantly improve adult professionals' critical thinking in blended learning environments? • Which learner attributes have the greatest influence on the learning of factual knowledge in blended learning? • Is there any interaction between the frequency of online interactions and learner level (elementary students versus graduate students) on argumentative writing performance? • Is there any significant difference between online versus face-to-face group size interaction on learner's (adult professionals versus secondary school students) ability to solve design problems?
<p>(b) Policy implication Learner attributes</p>  <p>Media attributes</p>	<ul style="list-style-type: none"> • What kinds of security-related policies should be considered when using wireless audio-based synchronous systems in an elementary school environment? • What are the specific supports required to help faculty implement a mobile-based blended learning program?

Fig. 7.2 Examples of how the programmatic research construct can be employed

Finally, media attributes include the various mode of presentations or communications afforded by a particular medium such as auditory versus visual, synchronous versus asynchronous, dynamic versus static presentations.

7.1.4 An Illustration of How the Programmatic Research Construct Can Be Used

In this section, we provide two examples to illustrate how the programmatic research construct can be used to propose future research directions concerning blended learning (see Fig. 7.2).

7.2 Epilogue

The use of blended learning has become increasingly widespread in both K-12 (Staker et al. 2011; Picciano et al. 2012) and higher education sectors. Particularly in higher education, blended learning has been predicted to be the “new normal” in course delivery (Norberg et al. 2011, p. 207), or the “new traditional model” (Ross and Gage 2006, p. 167).

Perhaps the most important challenge or issue related to blended learning is the question of how do we actually blend or mix the face-to-face and online learning components? Central to this book, is the conviction that it is the pedagogy or instructional strategy used which determines whether learning takes place, rather than the mere physical characteristics of the medium (Clark 1983). However,

although the physical characteristics of the learning environments (e.g., online or face-to-face) are not causal factors, they can enable or constrain particular pedagogical models (Graham 2013).

In this book we have presented five chapters based on empirical studies. In each chapter, we have carefully analyzed each research study in detail to describe the specific pedagogical approaches, instructional strategies, along with the respective models of blended learning to achieve the following learning objectives—promoting students’ attitude change toward country, helping students solve design problems, improving students’ critical thinking in assessing sources of social studies information, improving students’ argumentative writing and oral proficiencies, and enhancing students’ learning of factual knowledge (e.g., vocabulary). We hope that this book will spur further interest and research into the emerging and growing area of blended learning both in K-12 and higher education contexts.

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