Introducing and implementing an online learning environment in a Cambodian academic program: Impacts, enabling factors and constraints

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Abstract

The integration of information and communication technology (ICT) into education is widely perceived as an essential aspect of teaching and learning in contemporary society and therefore is embodied in education policies across many countries, Cambodia included. While the Cambodian Ministry of Education, Youth, and Sport (MoEYS) has promoted the use of ICT to support and enhance teaching and learning practices in Cambodian universities, very little is known about the enabling factors and challenges of introducing and implementing ICT in this particular cultural context.

This research study investigated the introduction and implementation of ICT in the form of an online learning environment in a Cambodian academic program, in which the participants had limited experience in using ICT for teaching and learning purposes. The study’s aim was to explore how an online learning environment can be used to support out-of-classroom teaching and learning and to identify enabling factors and constraints to the introduction and implementation processes. Participants included a program coordinator, four lecturers, and 55 students. The study adopted a design-based research approach as its methodology, and collected data from a student survey, interviews, focus groups, and field notes, across the three stages of the design-based research framework: pre-implementation, implementation, and post-implementation.

Analysis of the data revealed that the participants’ prior experience with technology, including their use of social networks and their perceptions of its usefulness were amongst key enabling factors for the online learning environment implementation. Key constraints to the implementation included socioeconomic challenges, the impact of a strong social hierarchy on information sharing, and a range of practical and contextual considerations inherent in the change processes. It is argued that ICT implementation in the Cambodian higher education context is not simply a linear step-by-step process as suggested in some literature (for example, Mills & Tincher, 2003; Moersch, 1995), but rather a complex process that requires examination of the interrelationships between policy, culture, and pedagogy.

The study identifies that the integration of ICT into education policies in Cambodia needs to move beyond the rhetoric of ICT infrastructure and skills development to focus on the sociocultural background, ICT experience, and the expectations of the local
practitioners and students. This study of a specific Cambodian situation provides an example of how the social practices of technology influence its academic practices, and how emerging online practices can collide with existing traditional cultural values and pedagogical approaches. The study also highlights the need for further research to investigate the relationships between academic and non-academic uses of ICT both inside and outside classroom contexts, and the cultural implications for teaching and learning practices in complex online learning environments.
Declaration

This is to certify that:

i) the thesis comprises only my original work towards the degree of Doctor of Philosophy;

ii) due acknowledgement has been made in the text to all other material used; and

iii) the thesis is fewer than 100,000 words in length, exclusive of tables, maps, bibliographies and appendices.

Sidonie Pors
Preface

Some of the content in Chapter 5 and Chapter 6 has appeared in the following publication:


Dedications

In memory of my grandmother Rim Ang. Your strength and intelligence never cease to inspire me. Thank you.
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This thesis might appear to be an individual endeavour, but there are many people along the journey who have supported me in different ways. First and foremost, I would like to thank my supervisors, Dr. Nick Reynolds, Dr. Sally Godinho, and Dr. Anthony Jones for their valuable advice and intellectual support, for helping me dealing with those ‘mini-crisis’ moments, and for inspiring me to be a good researcher.

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This research study would not have eventuated without the involvement of the research participants. Even though I am unable to list their names due to research confidentiality, I offer my deep thanks to the coordinator, lecturers, and students for devoting their time and effort to the study. I hope this study, in return, benefits their teaching and learning practices and give them new insights into teaching and learning with technology.

I believe that I simply could not have reached this point in my life without assistance from the people around me. They include my teachers, colleagues, friends, and most importantly my family, without whom I would not be where I am today. I am grateful to the love and support of my parents, Dr. Eav Pors Krui and Dr. Sidy Lam, who have instilled in me the great value of education and perseverance. My younger sisters and cousins have brought lots of joys to my life, and I thank them for that. A special thanks you is extended to my youngest sister, Ponnary, who patiently listened to me talking about my study, kindly proofread some parts of the draft, and was tremendously supportive during the last year of my PhD journey.
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Chapter 1: Introduction

1.1 Introducing the Study

Information and Communications Technology (ICT) is part of the digital technology evolution that began in the 1980s and 1990s when microcomputers and the World Wide Web started to dominate industries in the developed world (Blurton, 1999; Pelgrum & Law, 2003; Spector, 2012). ICT refers to “a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information” (Blurton, 1999, p. 1). Since its early development, ICT has been incorporated into education policies, implemented in education institutions, and introduced to teachers and students in a wide range of educational contexts. As a developing country, Cambodia hopes to draw on the benefits of the digital evolution to improve its education system and services. ICT was first introduced to the Cambodian education policies in 2004, aiming to increase teachers’ and students’ access to technology and equip them with relevant ICT skills needed for the information society (Ministry of Education, Youth, and Sport [MoEYS], 2004).

While the benefits and goals of this ICT integration initiative are outlined in Cambodia’s education policies, to date little is known about how ICT is implemented in this educational context and what its impacts are on the teaching and learning practices of local practitioners and students. Literature relating to ICT integration in the Cambodian education context is very scarce, comprising mostly reports generated by the government and international organizations which address ICT implementation guidelines and the limitation of technological and human resources in Cambodia (for example, Anderson, 2010; United Nations Educational Scientific and Cultural Organization [UNESCO], 2007; UNESCO, 2013). Policies and reports have a strong focus on ICT infrastructure and skills development as the key drivers for ICT integration. Yet, many scholars (for example, Blurton, 1999; Daniel, 2002; Kozma & Vota, 2014; Peeraer & van Petegem, 2011; Pelgrum & Law, 2003; Selwyn, 2013; Spector, 2012) have argued that technology integration is more complex than simply improving ICT access and skills of practitioners and students.

As a lecturer in a Cambodian tertiary institution I became interested in how online learning environments could be set up to support academic programs. Mindful of the
complexity of ICT integration, particularly in this cultural context, my specific interest was not only in the ‘impacts’ of online learning environments but also ‘the processes’ behind the introduction and implementation in academic programs. This interest led me to undertake a participatory design-based research study (McKenney & Reeves, 2012; van den Akker, Gravemeijer, McKenney & Nieveen, 2006; Wang & Hannafin, 2005) situated in the Cambodian higher education context, where resources are scarce, and quality education is in high demand.

This study, which seeks to explore the integration of ICT in an academic program that expressed interest in introducing an online learning environment to its academics and students is guided by two research questions:

1. How does the integration of an online learning environment into a Cambodian academic program impact the teaching and learning approaches of its lecturers and students?
2. What are the factors that enable and constrain the online learning environment’s introduction and implementation processes?

Participants in the study include the program coordinator, four lecturers, and 55 students. The research data were collected through a range of qualitative research methods, including a student survey, interviews, and focus groups to capture the introduction and implementation processes, and to gather the participants’ expectations and perceptions of engaging with the online learning environment.

Given that ICT integration is deeply connected to the local culture and teaching and learning practices (Selwyn, 2013; Spector, 2012), the study acknowledges and highlights the importance of its cultural context. Both the macro Cambodian context and the micro research setting context were taken into consideration when framing and scoping the research study. An overview of the macro context is presented in the following section and further discussed in Chapter 2. Following the macro context, I elaborate who I am as a researcher and the trajectory that has led to this study before introducing the research questions and the research methodology. This first chapter of the thesis concludes by addressing the study’s significance and providing an overview of its structure.
1.2 Background of the Study

Cambodia is a small country in Southeast Asia with a population of around 15 million people, about a third of whom were under the age of 14 (The World Bank, 2015). In the Royal Government of Cambodia’s *Rectangular Strategy for Growth, Employment, Equity, and Efficiency* (2004), ICT is perceived to be one of the key drivers for the country’s development. Recent statistics on internet and mobile usage in Cambodia show that about 25% of the population were active internet users, and the average number of mobile subscriptions per person was 1.5 (Kemp, 2015). While the percentage of internet users in the country is still low compared to other countries, its growth rate of about 400% between 2014 and 2015 (Kemp, 2015) reflects the noticeable development of the Cambodian ICT landscape. The use of mobile broadband has also had a steady growth, and during 2015 approximately 20% of mobile connections were broadband (Kemp, 2015). As of March 2015, 16% of the total population were social media users and the social media growth rate was 100% from January 2014 to March 2015 (Kemp, 2015).

The recent influx of the internet and social media in Cambodia has the potential to influence ICT usage among university students. Although there are no accurate statistics on students’ usage of the Internet and social media, recent studies (Elwood & MacLean, 2009; Peou & Lwin, 2011; we are social, 2012) note that university students and young people in the 18-24 year old age group are among the most active internet users. Elwood and MacLean’s study found that Cambodian students perceived technology as useful for their learning, and Peou and Lwin’s study reported that the internet was used by students for various purposes such as online communication, entertainment, and education. Their study suggests the potential use of ICT for learning, despite the fact that ICT is not yet widely accessible to students across the country.

As a developing country, Cambodia aims to integrate ICT in different sectors to promote economic growth and human resource development. One of the key sectors, which is perceived to be crucial for the development of this young nation, is education. A survey of the Cambodian education landscape shows an education system that has undergone many reforms since the country was liberated from the Khmer Rouge regime in 1979 (Chhinh & Dy, 2009; MoEYS, 2012). General education nowadays consists of six years of primary school, three years of secondary school, and three years of high
school. After completing this twelve-year general education program, students can continue to higher education and choose their areas of specialization. Education quality is a key concern of the Ministry of Education, Youth, and Sport (MoEYS) which is currently working to improve not only students’ access to education but also teachers’ pedagogical practices. Ngo (2013) sums up the state of the Cambodian education system by claiming that “[Cambodia] is a nation wrestling with the problem of how to improve the quality of education and raise student achievement in the context of poverty, development, and recovery” (p. 82).

The inclusion of ICT in education is perceived to play a key role in supporting the goals of the Cambodian education policies (MoEYS, 2004; MoEYS, 2010). In 2010 the Ministry of Education, Youth, and Sport (MoEYS, 2010) produced a Master Plan for Information Communication Technology in Education, outlining the goals and vision of harnessing the benefits of ICT in Cambodia in all forms and at all levels of the education system.

For General Education, the Plan concentrates on increasing the preparation and employability of students by giving them ICT-based professional skills and other pre-university skills.

For Higher Education, it focuses on expanding computer use, increasing access to information and research, reaching out to more students through distance education, and improving the distribution of research and subject-based materials through a web-based clearinghouse.

Teacher Training will be improved by using video and multimedia as a teacher education support materials, mainly for science subjects but also for general pedagogy. Pre-service teacher trainees (and in-service teachers whenever possible) will be taught how to improve their teaching and administration skills through the use of computers and other forms of ICT. (MoEYS, 2010, p. 3)

The Master Plan document augments the preceding policy and strategies plan released in 2004, which focused on four key areas of ICT in education:

- improving teachers’ and students’ access to ICT to narrow Cambodia’s digital gap;
• using ICT for communication and access to new knowledge;
• using ICT to promote education for all; and
• using ICT for productivity improvement (MoEYS, 2004).

While the Master Plan (MoEYS, 2010) and policy (MoEYS, 2004) provide a broad overview of the goals and vision of ICT integration, the implementation of ICT in the Cambodian education context is a challenging endeavor for both policy makers and practitioners. As a developing country, Cambodia shares some similar challenges of ICT integration to those in the developing world. Those challenges include limited ICT infrastructures and lack of financial and human resources to implement ICT in education (UNESCO, 2013). The relative cost for technological infrastructure and support is high compared with the cost in the developed world, and a dilemma Cambodia faces is whether or not they are ready to bring in new technologies while there are other more urgent problems to deal with such as poverty and basic education for all. According to UNESCO (2013):

The development of ICT in education in Cambodia is currently seen as a lesser priority than increasing access to traditional schools. The introduction of advanced technologies would therefore have to contribute towards increasing access to education. (p. 29)

With the assistance of other international organizations, the MoEYS has developed action plans for improving ICT infrastructure in schools and universities and promoted the use of ICT to improve access to education. Education policies (MoEYS, 2010; MoEYS, 2014b) and reports from international organizations (Anderson, 2010; UNESCO, 2007; UNESCO, 2013) share a similar foci on improving ICT infrastructures in public education institutions and in the capacity building of the key stakeholders – teachers, students, and administrators – with regards to ICT literacy and implementation.

Despite the MoEYS’s effort to improve ICT access and skills, ICT integration involves more than simply installing computers in schools or training teachers and students on how to use technology devices (Daniel, 2002; Hart, 2007; Peeraer & van Petegem, 2011; Selwyn, 2013; Spector, 2012; Tearle, 2003). Researchers have argued that the introduction of ICT into education needs to move beyond the rhetoric of preparing students for the information society (Pelgrum & Law, 2003) and developing
infrastructure and skills (Peeraer & van Petegem, 2011). Findings from Elwood and MacLean’s (2009) study support this argument and add that “access does not necessarily equate with proficiency or even willingness to use technology” (p. 79). Therefore, although teachers and students may have access to the technology and good ICT proficiency, this does not mean that they are going to use it to support and enhance their teaching and learning. The essence of ICT integration lies in the interconnections between ICT and the local culture, the attitude and belief of the practitioners and students, and their approaches to teaching and learning (Hart, 2007; Peeraer & van Petegem, 2011; Tearle, 2003). It is the goal of the current study to explore these interconnections and look into ICT integration in the Cambodian higher education context beyond access and skills development.

While ICT has become a recent focus for the Cambodian education policy, the topic of ICT integration in education has been discussed among academic researchers in the developed world for decades (for example, Blurton, 1999; Hawkridge, 1990; Saettler, 1990). During the 1980s and 1990s, ICT integration in education in the developed world focused primarily on schools’ infrastructure and ICT teacher training, but later the focus shifted to understanding the connection between ICT and pedagogical practices (Selwyn, 2013). This shift in focus is attributed to not only the increasing access to ICT (Davison, Vogel, Harris & Jones, 2000), but also, as Pelgrum and Law (2003) note, “in systems where there is a longer history of ICT use across the curriculum, professional development programmes focus more on links between ICT use and classroom practice” (p. 61). Some of the common rationales for introducing ICT into education include: equipping students with ICT skills to prepare them for the information society (Pelgrum & Law, 2003; Wellington, 2005); improving the efficacy and efficiency of the education system (Bates, 2000; Blurton, 1999; Daniel, 2002); and enhancing teaching and learning practices (Mandinach, 2009; Pelgrum & Law, 2003; Saettler, 1990; Wellington, 2005).

Although different countries might share similar rationales for ICT adoption, the introduction and implementation of ICT can vary considerably according to their different social and educational contexts. In the case of the developed versus developing world contexts, some scholars (Latchem & Jung, 2010; Pelgrum & Law, 2003; Zhao, Lei, & Conway, 2006) agree that developing countries can learn from studies conducted in developed countries to inform their local ICT implementation and thus avoid
reinventing the wheels. Latchem and Jung (2010) mention that “for weaker economies, a general strategy might be to follow the ‘experiments’ of the stronger economies and focus in particular on those which seem to be very successful and, in principle, also adaptable and transferrable to other educational contexts” (p. 118). The assumption underlying this strategy is that research findings from developed countries will be of relevance to the developing world context. However, other scholars (Mandinach, 2009; Oliver, 2014; Selwyn, 2013) argue that this assumption underestimates the importance of context in educational technology. According to Oliver (2014), “research on Educational Communications and Technology might be expected to inform practice or decisions in a wide range of settings, but differences between settings mean that work undertaken in one context may not be relevant elsewhere” (p. 910). Thus, it cannot be assumed that ICT integration in the Cambodian education context would take the same pathways and have the same emphases as pursued by other countries.

Cambodia, like all countries, has its own distinctive sociocultural context. Different aspects of its history, tradition, and culture continue to influence teaching and learning practices within its education system. Some of those aspects include the high respect students have for their teachers and the way knowledge is transmitted from teachers to students.

Teacher, like a parent, bestows, transmits, and commands. The student, like the child, receives, accepts, and obeys. Nothing changes in the transmission process, except perhaps the diminishing ignorance of the student; knowledge is passed on by teachers who are former students over generations. (Chandler, 2008, p. 107)

Howes and Ford (2011) add that “the traditional means of expressing disagreement is silent non-cooperation, and loss of face (and causing it) is to be avoided at all cost … Children are taught from an early age to respect and not question authority” (p. 170).

These underlying sociocultural factors need to be taken into consideration when discussing ICT integration in the Cambodian education system since they potentially impact teachers’ and students’ uptake of ICT and how ICT is used in this particular sociocultural context. As Selwyn (2013) argues, local factors are not simply the add-ons of technology integration, but they are “deep-rooted influences that impact upon any instance of educational technology use, and therefore should underpin any
understanding of how digital technologies are actually being used by different sets of groups of people in different social, cultural and political contexts” (p. 96). To study how ICT is integrated into the Cambodian higher education context requires not only exploring how it is appropriated by the local practitioners and students, but also how the contextual factors might lead to or hinder effective introduction and implementation of ICT. The complexity of Cambodia’s sociocultural context and its relevance to the current study is elaborated in Chapter 2.

My interest in investigating ICT integration in the Cambodian higher education context draws on my interpretations of the Cambodian ICT in education policies as well as my personal background and experience in the field of educational technology. To date, the majority of research studies in this field have been conducted in the developed world context, and to what extent they are applicable to the developing world context is debatable.

1.3 Who I am as a Researcher

I am a Cambodian. I was born after Cambodia had been liberated from the Khmer Rouge regime and was in the process of rebuilding its nation state. From the perspectives of the older generations, my generation was the lucky one since unlike them we had not experienced the hardship of wars and genocide that they had endured. While we might be lucky in that sense, growing up and going to schools in the 1990s was far from perfect as the decades of war had left the country with a dire shortage of schools, teachers, and teaching materials (Ayres, 1999; Chhinh & Dy, 2009; Sam, Zain, & Jamil, 2012). While the conditions of education in Cambodia have improved since then, there are still many challenges to address such as improving students’ competencies and reforming teachers’ pedagogical practices which are still predominantly teacher-centric.

My early interest in educational technology started when I undertook a Bachelor of Computer Science at the Royal University of Phnom Penh. Teaching and learning resources were very limited in Cambodia (Ahrens & McNamara, 2013), and the internet with its unlimited resources became a critical learning tool from the first year of my studies. I was very fortunate to be able to pursue my interest in technology and education while studying for my Master in Instructional Technology and Media at Teachers College, Columbia University in the U.S. where I gained a more theoretical
understanding of teaching and learning with technologies and was able to explore the potential of ICT in a very different educational context. My interests and my education experience in Cambodia, the U.S., and Australia have shaped my understanding of the field of educational technology and how it is interpreted and applied in different educational contexts. This research study is inspired by these experiences and is driven by my curiosity to uncover the relationship between people’s actions, their perceptions, and the context within which they operate.

1.3.1 Resources: An Answer to a Complex Problem

During a panel interview for a graduate scholarship to pursue my Master’s degree, I was asked to identify a key challenge for implementing ICT in the Cambodian education system. My answer was “electricity”. The answer sounded reasonable enough back then given that electronic devices cannot function without electricity, and many remote parts of Cambodia in 2007 did not have sufficient electricity supply. My answer reflected my perspective of educational technology in Cambodia at the time, which was that the lack of resources was the only key challenge. This perspective was by and large informed by policy documents and reports I had read in preparation for the interview. The lack of resources – both human and technology resources – was markedly addressed in those documents and reports, making me think that if only we had those resources technology implementation should not be an issue.

In 2011 my supervisor at the non-government organization where I worked delegated me to a local ICT and e-learning seminar organized by the Cambodian government in partnership with some non-government organizations. I was very excited about the seminar because of my interest in e-learning. Presentations and panel discussions during the seminar were about different ICT projects and the state of ICT and e-learning development in Cambodia. During the seminar, I noticed that the rhetoric of resources was repeated again in those presentations, and the lack of financial and technology resources was often raised as the key challenge of e-learning in Cambodia. The general assumption was that without sufficient technology resources, ICT integration in education could not happen. I acknowledged that resources are a legitimate issue in Cambodia, but by viewing ICT from the demand-and-supply perspective alone, the social and educational implications of ICT are likely to be neglected. My concern is that if ICT continues to be viewed as a commodity, there is a risk of overlooking other
important issues such as the top-down structure of ICT implementation (Abrahams, 2010; Pellini, 2005), the lack of support mechanisms to sustain ICT projects (Dionys, 2012), and the sociocultural dilemmas embedded within ICT in education (Ngo, 2013; Peeraer & van Petegem, 2011). Resources are an important issue, but it cannot be assumed that they are the only issue, or provide the “silver bullet” for ICT implementation in the Cambodian education context.

If I were asked today the same question they asked me during that interview, my answer would be that there is no single answer to explain the challenge of ICT implementation in the Cambodian education. Implementation is very closely related to context, and a simple answer like “electricity” or resources is insufficient to explain the complexity of ICT implementation.

1.3.2 Teaching with Technologies

As a Computer-Assisted Language Learning (CALL) lecturer at a public university in Cambodia, my hands-on experience in teaching with technologies informed my perception of the application of educational technology in the Cambodian higher education context. In my teaching, I applied and incorporated the instructional technology skills I had learned in my graduate course into my class activities and tried to explore different ways to use technology to support and enhance my teaching practices. At that time, I employed Wikispaces as an online space for a graduate class I was teaching. I uploaded my lessons and other reading materials on the wiki pages, and students could download those documents and participate in discussions with their peers on the online platform. For most students this was their first experience of using an online platform to support their face-to-face class, but they were willing to try and explore the potential of this new tool. Even though some students admitted having low self-esteem in handling new technologies, their engagement within the online platform showed otherwise. I once asked them to search for educational websites to share through our class online discussion forum, and I was amazed with the results and the rich discussion emanating from the forum. The use of Wikispaces was perceived by the students as beneficial for their learning, and some students hoped to apply a similar concept by creating their own wiki pages for their other classes.

I really enjoyed teaching with technology and what I learnt from this experience with my class is the potential for a simple and free technology such as Wikispaces to support
teaching and learning in the Cambodian educational context. What can also be inferred from this experience is that ICT integration in the Cambodian higher education does not have to be large-scale or equipped with state-of-the-art technologies for its education benefits to be realized. Small-scale implementation of ICT in classrooms and at academic program levels has the potential to transform teaching and learning in a profound way. Moreover, I believe that as the internet and social media become more popular and accessible in Cambodia, other lecturers and students must exploit the potential of these technologies to support teaching and learning in their classes the way my students and I did. The spotlight of ICT integration should be on those lecturers and students and how they integrate ICT in their teaching and learning practices rather than on the impacts of major ICT investment projects in Cambodia or on bringing in state-of-the-art technologies to Cambodian higher institutions. I decided to conduct this study on online learning environment in a Cambodian academic program because I believed in the potential of ICT to support teaching and learning practices, and I also understand that ICT integration is a very complex process that deserves a closer investigation of its relationship with the teaching and learning practices of the local context.

1.4 Scoping the Study

Framed by the macro Cambodian context, the ICT in education policies, and my personal interest, this study is set in a Cambodian higher education institution that has limited experience of using ICT to support teaching and learning. The study examines the introduction and implementation of an online learning environment in an academic program of the institution. Congruent with the research questions introduced earlier in the chapter, the aims of the study are twofold:

- to investigate how an online learning environment can be used to support out-of-classroom teaching and learning; and
- to identify what factors enable and constrain the introduction and implementation processes of establishing an online learning environment.

Participants in the study include the program coordinator, lecturers, and students, whose experiences in technology-enhanced learning are limited. Given that this is the first time the academic program has implemented such an online learning environment, I opted for a proactive, participatory way of investigating the online learning environment integration. The online learning environment was regarded as an ‘intervention’ to
enhance the teaching and learning approaches of the lecturers and students within the academic program. It was developed simultaneously with the research study, and its development was informed by the research data collected from a student survey and a lecturer focus group, which were part of the study’s context and the needs analysis associated with the design-based research methodology. Therefore, this study investigates both the introduction and implementation of the online learning environment and how it influenced the participants’ teaching and learning approaches, using the data collected from online records, serial student focus groups, and lecturer interviews. Both the ‘impacts’ of the online learning environment and the ‘processes’ associated with its introduction and implementation are integral to the research study.

1.5 Methodology

According to Somekh (2010), “to generate useful knowledge that will inform policy and practice in IT education, we need a methodology that integrates research with development, because we need knowledge about how the process of change itself shapes practice” (p. 129). She suggests that research related to the use of technology in education should be participatory in a way that it encourages participation from different roles and levels, involves participants in the design and development of the study, and supports participants in their practices. Taking up Somekh’s recommendation that participatory research is best suited to a study that seeks to inform policy and practice, which is an intended outcome of my study, I adopted a design-based research methodology.

Design-based research is a participatory type of research approach aiming to link theories with real practices (Bell, 2004; McKenney & Reeves, 2012; O'Toole & Beckett, 2013; Randolph, 2008; Reeves, 2006; van den Akker et al., 2006). Some key characteristics of design-based research include contextual, collaborative, and theory-and-practice driven. These characteristics align with the aims and scope of the current study which focus on investigating ICT integration at the local level and involve the participation of different stakeholders.

Design-based research forms a crucial part of the study as the act of introduction and implementation is intertwined with the processes of conducting design-based research in itself. Consistent with the framework of design-based research, I worked in collaboration with the program coordinator, lecturers, and students to analyse their
context, identify their needs, and explore the introduction and implementation of the online learning environment from the initial pre-implementation stage to its adoption and enactment stage. This collaborative process is embedded within my research investigation, and it is part of how I construct my understanding of the research phenomenon. The theoretical framework of design-based research and detailed procedures of the research design and methods are further elaborated and discussed in the methodology chapter of the thesis.

1.6 Significance of the Study

The Cambodia ICT in education policies (MoEYS, 2004; MoEYS, 2010) have set the initiative and blueprint for what the country aims to achieve through incorporating ICT in its education system. Nevertheless, as Selwyn notes, “what these policies and initiatives are not able to do … is tell us how and why digital technologies are actually being used in educational settings in any particular … locality” (Selwyn, 2013, p. 86). Thus, a closer look into the introduction and implementation of ICT in a small-scale local context, as in the current study, should provide insights into what happens when local teachers and students start to adopt ICT and how ICT influences their teaching and learning. These insights will hopefully contribute to the future development of policies that address the needs and challenges of teachers and students in Cambodia when integrating ICT into their programs.

A study by Ogisu (2014) notes that the voices of Cambodian teachers are often excluded in policy documents and that “reconceptualizing teachers as active agents, not as implementers, helps us be aware of the importance of seriously listening to the voices of teachers” (p. 170). The inclusion of the voices of the participants in the study (the program coordinator, lecturers, and students) provides an opportunity to gain insights into their background and experiences and the understandings they have gained of the online learning environment implementation. Their voices will reveal how people in a different part of the world perceive the roles of ICT within their education practices. Those perceptions might not necessarily align with how the world sees them or how they are portrayed in policy documents. In addition, the involvement and collaboration of the participants in this design-based research add to the significance of the study, showing that it is not only about investigating what happens but also the intend is also
to give agency to the participants by enabling them to contribute to the decision-making about the implementation experiences and practices.

To date, literature relating to the introduction and implementation of ICT to enhance teaching and learning in the Cambodian and the developing world context is also limited. As Kozma and Vota (2014) attests, there is a high expectation of what ICT can contribute to education, particularly in the developing world. His review of ICT integration studies in this context shows that there is more focus on large-scale or countrywide implementation of ICT projects than on ICT impacts on the local teaching and learning practices. In the case of Cambodia, the relevant literature largely takes the forms of reports produced by non-government organizations such as UNESCO on topics relating to policy formulation and implementation (for example, Anderson, 2010; UNESCO, 2007; UNESCO, 2013). The literature also places some emphasis on the deficiency of the policies (Richardson, 2008), ICT integration in teacher training centres (Dionys, 2012), and general ICT usage in Cambodian higher education (Elwood & MacLean, 2009; Peou & Lwin, 2011). To date no research study has probed into the nature of ICT integration in a local higher education setting to seek some understanding of how ICT can potentially be used to support teaching and learning in the Cambodian higher education context.

Although it is beyond the scope of the current study to investigate teaching and learning practices in the broader Cambodian higher education context, the study will contribute to a deeper contextual understanding of the ICT integration phenomenon. As Oliver (2014) mentions, “the introduction of any new technology, or even a new use of an existing technology, can be understood as changing the context of practice itself” (p. 910). The understanding of the complexity of changing practices through ICT in the current study will contribute to the very limited literature on ICT implementation to enhance teaching and learning within the context of the Cambodian higher education. Other higher education institutions in Cambodia can also refer the lessons learned in the study to inform the introduction and implementation of ICT in their institutions.

1.7 Thesis structure

This thesis is organized into eight chapters. In this chapter, I introduce the context of my study and my background as a researcher. I also identify the aims of the study and the research questions which frame and guide it. The methodology and significance of the
study are considered to provide a snapshot of how I approach the research and the study's potential to contribute to policies, practices, and literature.

Chapter Two presents the macro-level of the Cambodian context that is critical to this research study. It builds on the background of the study in Chapter 1 by discussing the Cambodian sociocultural context and considering how this has influenced current educational practices. Cambodian general education system and higher education are described and connected to the concept of ICT integration. The chapter also explores the inclusion of ICT in the Cambodian education policies and social landscape.

Chapter Three reviews key literature relating to ICT integration in the broader education landscape, the conceptual framework of ICT integration, and teaching and learning within an online environment. The key rationales behind ICT adoption and the pathways for ICT integration and implementation are critically reviewed. The technology adoption theories are discussed and teaching and learning in an online environment from the perspectives of social constructivist and situated learning theories are considered.

Chapter Four describes the methodology adopted for this research study. It presents and discusses the theoretical framework of design-based research and the justifications for choosing a design-based research approach. The research setting, research methods, and research framework are elaborated. The chapter concludes with a discussion of how the trustworthiness of the study is established and notes the limitations of the study.

Chapter Five describes the commencement of the design-based research study. It addresses the participants’ expectations in the pre-implementation stage, how the design-based research project was initiated and conducted, and critically analyses the formulation of the design-based research in its pre-implementation stage. Reflection on conceptualizing the design-based research study raises the tensions between different epistemic stances in design-based research (educational design, educational research, and educational change), prior to discussing how those epistemic stances converged to form the roadmap of this study.

Chapters Six and Seven report and discuss the findings and analyses of the study, focusing on the implementation of the online learning environment. Chapter Six presents and discusses the adoption, appropriation, and adaptation of the online
platform. Chapter Seven considers the teaching and learning opportunities created by the online learning environment. Teaching and learning activities on the online learning environment are then identified and discussed to provide insights into the pedagogies and learning approaches of the participants.

In Chapter Eight, I conclude the thesis by revisiting the research aims and questions and drawing conclusions from the study’s findings. The implications of the findings along with the recommendations that have emerged from the study are then detailed. Suggestions for further research are made and finally some personal reflections on the research process are presented.
Chapter 2: The Cambodian Context

2.1 Introduction

It is hard to pinpoint where to start when describing and discussing the Cambodian context that grounds the study. This is not only because of the broad contextual scope, but also because of the intricate connections between different characteristics and perspectives of Cambodia that need to be taken into consideration. For some, Cambodia represents the image of a rich cultural heritage and tradition, while for others it evokes the memory of an unfortunate past. To understand the study’s Cambodian context requires not only knowledge of factual information about Cambodia, but also how different aspects of the Cambodian society relate to each other.

In this chapter, I present and discuss three key aspects of Cambodia which are related to the topic of my study: the historical, sociocultural, and developmental context; the educational context; and the ICT context. These contexts provide factual information and subjective perspectives that reflect different insiders’ and outsiders’ stances. In some parts of the chapter, I insert my perspective as a Cambodian into the discussion to provide an insider’s insights.

The chapter begins with a review of the limited literature on the Cambodian historical, sociocultural, and developmental background which influence the Cambodian education system and how teaching and learning are conducted. It then provides a snapshot of education in Cambodia with a particular focus on higher education and its key challenges. The final sections of the chapter explore the topic of ICT in relation to the Cambodian education policies and social landscape to uncover the roles that ICT plays in education and social communication in the contemporary Cambodian society.

2.2 Historical, Sociocultural, and Development Background

No one knows for certain how long people have lived in what is now Cambodia, where they came from, or what languages they spoke before writing was introduced, using an Indian-style alphabet, around the third century CE. (Chandler, 2008, p. 13)

However, archaeological evidence suggests that the initial settlement of the Cambodian region could have started as early as 4200BC and that “mainland Southeast Asia had a
comparatively sophisticated culture in the prehistoric era” (Chandler, 2008, p. 13). Cambodia prides itself on its rich cultural heritage and traditional values of homogeneity, respect for elders, and strong family ties (Whitaker et al., 1979), which are passed from one generation to the next and are the core tenets defining the Cambodian society. Despite its long cultural heritage, Cambodian history is also scarred by its tragic past of genocide and civil wars that have subsequently influenced the sociocultural and developmental landscapes of the country.

A review of the Cambodian history from the first century suggests a long historical timeline which includes:

- the Kingdoms of Funan and Chenla (1st century – 802);
- the Angkor Empire (802 – 1431);
- the Post-Angkor Era (1431 – 1863);
- the French Colonization (1863-1953);
- the Post-Colonial Era (1953 – 1970);
- the Khmer Republic (1970 – 1975);
- the Khmer Rouge Era (1975 – 1979);
- the People’s Republic of Kampuchea (1979 – 1993); and
- the Kingdom of Cambodia (1993 – present).

From one era to another, Cambodia underwent multiple political transformations “which comprised traditionalism, colonialism, Buddhist socialism, monarchy, republicanism, Maoist communism, Vietnamese communism, United Nations transactional authority, and a hybrid democracy respectively” (Sam et al., 2012, p. 226). These frequent radical changes of the social system, particularly after its independence from France in 1953, placed the country in a state of continual social instability and political turmoil. As stated by Ayres (2000),

> Each of the attempts at nation building by Cambodia’s different ruling regimes since independence has been based, in terms of underlying political ideology, on extremely disparate ideals … Successive regimes abhorred the preceding ones and tried to stamp out any leftover influence. (p. 455)

The transition from one era to another forms a crucial part of the country’s historical development shaping the social landscape of Cambodia today.
Contemporary Cambodia is a society where tradition at one end of the spectrum collides with modernity at the other. A strong social hierarchy inherited from its historical monarchic roots underpins the traditional aspects of the Cambodian society (Ahrens & McNamara, 2013; Ayres, 2000; Chandler, 2008; Howes & Ford, 2011; Pellini, 2005). As noted by Ayres and Chandler, this comes from a long tradition of patronage and rigid patron-client relationships in which the underprivileged group seeks protection and guidance from the elite. “Throughout Cambodian history, in any case, governance … was the privilege enjoyed by the people freed in some way from the obligation of growing their own food. The governed grew food for those above them in exchange for their protection” (Chandler, 2008, p. 3). Implications of this tradition are reflected in various aspects of contemporary Cambodia such as leadership, community, and participation. Ahrens and McNamara (2013) claim it is typical in Cambodian society that seniority is often prioritized over competency in the recruitment of leadership positions and that “appointments are also made for ‘life’” (p. 53).

In Pellini’s study on community participation in rural Cambodian schools, he mentions that village leaders also gain trust by their status and with their authority they can manage and distribute community resources. Strong community values in Cambodian society not only affect the trust people place in their leaders, but also in the hierarchical way leadership functions. Howes and Ford (2011) add that “the role of leaders is to provide moral direction and state what ‘should be correct’, but without any expectation that the direction will necessarily be followed” (p. 172). This statement aligns with Ayres’s (2000) comment on the flow of participation in Cambodian society that “the notion of mutual obligation did not exist. In essence, those at the top governed, while those at the bottom existed to be governed” (p. 456).

Traditional values of hierarchy, leadership, community, and participation might still exist in contemporary Cambodia, but at the other end of the spectrum the rise of globalization might have some impact on the Cambodian society as well. According to Howes and Ford’s (2011) observation, “cultural hybridization is apparent especially amongst Cambodian youth who are absorbing external ideas not only from their new places of employment but downloads from the Internet, fashions on cable television, chatting and blogging online” (p. 167). Cultural hybridization and web evolution are not uncommon in the digital age, but they are significant in the Cambodian context as they place the country in a slightly different position to simply being the product of its
traditions. The notion of changeless, as mentioned by Chandler (2008), might no longer be valid in the contemporary context given that Cambodia as a country is redefining itself in the digital age. Nevertheless, Chandler (2008) also cautions that “it may still be too soon, and it is certainly very difficult, to speak with assurance about the prospects for Cambodian society in its partially globalized, postrevolutionary phase” (p. 11). The country is still in a developmental stage, and the Cambodian society needs to seek a balance between retaining important cultural traditions and embracing the beneficial aspects of globalization in order to move forward.

Socioeconomic development is another important aspect of the Cambodian landscape. The state of Cambodia’s development has been reported by international development organizations such as the World Bank and the United Nations Development Programme (UNDP). Cambodia is regarded as a low-income country with a poverty rate of approximately 17.7% in 2012 (The World Bank, 2015). About 80% of the country’s total population live in rural areas, and the mean years of schooling in Cambodia is merely 5.8 (UNDP, 2014). According to the World Bank and UNDP, key development challenges Cambodia faces include growing inequality, good governance, land and resource management, and quality education. Considering that approximately 65.3% of the country’s population are under the age of 30 (UNDP, 2014), government and international development organizations place a strong emphasis on providing accessible, quality education to children and youth. It is with the hope that not only is education the key to a better life, but that a skilled labour force is crucial for Cambodia in order to meet its development goals and overcome its developmental challenges. In the following section, I take a closer look at education in Cambodia with a particular focus on higher education and how the country’s developmental, sociocultural, and historical background shapes the education system and teaching practices within this context.

2.3 Education in Cambodia

The provision of formal education in Cambodia has been embraced to build a nation-state that looks modern, yet is concerned almost exclusively with sustaining the key tenets of the traditional polity, where leadership is associated with power and where the nature of the state is perceived to be a function of that power. (Ayres, 2000, p. 459)
In any era of Cambodian history, education is always present in the social landscape, although its meaning and practice may differ. Cambodian education in the early days relied on religious institutions, for example temples and pagodas, as the main hubs for educating boys, and education was mainly about teaching Buddhist principles and philosophy.

Pupils received instruction in the arts of writing, ethical precepts, practical philosophy, and good manners. There were also traditional codes of conduct and rules (chhab) for men and women requiring them to learn and obey to become good members of the Khmer family and society (Dy, 2004, p. 93)

Knowledge was passed down from teachers to students who not only had to learn the codes of conduct by heart, but also learn to obey and follow their teachers’ advice. These traditional codes of conduct and perceptions of knowledge are still embedded in the mindset of many Cambodians today. They are often posted on the classroom wall to remind students to be obedient and to place high value on acquiring knowledge.

The French colonial period in the early 1900s introduced a modern schooling system, where formal education was conducted in schools by trained teachers and was open to both boys and girls. Compulsory primary education was first introduced in the 1950s with recommendations from UNESCO, and education was based on pragmatic ideology and rapid expansion, which aimed to increase students’ enrolment in schools (Ayres, 2000). The meaning of education itself has changed slightly from the traditional focus on good manners to a focus on skills development.

From a traditional, social and cultural perspective, ‘education’ is literally defined by Cambodians on one hand as an honest route to better the human condition, intentionally aimed at shaping individuals for a better lifestyle, knowledge, and good manners for living in their respective societies. On the other hand, the contemporary Cambodian perception of ‘education’ refers to a process of training and instruction, especially of children and young people in schools, which is designed to give knowledge and develop skills. (Dy, 2004, p. 93)

When Cambodia came under the rule of the Khmer Rouge in 1975, Cambodian education was in a dire state and education was limited to learning basic literacy and instilling political ideology (Ayres, 1999). After the Khmer Rouge rule ended in 1979,
the country moved into a recovery mode, and formal education was restored with the assistance of Vietnam and the Soviet Union. Education was deemed to be essential for the country’s development, and education restoration focused again on rapid expansion similar to that of the 1950s. In 1993 Cambodia had its first national election after the Khmer Rouge retreated, and since then there has been a strong emphasis on the Millennium Development Goals (MDGs) and Education For All (EFA), which are reflected in the education policies of the Ministry of Education, Youth, and Sport (Chhinh & Dy, 2009). The MoEYS has also tried to promote a student-centric approach to learning (MoEYS, 2014b), but the limited access to schools, teachers, and teaching materials (Ayres, 1999; Chhinh & Dy, 2009; Sam et al., 2012) make it challenging to adopt this new learning approach. I remember that when I was in Grade 10 in 2000, there was a major reform of the national curriculum to align with the student-centred approach, but in a large class of 50 plus students with limited learning resources there was some confusion amongst teachers and students regarding what this new approach meant and how it could be implemented in this educational context. Learning activities during that time comprised mainly copying teachers’ notes from the blackboard and memorizing and repeating the written notes. This was considered the “right” way to learn at that time, and changing the teaching practices would have meant changing the way we thought about what constituted appropriate practices.

2.3.1 Primary and Secondary Education

The current Cambodian education system consists of three years of pre-school, six years of primary school, three years of lower secondary school, three years of upper secondary school, and four or more years of higher education (see Figure 2.1).
Figure 2.1 Structure of the Cambodian Education System (IBE, 2011)

As shown in Figure 2.1, primary and lower secondary schooling (a total of 9 years) is referred to as basic education and is compulsory for all Cambodian children. Despite the compulsory nine-years of schooling, more than half of Cambodian children have not completed this basic education. According to recent statistics from the MoEYS (2014), in the academic year 2013/2014 the primary school completion rate was approximately 88%; the lower secondary school completion rate was approximately 40%; and the upper secondary school completion rate was merely 25%. According to Chhinh and Dy (2009), although primary school and lower secondary school student enrolment rates have increased over the years, there are still high dropout rates among the students, especially during the lower secondary school years.

2.3.2 Higher Education

For many young Cambodians who successfully complete their secondary education, higher education is perceived as a means to a better socioeconomic status and as a ticket
for professional employment (Howes & Ford, 2011). According to the World Bank (2012), “no country or region has achieved, in the long term, high-income status without first crossing a ‘respectable’ higher education threshold” (p. 13), and statistics collected from East Asian countries show that higher education enrolment correlates with the country’s GDP and labour productivity.

Cambodian higher education has been acknowledged by scholars (Ahrens & McNamara, 2013; Kwok et al., 2010; Sam et al., 2012; Sen, 2013) as a growing sector and a main production hub for the skilled labour force. There are currently about 34 public and 57 private universities in the country (Sam et al., 2012), and the gross enrolment ratio of higher education has increased steadily in the last decade from 2.9% in 2003 to 15.8% in 2011 (UIS, 2014). Despite its expansion, this ratio constitutes only a small proportion of the population, placing Cambodia in the lowest higher enrolment group compared with other countries in East Asia (The World Bank, 2012). Over the years, the Ministry of Education Youth and Sport has put in a lot of effort to improve student accessibility to higher education, but many researchers (Ahrens & McNamara, 2013; Kwok et al., 2010) are concerned that Cambodian higher education might be succumbing to rapid expansion without much consideration of the quality of the education the students receive. In May 2015, it was reported that the MoEYS “placed a partial freeze on registering new universities as it worked to transform the body with assistance from the World Bank and Unesco” (Brito, 2015, p. 1). Kwok et al. (2010) argue that the goal to increase student enrolment in higher education institutions in Cambodia is challenged by concerns about the capacity of higher institutions to accommodate massive intakes while providing students with quality education. It is important that higher education institutions not only meet the supply requirements of the labour market, but also produce qualified graduates who have the capacity to perform their jobs well.

Challenges facing Cambodian higher education are well addressed in recent literature (Ahrens & McNamara, 2013; Chen, Sok, & Sok, 2007; Howes & Ford, 2011; Kwok et al., 2010; Sam et al., 2012; Sen, 2013), exposing a web of interrelated issues connected to the country’s historical, social, and developmental contexts. From a historical perspective, Sam et al. (2012) view Cambodian higher education as a sector that still suffers from the abolition of professionals and scholars three decades ago during the Khmer Rouge regime. Statistics from the World Bank (2012) on academic
qualifications of faculty members in Cambodia in 2008/09 show that only about 8% of faculty members had a PhD and 52% had a Master’s degree. Ahrens and McNamara also acknowledge the lack of human resources in Cambodian universities and add that even though some lecturers have similar titles and degrees their competency could vary considerably, depending on where they were trained.

Lecturer qualification and competency are also discussed in relation to poor remuneration and incentive (Ahrens & McNamara, 2013; Chen et al., 2007; Howes & Ford, 2011; Kwok et al., 2010; Sam et al., 2012). Government funding for public higher education in Cambodia is merely 0.05% as a share of GDP (The World Bank, 2012), and this has a major impact on the remuneration of professional staff in public universities. A scoping study conducted by Kwok et al. (2010) found that full-time lecturers in Cambodia usually receive a modest base salary of about 100 USD per month supplemented by hourly teaching rates ranging from 6 to 20 USD according to their qualifications. Chen, Sok, and Sok (2007) assert that this low academic salary correlates with low tuition fees which could be as low as 200 USD per academic year. “The implication of low salaries is clear: without being able to earn adequate incomes with a ‘normal’ teaching load, lecturers are chained to the teaching treadmill, and there is literally no time left for research” (Kwok et al., 2010, p. 36).

Heavy teaching loads also mean less teaching preparation time and consultation time with students, which potentially can impact the quality of teaching. According to Chen, Sok, and Sok (2007), “sufficient interaction between teachers and students and teachers’ involvement can compensate the poor teaching facilities and teacher quality. However, Cambodian universities seem to ignore this issue” (p. 144). Since the literature on teaching practices and pedagogy in Cambodian higher education is very limited, it is not possible to infer whether this lack of teacher-student interaction results from the lack of time and incentive, or if it could be a continuance of the teacher-centred academic tradition from earlier approaches to education.

Literature related to teaching and learning in the Cambodian context (for example, Ahrens & McNamara, 2013; Howes & Ford, 2011; Ngo, 2013; Ogisu, 2014; Pellini, 2005) imply that rote learning and teacher-centred approaches are prevalent in Cambodian education, despite the MoEYS’s effort to promote student-centred learning. The aforementioned issues of poor remuneration and heavy teaching loads are likely to
contribute to teachers’ allegiance to teacher-centred pedagogies. In addition to these factors, teacher-centred practices are also deeply rooted in the Cambodian historical context where knowledge was passed down from teachers to students. In a brief review on academic tradition in Cambodia, Howes and Ford (2011) note that the word ‘learning’ is translated as ‘to recite’ in Khmer, and “the concept of a good student [in Cambodia] is one who learns the knowledge already acquired by his or her teacher” (p. 169). Cambodian students are also taught from a young age to respect their teachers. Pellini (2005) notes “correct behaviour is taught first in the family and then in schools. Within the family children are taught not to challenge the authority of their parents and in schools they are taught to respect the teacher” (p. 213). The high respect students have for their teachers and the tradition of knowledge transferred from teachers to students makes a teacher-centred pedagogy more acceptable to this education context. Ogisu (2014) notes that

[i]n Cambodia, teaching and learning is strongly linked to political circumstance, socially appropriate relationships, and cultural norms and value. Also, these rationales are closely entangled with each other and work as a mechanism through which student-centered principles are changed and twisted to be incorporated into local practices (p. 165).

This brief synopsis of what has impacted the Cambodian education system shows some connections between the country’s education landscape and its historical, sociocultural, and developmental background. The prospect of creating more skilled workers and modernising the education system is compromised by the prevailing conflict between traditional values and the changes needed to catch up with the rest of the world. In the mid-20th century, the concept of education modernization in Cambodia revolved around creating a formal schooling system (Dy, 2004). Nowadays, with the support of other international organizations, it appears that the focus of education in Cambodia has shifted to an emphasis on education for all and the introduction of new technology in key education reforms. The past decade has seen the Cambodian government place an increasing focus on the use of ICT in education institutions, with the hope of enhancing teaching and learning practices and improving the quality of its education system.
2.4 ICT in the Cambodian Education Policies

The first policy on “ICT in Education” was formulated in 2004 by the Ministry of Education, Youth, and Sport in partnership with the Japanese Funds-in-Trust and UNESCO. The four focus areas for ICT in Education policy are improving teachers’ and students’ access to ICT to narrow Cambodia’s digital gap, using ICT for communication and access to new knowledge, using ICT to promote education for all, and using ICT for productivity improvement.

As Richardson (2008) states, the inclusion of ICT in education policies in 2004 fits with the increasing focus of the international community on ICT for development during that period.

Since the mid-1990s, various organizations supported ICT for development (ICT4D) initiatives generally and ICT in education initiatives specifically. Organizations such as UNESCO, UNICEF, the Asian Development Bank, and the World Bank, among others, have demonstrated their willingness to incorporate ICTs into development projects in Cambodia. (p. 68)

In 2010 the MoEYS collaborated with the Open Institute, UNESCO, and other international organizations to produce a Master Plan for Information Communication Technology in Education (MoEYS, 2010). The Master Plan outlines the objectives and results of ICT implementation in education at different levels from primary to higher education. A review of the Master Plan document shows that it is more outcome-oriented than the previous ICT in education policy document although the four general goals of accessibility, skill development, education for all, and efficiency and efficacy remain the same. In the area of higher education, the Master Plan notes that

[t]o meet the increased demands and expectations of their students, lecturers in higher education institutions of Cambodia will have to systematically use ICT to teach their classes, to share information with their students, to promote student-centered learning, and to evaluate their students. [The] Master Plan will therefore need to ensure that all teachers not only are computer literate, but also understand how to use ICT to improve their administrative and pedagogical skills. (MoEYS, 2010, p. 12)

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The Master Plan sets five objectives for the higher education sector: improve lecturers’ pedagogical skills; improve students’ ICT-based professional skills; provide mechanisms for managing open and distance learning programs; improve inter-university telecommunication; and standardize electronic documents. Table 2.1 shows the five objectives and their results as reported in the Master Plan document.

**Table 2.1 Objectives and Results of ICT in Higher education in Cambodia (MoEYS, 2010)**

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Improvement of the pedagogical skills of teaching staff and the effectiveness of non-teaching staff at higher education institutions (HEIs).</td>
<td>• Training on ICT Skills for higher education lecturers and staff is delivered in all HEIs.</td>
</tr>
<tr>
<td>2. Systematic preparation of students graduating from Cambodian HEIs with the necessary ICT-based professional skills to join the labour market or to continue to further education.</td>
<td>• Training on ICT-based Professional Skills is delivered to students in all HEIs.</td>
</tr>
</tbody>
</table>
| 3. The development of feasible and effective structures and mechanisms for providing, supporting, and managing Open and Distance Learning in Cambodia. | • Capacity of the MoEYS and HEIs is strengthened in regard to the essential principles of Open and Distance Learning (ODL) management, its development, and technology, using Khmer language tools and materials.  
• An Open and Distance Learning Policy Framework will be formulated.  
• Cambodian HEIs will offer ODL courses.  
• A study will be implemented to assess the feasibility and define the possible process of creating a National Open University in Cambodia. |
4. Researchers and higher education lecturers share and have access to available research, teaching materials, and other educational resources, and academic and research cooperation is activated through improvement in inter-university telecommunications.

- An electronic clearinghouse or repository for all Cambodian research, training materials, and educational resources for higher education level becomes available.
- Research and academic cooperation are activated through the use of a high speed network that connects Cambodian Universities.

5. All research and administrative documents of HEI are standardized.

- All documents and educational resources produced by the Ministry and HEIs, and all administrative documents inside HEIs and in their communication with the Ministry, use standard encoding and formats.

The objectives outlined in Table 2.1 have set the benchmarks for what the government hopes education institutions will be able to achieve in terms of implementing and integrating ICT into their curriculum and teaching practices. Nevertheless, for some objectives, the stated results do not actually match with the intended outcomes. For instance, the first objective is focused on pedagogical skills improvement while the results report the delivery of ICT skills. The implementation of the action plans set in the Master Plan is still in its early stage, and the Master Plan also requires a considerable amount of human and financial resources to achieve the set objectives.

According to a recent UNESCO report (2013), although ICT is perceived to play an important role in Cambodian education and development, government funding allocated to ICT was a mere 0.12% in 2013. Since the formulation of the first ICT in Education policy in 2004, various international agencies have provided human and financial resources to assist the MoEYS in formulating and implementing its policies. Many ICT development projects have been initiated, focusing on different areas such as primary and secondary education, higher education, and teacher training centres. Table 2.2 shows the key NGOs involved and their areas of focus.
### Table 2.2 NGOs and their areas of focus (adapted from UNESCO, 2013)

<table>
<thead>
<tr>
<th>NGOs</th>
<th>Area of Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Development Bank (ADB)</td>
<td>• Enhancing Education Quality Project since 2008</td>
</tr>
<tr>
<td></td>
<td>• Secondary education</td>
</tr>
<tr>
<td>World bank</td>
<td>• Higher education quality</td>
</tr>
<tr>
<td>United Nations Educational Scientific and Cultural Organization (UNESCO)</td>
<td>• Technical and vocational education – ICT skills</td>
</tr>
<tr>
<td></td>
<td>• SchoolNet program and Intel Teach Program</td>
</tr>
<tr>
<td>The Flemish Association for Development Cooperation and Technical Assistance (VVOB)</td>
<td>• Provincial and regional teacher training centers (TTCs)</td>
</tr>
<tr>
<td></td>
<td>• Learner-centred method supplemented by ICT</td>
</tr>
<tr>
<td>Busan Metropolitan City Office of Education of the Republic of Korea</td>
<td>• Computers and ICT training for high schools</td>
</tr>
<tr>
<td>Japan International Cooperation Agency (JICA)</td>
<td>• E-government and e-learning initiatives</td>
</tr>
<tr>
<td>The Open Institute</td>
<td>• Khmer Software Initiative</td>
</tr>
<tr>
<td></td>
<td>• Open Schools program for high schools</td>
</tr>
<tr>
<td>United States Agency for International Development</td>
<td>• ICT facilities for basic education</td>
</tr>
</tbody>
</table>

As the Cambodian economy has continued to grow, there has been an emergence of private sector involvement in the area of ICT in Education, particularly in the providence of infrastructure to schools and universities. The UNESCO (2013) report indicates that private telecommunication companies, including Metfone and Ezecom have cooperated with the MoEYS to install computers and internet in schools and universities across the country.

While the MoEYS’s ICT in Education policies have received some support from the private sector and other NGOs, some researchers (Peou & Lwin, 2011; Richardson, 2008) are concerned that the policies seem to focus primarily on what are to be
achieved, rather than on how they can be achieved. Richardson (2008) claims “the Cambodian government is setting high expectations without putting in place support mechanisms to achieve these objectives” (p. 75). Funding and human resources are the key issues in ICT policy implementation, and in the context where there are other education-related issues to deal with such as increasing access to education, “the introduction of advanced technologies would therefore have to contribute towards increasing access to education” (UNESCO, 2013, p. 29). From a developmental perspective, UNESCO mentions resources and capacity development as the main focuses of ICT in Cambodian education.

Cambodia has devoted extensive resources to improvements to its education system. Given the primary focus on expanding access to school, the main use of ICT consists of very basic training at the secondary level and the development of computerized information management systems. (UNESCO, 2013, p. 28)

This is a logical outcome since adequate resources and skills are the prerequisites for promoting ICT use in education. However, from an education perspective Keng (2009) argues that “it is the dominant thinking that resource input into the education sector is the surest way to improve the outcomes of education” (p. 132). She adds, “what happened in the education sectors of many developing countries indicates that improving schools and education systems is a much more complex task than merely increasing resource inputs” (p. 133). Other researchers (Peou & Lwin, 2011; Richardson, 2008) also share similar concerns about the ICT resource inputs in Cambodian education and the gap between education policies and teaching and learning practices at the classroom level. Since there is little research evidence on the implementation side of ICT in Cambodian education, it is challenging to back up any claims about the effectiveness of the policy approach or the impacts of ICT on teaching and learning practices.

2.5 ICT in the Cambodian Social Landscape

While the previous section focused on ICT within the education policies, this section looks at ICT in the Cambodian social landscape. Given the statistics and the research related to this area are very limited, this section can only provide a snapshot of this broad topic.
The MoEYS (2014a) advises that ICT infrastructure and internet connectivity in Cambodia education institutions are restricted.

Like many countries, Cambodia does not yet have a full sustainable model for providing technical support for its ICT infrastructure. The problem will likely be most acute in the smallest schools where there is very limited availability of resources to support complex technology. (MoEYS, 2014a, p. 15)

Despite the fact that many education institutions in Cambodia have poor ICT infrastructure, there is a recent emergence of ICT in the form of mobile phones and the internet in the broader social landscape. According to Adler (2014), the state of ICT in Cambodia is a paradox:

Traditional information and communication services are of poor quality. Public postal services are unreliable; mass media do not reach 15 percent of the Cambodians; and only 3.96 percent have a fixed phone line. When you look closer, though, the picture is different. It turns out that Cambodia has been closing its technological gap by moving straight to mobile and Internet. (p. 1)

Mobile and internet connections have become more accessible to the Cambodian people in recent years. As of March 2015, the number of mobile connections in Cambodia is 157% of the total population and had a growth rate of 27% in the past year (Kemp, 2015). It should be noted that it is not uncommon in Cambodia for a person to own more than one mobile phone or have more than one mobile connection, which explains why the number of mobile connections is 157% of the total population.

Approximately 25% of the Cambodian population are active internet users, and from January 2014 to March 2015 the number of internet users in Cambodia increased by four times (Kemp, 2015). This high growth of internet users might be due to the increase in the number of internet service providers and the affordability of home and mobile internet connections.

According to Kemp (2015), there was also an increase in the number of social media users (100% growth) and mobile social users (108% growth) in 2014. Facebook is the most popular social networking site in Cambodia, particularly among the 18-24 age
group (we are social, 2012). In terms of web traffic, 45% of the web connections in March 2015 was through desktops or laptops; 47% through mobile phones; and 8% through tablets (Kemp, 2015). A snapshot of digital, social, and mobile in Cambodia is shown in Table 2.3.

Table 2.3 Snapshot of digital, social, and mobile in Cambodia (Kemp, 2015)

<table>
<thead>
<tr>
<th>Categories</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet users</td>
<td>25% of the total population (as of March 2015)</td>
</tr>
<tr>
<td></td>
<td>414% growth (Jan 2014 – Mar 2015)</td>
</tr>
<tr>
<td>Social media users</td>
<td>16% of the total population (as of March 2015)</td>
</tr>
<tr>
<td></td>
<td>100% growth (Jan 2014 – Mar 2015)</td>
</tr>
<tr>
<td></td>
<td>41% growth in Facebook users (Apr – Oct 2012)</td>
</tr>
<tr>
<td>Mobile connections</td>
<td>157% of the total population (as of March 2015)</td>
</tr>
<tr>
<td></td>
<td>27% growth (Jan 2014 – Mar 2015)</td>
</tr>
<tr>
<td></td>
<td>20% of mobile connections are broadband</td>
</tr>
<tr>
<td>Mobile social users</td>
<td>14% of the total population (as of March 2015)</td>
</tr>
<tr>
<td></td>
<td>108% growth (Jan 2014 – Mar 2015)</td>
</tr>
<tr>
<td>Share of web traffic</td>
<td>Desktop/laptop: 45%; Mobile: 47%; Tablet: 8%</td>
</tr>
</tbody>
</table>

2.6 Chapter Summary

The chapter has reviewed literature relating to Cambodia and its education system. I have presented the Cambodian historical, sociocultural, and developmental background and shown how those aspects shape the Cambodian education system and policies. This brief background of Cambodia reveals a complex sociocultural context, a mixture of tradition and modernity which make Cambodia what it is today. The struggle to find a middle ground between tradition and modernity and the recent introduction of ICT to develop this young nation and improve its education system and practices are what make this context unique and worthy of further investigation.

My review of ICT in the Cambodian education system shows that there were ICT policies and Master Plans in place to pave the way for ICT introduction and implementation in education. The state of ICT in the Cambodian social landscape also suggests the growth of ICT, particularly in the area of mobile phone and internet usages, are good signs for ICT adoption and implementation in this education context.
However, the linkage between the policies and actual implementation of ICT to support teaching and learning in an academic context remains obscure. This is due to the fact that ICT has not been widely used in the Cambodian academic context despite its common uses for social activities, and empirical studies on the implementation and practice of ICT in education to support the existing policies are very limited, therefore little is known about ICT usage in this educational context.

To date, literature about ICT in Cambodian education comprises largely government policies and reports from international agencies involved in formulating and implementing ICT in education-related projects. Despite the fact that schools and universities are the key stakeholders in education policy implementations, the literature that reflects student, teacher, and school administrator voices is still very limited. Inference of ICT implementation in education institutions can only be drawn from relevant government policies with limited empirical data on practical applications of ICT in education and the factors that enable or constrain those processes. An intent of the current study is to contribute to filling this gap regarding the introduction and implementation of ICT in the Cambodian higher education context, using data collected from a local institution. It is hoped that lessons learned from the implementation experience will contribute to the development of future ICT policies in Cambodia.

The next chapter reviews key literature relating to ICT introduction, implementation, and integration in education, and discusses the theoretical framework of the study.
Chapter 3: Literature Review

3.1 Introduction

The integration of technology into higher education is a broad and complex topic (Blurton, 1999; Dabbagh & Reo, 2011; Daniel, 2002; Pelgrum & Law, 2003; Selwyn, 2013; Spector, 2012). While the contextual distinctiveness of technology integration in the Cambodian educational context cannot be overlooked, some of the challenges Cambodia faces are not dissimilar to those being experienced in the developing world or those the developed world has experienced. However, each country is unique within the context of its policies, cultural, and socioeconomic circumstances. To understand the complexity of technology integration in education requires a review of the literature beyond studies situated in Cambodia. Therefore, insights have been sought from relevant studies undertaken in the larger developing world and global context, and from the theories and models that underpin technology integration and teaching and learning with ICT.

The literature search was conducted using education databases such as ERIC (EBSCO), Education Research Complete (EBSCO), EdITLib, Educational Research Abstracts Online (Taylor & Francis), and ProQuest Education Journals. In addition to these core databases, online searches using Google and Google Scholar were performed to locate articles which could not be retrieved through the education databases. Since the research study was conducted in a Cambodian context, national and international websites such as the Ministry of Education, Youth, and Sport, UNESCO, and UNDP were targeted for education statistics and background information relating to Cambodia. The key terms used for the literature research strategy included: Cambodia, ICT in education, ICT integration, ICT implementation, technology adoption, online learning environment, technology-enhanced learning, web-enhanced learning, online discussion, online pedagogy, social constructivism, and situated learning. Literature related to wholly online courses, ICT in primary and secondary education, and literature dated older than 1990 were excluded from the review with a few exceptions of theoretical literature.

This chapter reviews key literature related to the topics of ICT introduction and implementation in education, the theoretical framework of technology adoption, and teaching and learning with ICT. In the first part of the chapter, I consider the
introduction of ICT to education in the developed and developing world context and discuss some common ICT adoption rationales and ICT integration and implementation models. I then review a theoretical framework of technology adoption that offers different perspectives on technology adoption trajectories and how people make their decisions to adopt or reject a technology. In the final section of the chapter, I explore the topic of teaching and learning in an online learning environment from the perspectives of social constructivist and situated learning theories. I then draw connections between these theories to teaching and learning with ICT and the implementation of pedagogical change.

3.2 The Introduction of ICT into Education

3.2.1 ICT in Education Policies

According to Oblinger (2012), information technology is currently an important game changer in higher education. The knowledge economy and rapid growth in information technology sectors demand that higher education transforms itself in response to the needs of the next generation and the changing learning environment. The previous chapter addressed how the Cambodian government and the Ministry of Education, Youth, and Sport are responding to the digital technology evolution through the ICT in education policies and the development of the country’s technology infrastructure. From the review of the policies there are expectations that, by introducing ICT into the education system, Cambodia will be able to improve its education services and enhance the teaching and learning practices of its teachers and students.

The introduction of ICT into the Cambodian education policies is a relatively recent development with regard to modernizing and improving its education system, but similar initiatives have been introduced and implemented in other developed countries for decades. Selwyn (2013) claims that the emergence of ICT in various industries in the 1980s and 1990s sparked interest among education policy makers regarding its potential applications in the field of education. Consequently, many developed countries started to formulate their own educational technology policies during that period. Selwyn (2013) summarizes the historical trend of ICT’s introduction to the educational landscape in the following excerpt.
During the 1980s these policies revolved largely around the provision of computers in classrooms and the development of ‘computer literacy’ amongst students and teachers. Policymaking during the 1990s and 2000s then commonly took the form of nationwide programmes of teacher training and support for indigenous IT industries – introduced by national governments keen to ensure that the circumstances existed for the effective educational use of internet-based digital technologies. (p. 64)

As illustrated in Selwyn’s summary, early educational technology policies focused mainly on computer education in schools. This was achieved by installing computers in schools and training teachers and students how to use them. Common justifications for investing in school computer infrastructure during that time included the arguments that computers could improve children’s cognitive thinking (Selwyn, 1999) and that knowledge of computers would prepare them for their future vocations (Selwyn, 1999; Wellington, 2005). These justifications align with the education movement and reform in the late twentieth century, which placed an emphasis on collaborative, student-centred, and lifelong learning (Blurton, 1999; Pelgrum & Law, 2003). As an emerging technological tool, ICT was perceived as playing a crucial role in supporting new teaching methods as well as promoting various innovative education initiatives. School curricula started to cover not only “learning about ICT” as a subject, but also “learning with ICT” which uses technology as a supplement, and “learning through ICT” in which learning is conducted fully via technology (Pelgrum & Law, 2003). Wegerif (2007) summarizes the strengths of ICT in education as follows:

- Provisionality: the ability to change texts and other outputs with minimum cost
- Interactivity: the capacity for feedback and response
- Capacity and range: the capacity to handle large amounts of information and overcome barriers of distance
- Speed and automatic functions: enabling routine tasks to be automated
- Support for multi-modal communication. (p. 180)

As ICT has become more accessible and affordable, the introduction of ICT to education has become a global trend, gradually reaching out to those in the developing world. According to Davison et al. (2000), “IT has been recognised as a means for accelerating development, and as the cost of obtaining IT continues to fall, most
developing countries are now anxious to acquire and adopt IT for their development endeavours” (p. 2). In the early 2000s, many developing countries – Cambodia included – started to integrate ICT into its education system and policies, following a similar pathway to that of the developed world. In the case of Cambodian education, the current foci of ICT integration are on developing ICT infrastructures in schools and universities and on “learning about ICT” to equip students with basic ICT skills such as learning how to use computers and the internet (MoEYS, 2010).

The Cambodian approach to ICT introduction in education policies does not appear to be very different from what other developed countries undertook in the 1990s – addressing the ICT infrastructure, the ICT skills needed for future employment, and the general prospect of ICT improving its education. In a review of national ICT inclusion in the education plans of 13 countries – a mix of developed countries, emerging economies, and developing countries – Zhao et al. (2006) discovered some noteworthy similarities in their educational technology policies, despite their differences in socioeconomic and cultural backgrounds.

Although national ICT plans vary greatly in their length, coverage, and some specific emphasis, generally speaking, they have the same utilitarian educational goals in technology integration in schools, similarly ardent enthusiasm and utopian expectation in technology, and the same images toward students as active learners and teachers as gatekeepers of technology use. (pp. 693-694)

This critical analysis of educational technology policies infers that policies, as a set of documents, can only portray what the government aims to achieve by introducing ICT into its education system. What they are not able to convey is “how and why digital technologies are actually being used in educational settings in any particular country or locality” (Selwyn, 2013, p. 86). In order to understand how ICT impacts on teaching and learning practices it is important that the implementation aspect of ICT use is carefully researched and documented. This will provide evidence of lessons that have been learned and that can be used in the future implementation of ICT in education as well as in the development of future policies.

The claim made by Zhao et al. (2006) on the common portrayal of educational technology goals for students and teachers across different social contexts raises
questions concerning why this is the case and what roles local context plays in understanding educational technology policies and their implementation. Zhao et al. suggest that a reason behind the common portrayal of ICT in education can be attributed to educational ICT integration and implementation in both the developed and developing worlds following similar stages of evolution. This reason is based on the assumption that there is a fixed model or pathway for ICT implementation, and that as late-comers developing countries are likely to have followed the pathway of developed countries. Another reason suggested by Selwyn (2013) is that national ICT in education policies in many developing countries were formulated with the assistance of similar international organizations. By reviewing policy documents alone, little can be learned about their context as the ICT adoption rationales and goals are likely to be similar, despite the contextual differences.

These reasons are further explored in the review of literature in the following sections which contemplate first whether there are any differences in ICT adoption rationales in the developed and the developing world contexts, and then if there is a fixed pathway or framework of ICT integration and implementation that can lead to the state of “ICT integration” which educational technology policies aim to achieve.

3.2.2 Similar Adoption Rationales, Different Contexts

A question that is usually asked when ICT is introduced into a particular education context is “Why ICT?” and “What differences will ICT make to the existing teaching and learning practices?” A review of key literature related to the introduction of ICT (Mandinach, 2009; Pelgrum & Law, 2003; Saettler, 1990; Wellington, 2005) suggests three general ICT adoption rationales which reflect the key expectations of ICT uses in education settings. Those rationales include societal and vocational reasons, efficacy and efficiency reasons, and learning and pedagogical reasons.

The societal and vocational rationales of ICT adoption stress the interrelationship between an information society, future employment, and the global community. Gudmund Hernes, former director of the UNESCO’s International Institute for Education Planning, argues that technology integration might be a complex process, but its benefits are significant for educational development.
The integration of computers and technology into schools is an expensive and sometimes complex process. It requires all the necessary equipment, competent staff to get it up and running, technical support, and teaching of others to use it correctly and effectively. However, its advantages are evident, and benefits that it can bring to schools and their pupils are significant enough to make the introduction of technology into the classroom one of the priorities of educational planners in both developed and developing countries. (Pelgrum & Law, 2003, p. 7)

In their review of ICT in education around the world, Pelgrum and Law (2003) point out that the integration of ICT in education is “accompanied by a commonly accepted rhetoric that education systems would need to prepare citizens for lifelong learning in an information society” (p. 20). This draws attention to the need for integration of ICT so that students will be able to function in the information society and participate in the global learning network. Even in developing countries like Cambodia, the prospect of an information society is well-embedded in its government policies (MoEYS, 2014; Royal Government of Cambodia, 2004). As noted by Mandinach (2009), “in order to become part of the global community, countries are examining their educational systems to determine how the infusion of ICT will enhance the ability to provide an education that will enable students to better function in a global society” (p. 140).

Although the aspiration to be part of the global community is well acknowledged in policy documents (Pelgrum & Law, 2003), many scholars (for example, Davison et al., 2000; Selwyn, 2013; Zhao et al., 2006) caution the use of this information society rhetoric, particularly in the context of the developing world where educational goals are often discussed in relation to the notion of modernization and globalization. According to Selwyn, ICT can be included in education policies for the wrong reasons, such as to make the policies appear to be modern and globally acceptable while overlooking other important educational challenges. “If technology has not been introduced into educational settings primarily for educational reasons, then we cannot expect it to have ended up being used in educational ways” (Selwyn, 2007, pp. 38-39). It follows then that while the societal and vocational rationales of ICT adoption are important for preparing students for the information society, they need to be carefully considered in the developing world context so that the introduction of ICT genuinely aligns with the local needs and context.
ICT is also believed to enhance the efficacy and efficiency of the education system by helping to reduce costs and making education more accessible to students (Bates, 2000; Blurton, 1999; Daniel, 2002). Examples of using ICT for these particular reasons can be found in studies on virtual and distance learning (Ko & Rossen, 2010; Latchem & Jung, 2010; Wells, de Lange, & Fieger, 2008) and in reports from international development projects (for example, UNESCO, 2007). The justification to support the use of ICT to broaden education access is that ICT could create learning opportunities that otherwise would not be available to learners in remote areas or underprivileged communities. This rationale is commonly applied to education in the developing world, but the efficacy and efficiency of ICT need to be carefully discussed to yield maximum returns of investment. Mandinach (2009) states that

> [d]eveloping countries must make difficult decisions about resource allocation. Oftentimes the decision point is whether to invest in an ICT infrastructure that may stimulate economic, educational, and cultural growth, or provide for the basic necessities for their citizenry. (p. 140)

As noted in the review of the Cambodian ICT policies in the previous chapter, resource allocation is one of the challenges for Cambodia, and with limited funding in the ICT sector (UNESCO, 2013) efficacy and efficiency are important considerations for their ICT adoption in education.

The third rationale, which is the focus of the current study, is related to improving learning and pedagogy. Educational benefits of ICT, such as introducing innovative student-centred approaches (Pelgrum & Law, 2003) and enhancing student learning experiences and teaching practices (Anderson, 2010; Wellington, 2005), are often raised to support educational technology policies and their implementation. There is a plethora of research studies that look into the use of ICT to support or enhance learning, ranging from regular uses of ICT in the classroom context to learning transformation through ICT. Many researchers (for example, Brodahl, Hadjerrouit, & Hansen, 2011; Mompean, 2010; Soares, 2008; Wheeler & Wheeler, 2009) investigate the use of different ICT tools for teaching and learning practices, and note the challenge of measuring these educational benefits due to the contextual differences and the complex relationships between technology and its users. The literature on ICT in education in the developing world (Davison et al., 2000; Kozma & Vota, 2014; Mandinach, 2009; Peeraer & van
Petegem, 2011; Richards, 2004) also reveals some challenges of transitioning from traditional pedagogical approaches to contemporary approaches with the support of ICT.

Peera and van Petegem (2011) state there are two lines of critiques of ICT in education in the developing world: “disappointingly slow uptake of ICT in education” and the non-existence of “educational revolution in teaching and learning” (p. 975). The main reason for this, they suggest, is the assumption that teachers and students in the developing world will be able to transform their teaching and learning provided that they have sufficient IT access and skills. Yet in their study of ICT in teacher education in Vietnam, Peera and van Petegem found that the country’s sociocultural setting and value system hindered the transformation of a teacher-centred approach. Likewise, Richards (2004) agrees that a cultural clash could exist when using ICT to transform traditional teaching and learning practices. Education evolution, as suggested in the previously discussed literature, does not appear by simply installing computers in schools or universities. Essentially, changing teaching and learning practices with ICT requires teacher professional development and the time to develop a deep understanding of the sociocultural context surrounding teaching and learning practices.

The general rationales presented and discussed here provide a glimpse into the key expectations of ICT adoption in the developed and the developing world contexts. However, it is apparent that the introduction of ICT in less developed countries with shortages of resources and technological skills involves more challenges than in developed countries. Some scholars (Latchem & Jung, 2010; Pelgrum & Law, 2003; Zhao et al., 2006) who study ICT in education across different countries suggest that developing countries could take lessons learned from developed countries to avoid making the same mistakes and reinventing the wheel. However, taking up new technologies developed for different social contexts could be a challenge, and contextual relevance needs to be reconsidered whenever ICT is implemented in a new context (Kozma & Vota, 2014; Oliver, 2014; Selwyn, 2013).

Despite the fact that developing countries might adopt similar rationales for ICT in education to developed countries, the applications and interpretations of those rationales can vary considerably. For instance, the societal and vocational rationale does apply in the developing world, but its focus is more on modernizing its education system or on
catching up with others. Likewise, the discussion on the efficacy and efficiency of ICT in the developing world is mainly focused on helping its education system to reach their development goals. Learning and pedagogical rationales – when discussed within the developing world context – involve not only enhancing teaching and learning practices but also negotiating between new learning methods introduced by ICT and traditional ways of teaching and learning. Therefore, it can be concluded that while ICT adoption rationales or goals as stated in educational technology policies might appear to be similar, the interpretations and applications of those rationales in different social contexts are not.

3.2.3 ICT Integration and Implementation Models

In this section, I continue the investigation of the argument presented in Section 3.2.1 into whether there is a fixed pathway or framework for ICT planning and implementation that can lead to the state of “ICT integration” which many educational technology policies aim to achieve. The term “ICT integration” is often mentioned in the educational technology literature (for example, Pelgrum & Law, 2003; Spector, 2012) as the common goal of introducing ICT into education settings. While many research studies (for example, Bingimlas, 2009; Dabbagh & Reo, 2011; Hart, 2007; Hsu & Sharma, 2010; Tu, Sujo-Montes, Yen, Chan, & Blocher, 2012; Wang, 2008) agree on the positive denotation of the term, there are different perspectives on what ICT integration entails and what are the factors or steps that can lead to it.

According to Wang (2008), ICT integration is a combination of three key elements of instructional design: pedagogy, social interaction, and technology (see Figure 3.1). These elements are constructed around the theoretical foundation of social constructivist learning theories, interactive design, and the usefulness of the technology system (its utility and usability). The pedagogical element focuses on the teaching and learning aspects such as learning activities, design, and scaffolding while the social interaction element focuses on collaboration and networking. The third element, technology, includes the type of technology to be implemented and how learners interact with the technology.
Figure 3.1 Wang's generic model for ICT integration (Wang, 2008)

Wang’s model provides a concise framework and a useful, flexible guideline for teachers to integrate ICT into their instructional design. This thematic view of ICT integration as a combination of different core components is shared by many researchers investigating similar topics (for example, Dabbagh & Reo, 2011; Hart, 2007; Hsu & Sharma, 2010; Spector, 2012; Tu et al., 2012). In Hart’s grounded theory study on technology integration in education, she noticed that while there is a large number of studies on the integration of technology in education, technology integration might mean different things in different educational contexts. She proposes a model which provides a broader view of technology integration beyond instructional design that includes different aspects of the school ecology, such as school management, curriculum, instruction, and assessment (see Figure 3.2). According to Hart, these various aspects of the school ecology are related to each other in different ways, and it is important that they are considered as part of the technology integration or implementation process. ICT integration in this model appears to revolve around the reorganization of schooling, which is triggered by the introduction of ICT. The ecological view of change implementation is the highlight of this model, although little is mentioned about the involvement of school administrators, teachers, and students who are the key stakeholders in the system.
Wang’s generic model for ICT integration and Hart’s grounded theory model of technology integration highlight different elements of instructional design and school ecology that construct a framework for ICT integration in education. In addition to these thematic views of ICT integration, other researchers (for example, Mills & Tincher, 2003; Moersch, 1995) regard integration as a stage within the technology implementation process.

Moersch (1995) asserts that ICT integration is one of the seven stages of the Level of Technology implementation (LoTi). LoTi was created to measure classroom use of technology, and it consists of seven key stages: nonuse, awareness, exploration, infusion, integration, expansion, and refinement. Each stage is a step-by-step process building up from the awareness stage, in which different stakeholders are informed about the technologies and their usages, to the refinement stage in which the stakeholders are able to refine their practices through the use of technologies. ICT integration in this framework appears to mark a stage in which the users are both sufficiently capable and willing to make effective use of the technologies to enhance their practices. If ICT planning and implementation follow the pathway of the Levels of Technology implementation, it will start by ensuring that the users, who commonly are teachers, are aware of the technologies and have the opportunities to explore them prior to their utilization. Their acquisition of knowledge and skills will then prepare the users for integrating the technologies into their classes, and subsequently lead to the expansion and refinement of their practices. This implementation framework is based on the assumption that the users need to be aware of and be able to build their skill sets.
before they can successfully integrate technology into their classes. It aligns with the TPACK (Technological, Pedagogical, and Content Knowledge) framework introduced by Mishra and Koehler (2006), which addresses the three core skills – technology, pedagogy, and content knowledge – that teachers need in order to integrate technology into their classes.

Another framework of technology implementation, which also appears to have a strong focus on skills development, is the Technology Implementation Standards Configuration Matrix (TISCM) developed by Mills and Tincher (2003). The TISCM suggests different standards for technology integration and evaluation, which Mills and Tincher summarize into three phases: using technology as a tool for professional productivity; facilitating and delivering instruction using technology; and integrating technology into student learning. Mills and Tincher (2003) attest that teachers, who are the key technology implementers, progress “from novice technology operators who use technology as a tool for professional productivity to technology facilitators who use technology as a tool for the delivery of instruction to expert technology integrators” (p. 384). The TISCM process of technology implementation is similar to Puentedura’s (2014) Substitution, Augmentation, Modification, and Redefinition (SAMR) model that categorises technology integration based on its different functionalities. From this developmental approach to integration, technology implementation appears to be a unidirectional linear process starting from the beginner stage and ending with the advance stage, in which the implementation reaches the goal of integration or transformation.

Both Moersch (1995) and Mills and Tincher (2003) view technology integration as part of the educational change implementation, but other scholars (Burke, 2014; Hall & Hord, 2006; Trowler, 2008) argue that change implementation is rarely a linear process. Burke (2014) opines change is a complex process, and the linear developmental approach to change might not be able to capture this complexity.

When planning organization change, the process is usually linear, that is, Step 1 or Phase 1, then Step 2, 3, and so on. And although an attempt is made in the implementation of change to follow these steps or phases, what actually occurs is anything but linear. The implementation process is messy: Things don’t proceed exactly as planned; people do things their own way, not always according to the plan. (p. 10)
While Burke’s statement addressed organizational change in general, it has implications for technology implementation in educational institutions, since the rationales for introducing new technologies are usually related to fostering positive changes in the organization or the practices of its stakeholders. For instance, in the Cambodian *Master Plan for Information Communication Technology in Education* (MoEYS, 2010), the provision of ICT training for lecturers and students in higher education aims to not only develop their ICT skills but also hopes that with adequate ICT skills the lecturers and students will be able to employ ICT to support and enhance their teaching and learning practices, which is part of the educational change process.

Adding to the view of ICT integration as part of a change implementation process, the Gartner Hype Cycle (Linden & Fenn, 2003) suggests a technology implementation framework that addresses the fluctuation of change implementation described by Burke (2014). The Hype Cycle was introduced by the IT research firm, Gartner, to map the pathway of technology implementation. As shown in Figure 3.3, there are five key phases of technology implementation: the technology trigger; the peak of inflated expectations; the trough of disillusionment; the slope of enlightenment; and the plateau of productivity.

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**Figure 3.3 The Gartner Hype Cycle (Linden & Fenn, 2003)**

The Gartner Hype Cycle suggests that technology implementation does not always have an upward trend and that it might fluctuate as it progresses toward maturity. After the technology is triggered, there is a steep rise in visibility until it reaches the peak that is the consequence of inflated expectations. Then the expectations start to decrease.
resulting in the trough of disillusionment, before commencing to slowly increase again to become the slope of enlightenment, and finally levelling out to create the plateau of productivity. Although the Gartner Hype Cycle is usually applied to IT research, this pathway of implementation might have some implications for ICT use in education particularly in the way that it addresses the high expectations of technology in the early stage of implementation (Peeraer & van Petegem, 2011; Selwyn, 2013; Spector, 2012). Spector (2012) notes that “when a new technology is introduced, it is tempting to believe that its effects will be immediate and significant. However, the reality is that the effects of educational technologies on teaching and learning are typically delayed” (p. 54). Some literature (Rindova & Petkova, 2007; Wells, Campbell, Valacich, & Featherman, 2010; Wells et al., 2008) also notes the affective impacts of technology, such as the high level of enthusiasm and interest at the early stage of implementation, and caution that those impacts might decrease over time as the implementation progresses. This cycle of the fluctuations of change implementation provides a different insight into ICT integration and contradicts the earlier models proposed by Moersch (1995) and Mills and Tincher (2003) on the linear developmental approach to change.

This review of ICT integration and implementation models suggests different stances on ICT integration. These include: ICT integration as a combination of different elements in instructional design and in the school ecology (Hart, 2007; Wang, 2008); ICT integration as a stage of the technology implementation process (Mills & Tincher, 2003; Moersch, 1995); and ICT integration as a change process (Burke, 2014; Hall & Hord, 2006; Hart, 2007; Linden & Fenn, 2003; Trowler, 2008). From these stances it can be inferred that the concept of ICT integration might have different foci depending on different educational contexts, and that the pathway of ICT implementation should not always be thought of as fixed or linear.

### 3.3 The Theoretical Framework of Technology Adoption

In my examination of the processes of ICT introduction and implementation, I refer to technology adoption theories to provide more insights into the cognitive, affective, and behavioural dimensions of the ICT uptake such as why and how ICT is adopted by a certain group of people. I review three key technology adoption theories: the Diffusion of Innovations (DoI) theory; the Technology Acceptance Model (TAM); and the Concern-Based Adoption Model (CBAM). These theories are grounded in the fields of
sociology, information systems, and education respectively. Accordingly, they offer different perspectives on technology adoption trajectories and on individuals’ decisions to accept or reject a technology innovation.

3.3.1 Diffusion of Innovations (DoI) Theory

The theory of Diffusion of Innovations was first introduced by Everett Rogers in 1962 and has since become one of the most widely applied theories in explaining why and how innovations are adopted (Rogers, 2003; Straub, 2009). In the current study, the online learning environment is regarded as an innovation since it meets the general definition of innovation as “an idea, practice or object that is perceived as new by an individual or other unit of adoption” (Rogers, 2003, p. 12). The theory of Diffusion of innovations is referred to in order to understand the participants’ adoption decisions when they start to implement the online learning environment.

The strength of this theory, as noted by Straub (2009), is “in the broad foundation it provides to understand the factors that influence the choices an individual makes about an innovation” (p. 630). Some of the key features of Rogers’s theory include: the rules of innovation; the adoption decision process; and the four key components of the diffusion of innovations. The rules of innovation raise five key principles underpinning effective adoption.

1. Innovation is more likely to be adopted if adopters think it is beneficial for them
2. Innovation should be compatible with the norms and values of the adopters
3. Innovation that is easy to use is more likely to be adopted
4. Adopters should get a chance to trial the innovation
5. The more observable an innovation is, the higher its chance for being adopted.
   (Rogers, 2003)

These principles suggest a close relationship between an innovation and its potential adopters, and have provided guidance for implementing a new innovation across disciplines (Abrahams, 2010; Al-Jabri, 2012; Cain & Mittman, 2002; Kim & Stefanone, 2010; Roman, 2003). Abrahams’s study on the issues and barriers to adoption of instructional technology in higher education found that if faculties and students are to adopt new technology in their teaching and learning practices, they must be able to foresee the benefits of the new innovation (rule 1) and decide whether or not it is
compatible with what they are doing (rule 2). However, it should also be noted that introducing technology into an education setting might require a considerable amount of support for its development and maintenance (Dabbagh & Kitsantas, 2012; Nworie & Haughton, 2008), and what the rules of innovation are not able to pinpoint is how the adoption and diffusion process can be facilitated (Straub, 2009).

Although the rules of innovation have identified some characteristics which could increase the likelihood of innovation adoption, not all great innovations will be adopted (Rogers, 2003). According to Rogers, individuals make the decision as to whether or not to accept an innovation by going through five stages: knowledge, persuasion, decision, implementation, and confirmation. In stages one and two, individuals start to be aware of an innovation and then gather more information about it. Their knowledge informs their subsequent decision to accept or reject the innovation in stage three. If they accept the innovation, in stage four they get to trial the innovation and through personal reflection and evaluation they confirm their decision to continue or discontinue it in stage five. As a result of this adoption decision process, Rogers suggests that each individual will have undergone one of these trajectories: adopt and continue to adopt the innovation; adopt and discontinue after some time; reject and later adopt the innovation; and reject and continue rejection. An implication that can be drawn from the adoption trajectories is that adoption decisions might change over time as adopters become more informed about the innovation.

In addition to looking into different adoption decision patterns, the Diffusion of Innovations theory also places adopters in different categories based on when they decide to adopt an innovation. Those categories include innovators, early adopters, early majority, late majority, and laggards. The adoption-diffusion normal curve (Figure 3.4) plots the percentages of adopters in each group in relation to time.
As shown in the graph in Figure 3.4, the majority of adopters are in the early majority and late majority groups with a combined percentage of 68, while the others are in the innovators, early adopters, and laggards groups. Straub (2009) notes that these groups provide a simple way to label the adopters, but he also observed that interestingly individuals in the same group also tend to share some commonalities with regard to personality, behaviour, and socioeconomic background. For example, “early adopters tend to have higher socioeconomic status, have broad access to communication methods… and have higher capacity for uncertainty for change” (Straub, 2009, p. 631).

By studying these different types of adopters, researchers can begin to understand why an individual adopts an innovation earlier or later than another individual. This has some implications for the current study which examines the implementation of an online learning environment within a period of time. For example, the participants of the study might adopt the online learning environment at different times and might belong to different categories of adopters.

In addition to the categories of adopters, Rogers (2003) also identifies four key factors that determine how fast an innovation spreads and its adoption rate: the innovation itself; the communication channels; the social system; and time. Innovation attributes, such as ease of use and compatibility could influence the diffusion trajectory of that innovation, and the social system and communication channel that circulates the innovation might also affect its diffusion rate. For instance, Rogers found that introducing an innovation to a group of people who had similar interests or background often results in a better diffusion rate than introducing the same innovation to a more diverse group. Nevertheless, he also mentions that it is still important to view an
innovation within a broader context of how it relates to the social system and other innovations.

The Diffusion of Innovations theory encourages change agents and opinion leaders to ask the ‘why’ questions of innovation such as why an innovation is adopted or why it is successful or unsuccessful. Meanwhile, it also cautions them about pro-innovation bias which includes the assumptions that everyone will have to adopt the innovation, that the innovation will have to diffuse rapidly, or that there will be no future change to the innovation. Overall, the theory is well-grounded and has provided some very useful insights into the nature of innovation adoption and diffusion. However, “because it can be applied to any discipline, a specific implementation of the model may require some tweaking to suit the individual situation” (Straub, 2009, p. 632).

3.3.2 Technology Acceptance Model (TAM)

While the Diffusion of Innovations theory focuses on an individual’s adoption pattern embedded in a broader social system, the Technology Acceptance Model focuses more on what makes an innovation adoptable. The model was first introduced by Davis (1989) to predict and explain user acceptance of information technology. It is based on the assumption that an individual’s acceptance of an innovation depends on two internal beliefs: perceived usefulness; and perceived ease of use. Perceived usefulness is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989, p. 320), and perceived ease of use is “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989, p. 320). As shown in Figure 3.5, the individual’s “perceived usefulness” and “perceived ease of use” could influence their attitude toward the use of IT and their intention of use, which ultimately affects their actual use of the system. It appears that in this case the “actual use of the system” equals “acceptance of the system”.

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The importance of the Technology Acceptance Model (TAM) in promoting discussion on users’ perceptions of technology has been widely acknowledged in the literature (for example, Lee, 2003; Legris, Ingham, & Collerette, 2003; Lui, Chen, Sun, Wible, & Kuo, 2010; Venkatesh, Morris, Davis, & Davis, 2003). The general consensus is that TAM’s succinct quantitative measures make it easy for other researchers to apply and extend the model. The two main constructs – perceived usefulness and perceived ease of use – were later extended by streams of research studies that added smaller branches of variables to elaborate on the original model (Lee, 2003; Legris et al., 2003; Lui et al., 2010; Venkatesh et al., 2003). For instance, in Liu’s study TAM is used as the backbone to construct other variables affecting users’ intentions to establish an online learning community. TAM has also helped inform later theories, such as the United Theory of Acceptance and Use of Technology (Venkatesh et al., 2003), which has added more breadth and depth to TAM by including other important determinants, for example social influence and facilitating conditions in order to better explain and predict technology acceptance and usage.

Despite its simplicity and applicability in various disciplines, TAM also has some limitations. Upon reviewing TAM literature, it appears that the goal of TAM research is to develop more constructs or new versions in order to expand the original model. Lee (2003) comments on this “cumulative tradition” of TAM research, asserting that “TAM researchers may have fallen into the trap of following an incremental approach based on replicating previous studies with minor adjustments” (p. 766). Another limitation of the original TAM, as highlighted by Straub (2009), is that it disregards individual differences in adopting an innovation. Unlike the Diffusion of Innovations theory, individuals’ decisions to accept or reject an innovation in TAM are assumed to be independent choices detached from the social system that could influence those choices.
3.3.3 Concerns-Based Adoption Model (CBAM)

Although the discussion of the two aforementioned theories has identified different factors that can lead to individual acceptance of an innovation, most of these factors are related to what makes an innovation adoption work, rather than what might hinder it. The Concerns-Based Adoption Model (CBAM) looks at a different side of the innovation adoption story by trying to understand adoption from the concerns of those who are affected by it the most. This model was introduced by Hall and colleagues (Hall, 1979; Hall, George, & Rutherford, 1977) to study teachers’ concerns when implementing and facilitating change within education institutions.

Concern is defined as “the composite representation of the feelings, preoccupation, thought, and consideration given to a particular issue or task” (Hall et al., 1977, p. 5). CBAM views individuals’ concerns as part of the overall change implementation, making the following assumptions.

1. Change is a process, not an event.
2. Change is accomplished by individuals.
3. Change is a highly personal experience.
4. Change involves developmental growth.
5. Change is best understood in operational terms.
6. The focus of facilitation should be on individuals, innovations, and context. (Hord, Rutherford, Huling-Austin, & Hall, 1987)

To successfully implement a new innovation, CBAM focuses on three main components of change: Stages of Concern (SoC); Levels of Use (LoU); and Innovation Configuration (IC). According to Hall (1979), individuals could go through multiple stages of concern when adopting an innovation, such as awareness, informational, personal, management, consequence, collaboration, and refocusing (see Table 3.1).

Table 3.1 Stages of concern (Hall et al., 1977; Hall & Hord, 2006)

<table>
<thead>
<tr>
<th>Stages</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – Awareness</td>
<td>Little concern about the innovation</td>
</tr>
<tr>
<td>1 – Informational</td>
<td>General awareness of the innovation</td>
</tr>
<tr>
<td>2 – Personal</td>
<td>Concerns about personal costs of the innovation such</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>3 – Management</strong></td>
<td>Concerns relating to how to use the innovation such as efficiency, task management, and organization</td>
</tr>
<tr>
<td><strong>4 – Consequence</strong></td>
<td>Concerns about the impacts of the innovation on students</td>
</tr>
<tr>
<td><strong>5 – Collaboration</strong></td>
<td>Concerns relating to working with others</td>
</tr>
<tr>
<td><strong>6 – Refocusing</strong></td>
<td>Concerns relating to exploring other uses of the innovation</td>
</tr>
</tbody>
</table>

These stages of concern look into the affective side of change, and they can be assessed through various tools such as interviews, open-ended concerns statements, and stages of concern questionnaires (Hall et al., 1977; Hall & Hord, 2006).

In addition to the stages of concern, CBAM also addresses the behavioural and developmental aspects of change by studying an individual’s level of use. Eight levels of use have been identified with individuals going through the change process: (1) nonuse, (2) orientation, (3) preparation, (4) mechanical, (5) routine, (6) refinement, (7) integration, and (8) renewal (Hall, 1979; Hall et al., 1977; Hall & Hord, 2006). Hall and Hord refer to individuals in the first three levels as “nonusers”, while those who pass through level 4 onwards are referred to as “users”. Unlike the Diffusion of Innovations theory, CBAM combines innovators, normal users, and laggards into one overarching group as “users”, without making any attempt to distinguish the types of adopters by their adoption start time. Instead, the model is more interested in people’s behaviour and reaction towards change.

The third dimension of change mentioned in the CBAM is called Innovation Configuration. The concept of Innovation Configuration is that innovation might not be used by the adopters (teachers in this case) the way it is intended (Hall & Hord, 2006). The researchers noted that the developers of an innovation might be able to create training manuals or provide training courses for potential adopters, but they are incapable of mapping the whole pathway of change or pinpointing exactly how the innovation is going to be used. This claim by Hall and Hord aligns with the argument of the Technology Appropriation Model proposed by Carroll, Howard, Vetere, Peck, and
Murphy (2001) that technology is not always appropriated in the way it is intended. It is not unusual for adopters to adapt the technology innovation to match with their current practices, or use the technology in a different way from the intent of its creators. To mitigate these issues, Hall and Hord propose the development of an Innovation Configuration map which details the innovation components and its variation of use to assist the adopters in the implementation process.

While the Concerns-Based Model has provided good insights into the affective, behavioural, developmental, and operational aspects of change, it has a few limitations. According to Straub (2009), the model appears to regard individuals as naturally resistant to change and has placed little consideration on their positive views towards change. In addition, CBAM was created primarily to diagnose teachers’ concerns, and some questions are raised about the reliability and validity of the CBAM diagnostic tools, such as the stages of concern questionnaire (Anderson, 1997; Straub, 2009). Anderson suggests that the model could be improved by studying not only individuals’ concerns about change but also the connections between individuals’ different patterns of changes within their organization.

3.3.4 A Summary of the Discussed Technology Adoption Theories

The previously discussed technology adoption theories have provided an interesting range of perspectives on innovation diffusion, technology acceptance, and change implementation. The Diffusion of Innovations theory has extensively described innovation adoption and diffusion by focusing on the cognitive, behavioural, and contextual aspects of the process. Its strength lies in the strong connection it makes between individuals and the social system surrounding them although it has overlooked how to facilitate that connection.

The Technology Acceptance Model, on the other hand, provides a succinct framework to study technology acceptance and usage with a strong focus on the relationship between people’s beliefs and their behaviour. Nevertheless, it does not provide an adequate explanation of how those beliefs are formed or how an individual’s adoption might vary in different contexts.

The Concerns-Based Model, which originates from the education field, emphasises the affective and behavioural aspects of change implementation by focusing on the
concerns of teachers whom the model creators believed are the key agents of change. Despite the importance of its three diagnostic dimensions (Stages of Concern, Levels of Use, and Innovation Configuration), their reliability and validity in assessing and evaluating change are still arguable. A summary of the strengths, limitations, and key focuses of the three adoption and diffusion theories is provided in Table 3.2.

Table 3.2 Summary of the three adoption and diffusion theories

<table>
<thead>
<tr>
<th>Theories</th>
<th>Strengths</th>
<th>Limitations</th>
<th>Dimensions of Adoption</th>
</tr>
</thead>
<tbody>
<tr>
<td>DoI</td>
<td>Extensive description of innovation and adoption and diffusion process</td>
<td>Prescriptive</td>
<td>Cognitive, Behavioural, Contextual</td>
</tr>
<tr>
<td>TAM</td>
<td>Succinct, easy to apply and extent</td>
<td>Lack of contextual explanation</td>
<td>Cognitive, Behavioural</td>
</tr>
<tr>
<td>CBAM</td>
<td>Concerns of the adopters</td>
<td>Validity of the diagnostic tools</td>
<td>Affective, Behavioural, Operational</td>
</tr>
</tbody>
</table>

Although the three adoption and diffusion theories have different interests and foci, they seem to share some commonalities in the way they study innovation adoption and diffusion. First, there is a general consensus that adoption is primarily based on an individual’s choices, and an individual’s different attributes from their cognitive to affective behaviour could influence their decisions and reactions towards an innovation. Second, the discussed theories involve at least two important stakeholders of innovation adoption: change agents or facilitators; and general adopters. The study of innovation adoption seems to view the general adopters – be they employees, technology users, or teachers – as passive receivers of innovation, and the diffusion process usually flows from the change agents to the general adopters. Third, as also noted by Straub (2009), all of the three theories share the same implicit goal which is to increase the innovation adoption and diffusion rate since low adoption or discontinuance is usually taken as non-success. This bias could neglect or undermine other important challenges that might occur during the adoption and diffusion process.
From this review of the technology adoption theories, it can be inferred that three key elements need to be examined when studying the introduction and implementation processes of the online learning environment in the current study: the online learning environment as an innovation, which includes attributes such as simplicity, usefulness, and compatibility; the individual attributes of the participants such as self-efficacy, experience, personality, and expectations; and the academic and social context of the study, which includes attributes such as pedagogies and learning approaches and organizational norms and culture. The interrelationship between all of these elements will provide insights into why the participants in the current study adopt the online learning environment and how the online learning environment is appropriated in the academic context.

The next section shifts the focus from technology adoption in order to explore the teaching and learning aspects within an online learning environment. It should be noted that introducing a technology innovation, such as an online learning environment in an academic context as is the case in the current study, is different from introducing a technology innovation to the general public. This is not only because it has smaller scope, but also because it is not simply about adopting and using the technology but rather using it to support the teaching and learning practices of the adopters (lecturers and students in the study). Therefore, key literature relating to online pedagogies and learning approaches needs to be reviewed critically in order to examine the complexity of teaching and learning in an online environment.

3.4 Teaching and Learning in an Online Environment

3.4.1 Online Learning Environment

The origin of online learning environments can be traced back to the 1980s when learning and content management systems started to enter the education market to provide a centralized learning system to assist educators in disseminating course materials and managing class projects and activities (Brown, 2010; Dabbagh & Reo, 2011; Jump, 2011; Lipeikiene, 2003; Wells et al., 2008). Traditional online learning environments usually come in the form of a one-size-fit-all system serving mostly as a one-way learning resource sharing for students (Lipeikiene, 2003). Collaborative online learning environments, as often used nowadays, usually integrate different Web 2.0 tools such as online discussion forums, blogs and wikis into the online system. The new
wave of online learning environment incorporates three key components of learning: “the fostering of social networks and communities, the emphasis on creation rather than consumption, and the decentralization of content and control” (Downes, 2007, p. 1).

This incorporation adds to the complexity of an online learning environment beyond simply being “a web-based software that is designed to host or house the learning activities” (Harasim, 2012, p. 98).

Dillenbourg, Schneider, and Synteta (2002) note that an online learning environment can be regarded as an information space, a social space, and a space in which different technologies and teaching approaches are integrated. It is an information space since it helps with storing and distributing information among teachers and students, and it is a social space since it allows teachers and students to communicate with each other online. The researchers address the distinctive features that constitute a learning environment in the following way:

A book can hardly be described as a learning environment. But, reading a book in a seminar, discussing with other students, writing a summary for the tutor… do constitute a learning environment. Similarly, a set of Web pages does not constitute a virtual learning environment unless there is social interaction about or around the information. (Dillenbourg et al., 2002, p. 5)

Thus, an online learning environment is not simply an online system where teaching and learning are conducted, but it is also a social space co-constructed by teachers and students. The importance of social interaction in an online learning environment is addressed in many research studies (for example, Collison, Elbaum, Haavind, & Tinker, 2000; Harasim, 2012; Hew & Cheung, 2012; Irwin & Berge, 2006; Ko & Rossen, 2010; Mayes, 2006; Tu & McIsaac, 2010). According to Mayes, there are three types of interactions which can lead to meaningful learning in a learning environment: interaction with a concept such as reading the learning materials; interaction with a task such as doing class exercises; and social interaction between teachers and students and students. The first two types of interaction are commonly found in the traditional teacher-centred learning approaches in which knowledge is generally distributed or transferred from teachers to students. Hew and Cheung (2012) mention that the emphasis on social interaction, as a key learning component, does not imply that:
Traditional learning is no longer relevant or useful but that during social learning, the interaction or discussion among students could generate extra activities … as well as additional cognitive mechanisms … which may not occur as frequently in traditional, individual learning. (p. 1)

Two forms of social interaction commonly found in an online learning environment are online discussion and online dialogue, which provide opportunities for students to share their ideas and add to or challenge other people’s perspectives (Hew & Cheung, 2012; Salam, 2011; Wegerif, 2007; Xia, 2011). There is a growing number of studies that focus on the use of technology as a tool to promote online discussion (Bernsteiner, Ostermann, & Staudinger, 2010; Brodahl et al., 2011; Cluett & Skene, 2011; Mompean, 2010), the comparison between online and face-to-face discussion (Caspi, Chajut, & Saporta, 2008; Hew & Cheung, 2012; Nørskov & Rask, 2011; Valentinto, 2011; Wegerif, 2007), and the role of online discussion in students’ knowledge construction and development (Hew & Cheung, 2012; Irwin & Berge, 2006; Jaques & Salmon, 2007; Salam, 2011; Wegerif, 2007). The general consensus among researchers is that by participating in online social interactions and online discussions students can transform from being passive receivers of knowledge to being the knowledge contributors, and that the two-way interactions between teachers and students and students and students play a crucial role in students’ learning.

While discussion focuses on “the exchange of ideas with a view to sharing information and solving problems” (Alexander, 2008, p. 110), the goal of dialogues is to reach “common understanding through structured, cumulative questioning and discussion” (Alexander, 2008, p. 110). Seminal researchers of teacher-student and student-student interactions (for example, Alexander, 2008; Mercer, 2000; Wegerif, 2007) advocate for the use of dialogue to develop and enhance teaching and learning practices. Mercer (2000) mentions three types of talk to support dialogic teaching: disputational talk, cumulative talk, and exploratory talk. He notes that the use of exploratory talk plays an important role in students’ learning as it allows students to “engage critically but constructively with each other’s ideas” (Mercer, p. 153). Wegerif (2007) adds that “the potential for interactivity of ICT can be used to provide contingent support for dialogues” (p. 181) in addition to face-to-face classroom dialogue. As Wegerif argued, dialogue is not simply a means to achieve a learning goal but that dialogue is an end in itself that promotes learning how to learn and higher order thinking.
In order to have a deeper understanding of the dynamics of social interactions through online discussions and dialogues, I now refer to the theories of social constructivism and situated learning, which have been widely used in the literature to explain how people learn through social interactions.

3.4.2 Social Constructivism and Situated Learning

Social constructivism is a branch of epistemology and learning theory originating from the work of Vygotsky (1962) in the developmental psychology field of study. It is based on the constructivist philosophical framework with the key assumptions that knowledge is continuously evolving, knowledge is constructed through individual experiences and interpretation, and learning is fundamentally an active process (Ally, 2004; Harasim, 2012; Hung & Chen, 2001; Piaget, 1968). As Ally (2004) noted,

> constructivists see learners as being active rather than passive. Knowledge is not received from the outside or from someone else; rather, it is the individual learner’s interpretation and processing of what is received through the senses that creates knowledge. The learner is the center of the learning, with the instructor playing an advising and facilitating role. (p. 18)

Although social constructivism shares these common assumptions with constructivism, it distinctively stresses the importance of the social context in knowledge construction and learning transformation processes (Harasim, 2012). According to social constructivist theory, knowledge evolves through social interactions and is constructed within a sociocultural context. Moreover, learning involves collaboration and integration into a community (Harasim, 2012; Hung & Chen, 2001). These principles of social constructivism have been applied to various online learning research studies from the use of Web 2.0 tools to support teaching and learning practices (Brodahl et al., 2011; Brown, 2010; Cluett & Skene, 2011; Mompean, 2010; Razmerita, Kirchner, & Sudzina, 2009) to the development of learning communities (Brown, 2001; Collison et al., 2000; Hung & Chen, 2001; Irwin & Berge, 2006; Lock, 2002).

Some researchers (for example, Garrison & Anderson, 2003; Irwin & Berge, 2006; Lear, Isernhagen, LaCost, & King, 2009; Reupert & Maybery, 2010; Tu & McIsaac, 2010) note that the acts of social interaction in an online learning environment do not only contribute to knowledge construction, but that they can also lead to the
development of online social presence, which is vital for learning in the context in which face-to-face interactions are replaced by online posts and comments. Social presence is defined by Tu and McIsaac (2010) as “the degree of awareness of another person in an interaction and the consequent appreciation of an interpersonal relationship” (p. 133). According to Reupert and Maybery, online learning environments are often criticized for the lack of human factors, such as connectedness and presence, and it is through the acts of social interaction via online posts and comments that teachers and students can establish their connections and online presence. Hew and Cheung’s studies (2008, 2012) on student interactions and participation in online asynchronous discussion suggest that it is possible that students can participate in online discussion through either reading or writing online posts. Nevertheless, although reading may be considered as a form of participation, it “does not really contribute to or encourage the exchange of ideas in the discussion, because if no postings of messages are made in the first place there will be no messages in the discussion for students to read” (Hew & Cheung, 2012, p. 7). Therefore, it is important that students establish their social interactions through writing as well so that they can develop stronger social connection and presence in an online learning environment.

The concepts of social connection and presence are also embedded in the theoretical framework of situated cognition and learning (Brown, Collins, & Duguid, 1989; Hara, 2009; Hung & Chen, 2001; Irwin & Berge, 2006; Lave & Wenger, 1991; Sawyer, 2006). Developed from the social constructivist principle that knowledge is constructed within a sociocultural context, the theory of situated cognition and learning focuses on the role context plays in understanding learning and knowledge construction. It is based on the general principle of situativity that “knowledge is not just a static mental structure inside the learner’s head; instead, knowing is a process that involves the person, the tools and other people in the environment, and the activities in which that knowledge is being applied” (Sawyer, 2006, p. 5). Irwin and Berge have applied this principle of situativity to study the act of socialization in online classrooms and note that social interactions and online presence are the key constructs for social knowledge construction in an online learning environment. In Hung and Chen’s (2001) study on the use of web-based technology in e-learning, these constructs are referred to as “mediated tools” which are “meaningful only in the context of its situation and use” (p. 6).
By explaining social interactions in relation to their context, situated learning complements social constructivist principles of learning and adds situativity as another dimension of learning through social interactions. According to Brown, Collins, and Duguid (1989), one of the key benefits of situated learning is that it allows learners to interact with tools through authentic activities and hence brings them closer to the culture in which knowledge is embedded. Examples of authentic activities within the situated learning framework include: informal knowledge sharing at work place (Hara, 2009); learning skills in context through computer simulations (Collins, 2006); and participating in virtual professional communities (Ala-Mutka, 2010; Wasko & Faraj, 2000). Engaging in these authentic activities can help promote what Sawyer (2006) refers to as “deep learning” in which students can build on their existing knowledge, reflect on what they have learned, and understand their own learning processes.

The theories of social constructivism and situated learning have provided a broad overview of how people learn through social interaction in an online learning environment. What these theories infer is that to understand the social learning process within a group, network, or community mediated by technologies requires a knowledge of how people establish their connections online, how they collaborate with one another, and how a learning network or community develops in an online learning environment. The next sections will further explore these ideas by examining the concepts of “learning through online collaboration”, “learning through building personal learning networks”, and “learning through participating in communities of practice”, all of which are often discussed in the literature relating to teaching and learning in an online learning environment.

**Learning through Online Collaboration**

Various research studies (for example, Brodahl et al., 2011; Harasim, 2012; Hew & Cheung, 2012; Ko & Rossen, 2010; Palloff & Pratt, 2005; Rich, Cowan, Herring, & Wilkes, 2009; Trentin, 2010; Tu, 2004) have applied the social constructivist learning principles to investigate how students collaborate in an online learning environment. Harasim defines online collaborative learning as “a model of learning in which students are encouraged and supported to work together to create knowledge: to invent, to explore ways to innovate and, by so doing, to see the conceptual knowledge needed to solve problems rather than recite what they think is the right answer” (Harasim, 2012, p.
Some of the key emphases of collaborative learning as mentioned in the literature include the negotiation of meaning and the co-construction of knowledge among students while working on the same task. Salam (2011) gives an example of how collaboration develops when students post messages to asynchronous online discussion forums. Salam states that each discussion thread is a series of messages; one message may trigger another, and together they transform into a collective knowledge. Salam’s view of collaboration is similar to that of Harasim (2012) who notes that collaboration is a process comprising idea generation, idea organization, and intellectual convergence.

The concept of collaborative learning has also been investigated in studies relating to how students learn in groups (for example, Harasim, 2012; Jaques & Salmon, 2007; Kling & Courtright, 2004; Salmon, 2011). Jaques and Salmon (2007) have investigated the complexity of group learning in relation to different group sizes, compositions, participation patterns, and communication. Their study notes that small groups usually have strong ties, which make it easier for members to collaborate on the group tasks and co-construct their knowledge, but they might be limited in terms of group diversity. They also find that a group’s composition can affect the outcomes of the group discussions, noting that “people tend to agree with individuals they like and disagree with those they dislike even though both may express the same opinion” (p. 26). These findings suggest that different group dynamics can impact on how students collaborate in an online learning environment. They also bring to attention how educators can use the understanding of social interactions and group dynamic to design, guide, and promote online collaborative learning.

Other research studies (for example, Collison et al., 2000; Ko & Rossen, 2010; Palloff & Pratt, 2005; Salmon, 2011; Tu, 2004) suggest different ways to guide online collaborative learning. Collison et al. (2000) recommend a facilitation method for online discussion in which educators first model the participation for students and later transfer the moderation role to students. Palloff and Pratt (2005) propose that collaborative learning can be guided when based on a five-stage model: setting the stage; creating the environment; modelling the collaboration process; guiding the process; and evaluating the process. The model commences with the educators informing the students about the purpose of the assigned task prior to modelling and facilitating the collaborative learning process. Salmon (2011) suggests another framework which focuses on e-moderation and the technical support provided to students. The framework includes five
key elements: access and motivation; online socialization; information exchange; knowledge construction; and development. It serves as a step-by-step guideline for educators who wish to incorporate collaborative learning in their online instruction activities. The lecturer participants in the current study might also refer to these frameworks to integrate technologies into their teaching practices.

While collaborative learning tasks can be designed and guided using the previously discussed facilitation methods, other researchers (Hew & Cheung, 2012; Kleinman, 2005; Maor, 2003; Wells et al., 2008) note that getting students to participate in those tasks can be challenging. Wells et al.’s (2008) study shows that many students prefer to be passive receivers of the information from their teachers, rather than active contributors to collaborative learning tasks. According to Hew and Cheung (2012), limited participation is a common problem, and this includes issues such as “students posting no or few messages, students demonstrating superficial or surface-level critical thinking, or students exhibiting low-level knowledge constructions” (p. 9). They address various factors which might cause these issues, including: students do not see the need for participating in the collaborative tasks; they do not have time to participate; they do not know what to contribute; and they cannot keep up with tasks. A number of researchers (Hew & Cheung, 2012; Kleinman, 2005; Maor, 2003; Wells et al., 2008) agree that there is no easy solution to dealing with these issues, but they also note that support from teachers and peers plays an important role in promoting active participation.

An earlier study by Hew and Cheung (2008) on asynchronous online discussion found that by putting students in the role of facilitator and letting them take turns in moderating the online discussions, students tend to participate more actively in the discussions and become more self-directed in their learning. Other studies use different techniques to improve student participation, such as asking students to provide regular feedback to fellow students (Collison et al., 2000), creating a self-organized discussion group (Stern, 2008), and facilitating their own learning tasks (Kleinman, 2005). As noted by Collison et al. (2000), the ultimate goal for online facilitation is to create a safe, open, and supportive learning environment for students, and such an environment starts by promoting student participation and peer-to-peer support.
Learning through Building Personal Learning Networks

The concept of learning through building personal learning networks is often associated with the notion of connectivism where learning is compared to a network creation and development process (Downes, 2007; Siemens, 2004). Both Downes and Siemens introduce connectivism as an alternative to existing learning theories such as behaviourism, cognitivism, and constructivism, which they believe to be inadequate for explaining learning phenomena in the digital age. They advocate for a type of learning which is context-based, not classroom-based; and learners are knowledge creators, not just consumers. Connectivism perceives learners as active seekers of new connections, which can be either objects or people, in order to organize their existing connections and build their own personal learning networks. Carter and Nugent (2011) define personal learning networks as “social ties with multiple people and resources through virtual communities of practice that contribute to individual learning” (p. 240). However, the strength of each connection in a personal learning network can vary according to different types of network layers: a communality layer, a sociality layer, and a connectivity layer (Grabher & Ibert, 2006). Through these different connections it is assumed that learners can learn from one another and develop a collective knowledge.

In the literature (Carter & Nugent, 2011; Rajagopal, Brinke, Bruggen, & Sloep, 2012; Richardson & Mancabelli, 2011; Tu et al., 2012; Warlick, 2009) discussions on personal learning networks often refer to two interrelated aspects of personal learning network development: connecting with a purpose; and learning with clear self-direction. Akkinen (2005) refers to economic theories to explain this self-conscious behaviour and that one may have to consider the benefits one will get from the network and the sacrifice one has to make before deciding whether or not to make a certain learning network connection. In the model proposed by Rajagopal et al., learners’ self-consciousness, including their attitude and intention, is placed at the forefront of the learning network formation. This is a consequence of the claim that without the right attitude and a clear intention, learners will neither be able to fully participate in the network activities nor will develop the skills needed to build their network connections. Carter and Nugent (2011) also support this claim by adding that the concept of a personal learning network derives from the theory of self-directed learning, which states that learning “is initiated and controlled through a learner’s actions and initiative” (p. 240).
Since each individual learner is unique in his or her own way, constructing one’s personal learning network may vary according to one’s needs and interests. As Downes (2007) asserts, properly designed networks will naturally become a learning network.

When networks are properly designed, they reliably facilitate learning. This is because, when properly designed, the network will itself learn. Through the process of interaction and communications, the entities that constitute the network will form a mesh of connections. Knowledge is embedded in this mesh of connections, and therefore, through interaction with the network, the learner can acquire the knowledge. (p. 6)

In addition, he stresses the importance of four key constituents of a properly designed network: diversity, autonomy, interactivity, and openness. The more diverse and autonomous the network is the better the opportunity for learning, and the more interactive and open the learners are the better the learning process (Downes, 2007).

Rajagopal, Verjans, Sloep, and Costa (2012) offer a different perspective on building a personal learning network. They argue that building personal learning networks requires content-related skill, networking and maintenance skills. Their study concludes that although the learners may know what their networks are, they may not be aware of the networking processes, and that self-reflection is very important to develop this awareness, promote a sense of control, and expand their networks so that they can become sophisticated networked learners. In Warlick’s (2009) article about growing your personal learning networks, personal learning networks come from three main sources: personally maintained synchronous connections; personally and socially maintained semi-asynchronous connections; and dynamically maintained asynchronous connections. He also recommends that to avoid being lost in the digital world learners should first start with a small network, set a regular learning schedule, and then gradually transform themselves from information consumers to contributors.

While the notion of learning through building personal learning networks has attracted interest from many researchers (for example, Carter & Nugent, 2011; Downes, 2007; Siemens, 2004; Warlick, 2009) in the past decade, some researchers (Bell, 2011; Kop, 2011; Ryberg, Buus, & Georgsen, 2012) have questioned its claim as a novel type of learning in the digital age. Ryberg et al. argue that the concept of a personal learning network is too individualistic and simplistic to address the diversity of complex learning
phenomenon. Kop (2011) agrees on this absence of deeper knowledge formation and adds other concerns such as the heavy emphasis on learners’ autonomy and the limited acknowledgement of power relations within the network connections.

**Learning through Participating in Communities of Practice**

The principle of situativity, noted earlier in the theoretical framework of situated cognition and learning, has paved the way for other theoretical approaches to learning such as legitimate peripheral participation (Lave & Wenger, 1991) and communities of practice (Brown & Duguid, 1991; Wenger, 1998). These approaches advocate a shift from learning through traditional lectures to learning through participation and engagement in learning communities. An extensive range of studies (for example, Brigham, 2003; Isakovic & Sulcic, 2011; Kling & Courtright, 2004; Palloff & Pratt, 2007; Riel & Polin, 2004) have investigated the nature of learning networks and communities situated in online learning environments. They have looked into the different meanings of community (Brigham, 2003; Riel & Polin, 2004), what constitutes a community (Kling & Courtright, 2004; Palloff & Pratt, 2007), how it develops (Brown, 2001), and how to foster it (Collison et al., 2000; Freese & Strong, 2008; Isakovic & Sulcic, 2011).

Literature on learning communities (Brown, 2001; Freese & Strong, 2008; Hopkins, Thomas, Meredyth, & Ewing, 2004; Kling & Courtright, 2004; Lock, 2002; Palloff & Pratt, 2005; Riel & Polin, 2004; Roberts & Lund, 2007; Tu, 2004) has addressed some distinctive characteristics which differentiate a learning community from a learning group or learning network. Those characteristics include: multigeneration, trust, common beliefs, shared goals, and strong social ties and support mechanisms. Kling and Courtright (2004) argue that not all online classes can be regarded as an online learning community and that a true learning community needs to have some elements that bind people together. The importance of this social bonding is also raised by Hopkins et al. (2004) as the key for building learners’ social capital in the community. Since communities are culturally and socially diverse, it is impossible to replicate or simply design these characteristics (Hoadley, 2002). Many researchers (for example, Brown, 2001; Collison et al., 2000; Palloff & Pratt, 2007; Tu, 2004) agree that learning communities need considerable time to develop and mature, and although communities cannot be designed, they can be facilitated.
The notion of learning through participating in communities of practice is believed to be grounded in social constructivism and situated learning theories (Hung & Chen, 2001; Irwin & Berge, 2006). Communities of practice are defined as “groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis” (Wenger, McDermott, & Snyder, 2002, p. 4). Early studies on communities of practice (Brown & Duguid, 1991; Lave & Wenger, 1991; Wenger, 1998) stress the importance of learning through observation, practice, and participating in communities in which knowledge is embedded. Hara (2009) regards communities of practice as a lens for “understanding informal collaborative learning that occurs outside formal classrooms and training environments” (p. 2). Wenger believes that classroom learning contributes to only a small part of knowledge construction and that learning can expand beyond classroom settings through meaningful practice within different learning communities. He identifies four interrelated components of learning through participation: meaning, practice, community, and identity. According to Wenger, participation does not necessarily mean presence; it is embedded in an individual’s identity and is always present even if an individual is not currently engaged in a practice.

According to Hara (2009), “although the term ‘communities of practice’ embodies the seemingly romantic image of individuals sharing knowledge with others, such sharing requires complex coordination” (p. 3). Research studies relating knowledge sharing within communities of practice (Ardichvili, Maurer, Li, Wentling, & Stuedemann, 2006; Cheung, Lee, & Lee, 2013; Sharratt & Usoro, 2003) reveal different issues relating to an individual’s decisions and to cultural factors such as trust, reciprocity, and competition. Roberts (2006) also identifies other limitations of the communities of practice theory, such as the lack of explanation on the power dynamic within the community. This can influence an individual’s participation within the community and impact knowledge construction which is “path-dependent as new knowledge reinforces an existing preference or predisposition” (Roberts, 2006, p. 630). Nevertheless, the notions of participation, identity, and practice have influenced subsequent studies related to virtual professional communities of shared practice (Elia, Secundo, & Taurino, 2010; Hara, 2009; Wasko & Faraj, 2000) and to online knowledge sharing and management (Ardichvili et al., 2006; Cheung et al., 2013; Sharratt & Usoro, 2003).
These applications expand the original model of communities of practice by exploring learning through participating in different communities.

3.4.3 Social Constructivism, Technology, and Pedagogy Reform

The theories of social constructivism and situated learning have been applied to research studies on teaching and learning in both face-to-face and online learning contexts. Although some researchers (Downes, 2007; Harasim, 2012; Siemens, 2004) emphasize the power of technology to connect people and to transform teaching and learning, social constructivist learning in an online environment still applies the same core principles of social constructivism and situated learning as applies in a face-to-face environment (Bell, 2011; Kop, 2011). Those principles include the proposition that learning comes from meaningful social interactions situated within authentic learning contexts and that to promote the social construction of knowledge educators need to guide and scaffold the learning processes rather than directly transfer the content knowledge to students. Social interactions, co-construction of knowledge, and peer-to-peer support are the core pillars of learning within an online context, regardless of the differences in communication medium and interaction patterns.

Dillenbourg et al. (2002) claim that when applying social constructivist principles in designing an online learning environment, educators often want it to be similar to the face-to-face learning environment. However, they mention that the “pedagogical challenge [of virtual learning environments] is not to imitate face-to-face interactions, but to explore different new communication functionalities that are effective in virtual learning environments” (p. 11). As noted in the discussion of key literature on situated learning in the previous section, how learners connect, interact, and learn in an online learning environment is a complex process, which involves the interactions between the learners, the learning activities, and the technology. Research studies (for example, Boling & Beatty, 2010; Brodahl et al., 2011; Mompean, 2010; Soares, 2008; Wheeler & Wheeler, 2009) have looked into different ways in which technology can be used to support the social constructivist and situated learning approaches. Boling and Beatty’s study explores the use of online discussion forums as a tool for getting feedback from students and notes the importance of feedback for the community’s development. The studies by both Mompean and Soares examine the use of blogs for online collaboration and self-reflection. Wheeler and Wheeler’s (2009) study investigates the use of wikis to
promote collaborative writing in higher education. Both of these studies indicate different applications of technology to enhance and support teaching and learning practices. However, while technology is considered as an important tool and communication medium for supporting learning, teaching and learning with technology are not about selecting which tools to use, but more importantly about the teaching and learning practices behind the applications of those tools.

Various researchers (including Judson, 2006; Peeraer & van Petegem, 2011; Spector, 2012; Trucano, 2005; Wagner et al., 2005; Watson, 2001) have stressed the importance of pedagogy over technology when implementing ICT in education by arguing that the role of technology is to support teaching and learning and not vice versa. Alexander (2008) notes that:

[p]edagogy is not a mere matter of teaching technique. It is a purposive cultural intervention in individual human development which is deeply saturated with the values and history of the society and community in which it is located. Pedagogy is best defined, then, as the act of teaching together with the ideas, values and collective histories which inform, shape and explain that act. (p. 92)

Therefore, it is important to note the role of pedagogy and teaching practice when discussing technology integration in education settings. Despite the strong connection in the literature between teaching and learning with ICT and social constructivism (Collison et al., 2000; Ko & Rossen, 2010; Palloff & Pratt, 2005; Salmon, 2011; Tu, 2004; Wang, 2008), Judson (2006) points out that the integration of ICT into teaching does not necessarily mean engaging with a social constructivist pedagogy. ICT is a tool which can be used in a range of teaching and learning approaches other than social constructivism and situated learning. Watson (2001) agrees with the view of ICT being a tool, noting that “with the rapid changes to the capabilities and directions of the technology, too much attention is focused on the actuality of the new rather than their function and implications, on the development of lower-order skills rather than higher-order learning” (p. 264). This suggests that when ICT is incorporated into education policies (as reviewed in Section 3.2.1) and different implementation models (as reviewed in Section 3.2.3), questions should be asked about the pedagogical approaches
of the practitioners, instead of assuming that inherent to ICT is the ideological framework of social constructivism and situated learning.

In the case of Cambodia, as noted in Chapter 2, literature related to teaching and learning practices in this educational context is very limited, and the connection between ICT and pedagogical practices has not been clearly addressed in the country’s education policies. Nevertheless, some scholars (for example, Ahrens & McNamara, 2013; Howes & Ford, 2011; Ngo, 2013; Ogisu, 2014; Pellini, 2005) have noted the widespread presence of teacher-centred approaches, and in Chapter 2 connections between the traditional teacher-centric approach to the historical, sociocultural, and developmental contexts were indicated.

If the teacher-centred approach is the enacted pedagogy of the practitioners in the study, the introduction of the online learning environment to support social constructivism and situated learning needs to consider the challenges the practitioners face in transforming from traditional to new pedagogical approaches. Some of those challenges might include: the change in their attitudes towards ICT and their pedagogical beliefs (Peeraer & van Petegem, 2011); the translation of their beliefs into practices (Judson, 2006; Trowler, 2008); and the cultural constraints embedded within their beliefs and practices when transitioning from traditional to new pedagogical approaches (Peeraer & van Petegem, 2011; Richards, 2004; Trowler, 2008). This pedagogical transformation adds another layer of complexity to the introduction and implementation of ICT in addition to the earlier discussions of ICT integration and implementation models (3.2.3) and an individual’s decision to adopt or reject a technology innovation in general (3.3). As Ogisu (2014) suggests,

    if we seriously want to see substantial changes in local practices, we should address both specific issues of teaching and learning and broader political, social, and cultural assumptions about education simultaneously. This can be done by having more open discussions about education—more than just its effectiveness—that involve various stakeholders. (p. 172)

An intent of the current study is to examine the changes of teaching practices through the introduction of the online learning environment and to engage practitioners in the discussion of their practices and how the integration of ICT can help enhance and support those practices.
3.5 Chapter Summary

This chapter has reviewed key literature relating to the introduction of ICT into education, the theoretical framework of technology adoption, and the teaching and learning aspects of online learning environments. In Section 3.2, I have discussed the introduction of ICT in education policies in the global context, its adoption rationales, and its implementation models. I argue that despite having similar adoption rationales, the interpretations and applications of ICT in education policies in the developed and developing worlds can be very different.

The review of literature relating to ICT integration and implementation models in Section 3.2.3 indicates different views of what ICT integration entails. “ICT integration” can be viewed as a combination of different themes, as a stage of technology implementation process, and as a change process. These different stances suggest that the pathway leading to ICT integration is not always perceived as fixed or linear, and the pathway might fluctuate according to implementation change processes.

In Section 3.3, I offered a critical review of key literature relating to technology adoption. Reference is made to Diffusion of Innovations theory, Technology Acceptance Model, and Concern-Based Adoption Model to provide insights into how people decide to adopt or reject an innovation. The review suggests three key dimensions of technology adoption – innovation, individual, and social context – and identifies the need for the implementation of the online learning environment to take into account the relationship between these dimensions.

In the final section, I focused on the teaching and learning aspects of online learning environments from the perspectives of social constructivism and situated learning. Social constructivism and situated learning are discussed in relation to the notion of online learning collaboration, networks, and learning communities to provide insights into how students connect, collaborate, and learn in an online learning environment. Insights were also sought for how educators can create a learning environment which incorporates those principles of social interactions and knowledge construction within learning communities. I argue that despite the importance of technological tools and the different models of ICT integration in education, the introduction and implementation of ICT in the Cambodian education context needs to also consider the pedagogical
approaches of the practitioners, rather than just assuming that the technology introduction will automatically change their practices.

This literature review has framed the scope and direction of my study. It suggests the need for empirical investigation into the introduction and implementation of ICT in the Cambodian educational context to inform the development of future policies as well as to broaden the understanding of ICT in supporting teaching and learning practices in the developing world context.

The next chapter discusses and justifies the methodological approach of the study and the study’s design is outlined. The qualitative research methods are described and the approach to data analysis is explained.
Chapter 4: Methodology

4.1 Introduction

This research study examines the introduction and implementation of an online learning environment in a Cambodian academic program. It aims to investigate how the online learning environment can be used to support out-of-classroom teaching and learning and identify what enables and constrains the introduction and implementation processes. As discussed in Chapter 1, the research questions that frame the study are:

1. How does the integration of an online learning environment into a Cambodian academic program impact the teaching and learning approaches of its lecturers and students?
2. What are the factors that enable and constrain the online learning environments’ introduction and implementation processes?

The need to investigate both the impacts of an online learning environment and the factors which influenced its introduction and implementation processes required a methodological approach that accommodated what happened prior to and after the implementation of the intervention. As noted in Chapter 1, the online learning environment was an intervention introduced to an academic program to enhance its teaching and learning approaches. It was my intent to engage the participants in the introduction and implementation processes, so a participatory approach to the research study was deemed appropriate.

After reviewing and considering a range of participatory methodological approaches, design-based research emerged as the best fit for this study. The choice of design-based research was not only because of its interventionist, pragmatic, participatory nature (McKenney & Reeves, 2012; Wang & Hannafin, 2005) but also because the core stages of design-based research approach (Bannan-Ritland, 2003; Randolph, 2008; Edelson, 2002) could encapsulate the introduction and implementation processes of the online learning environment which were the foci of this study.

This methodology chapter is divided into six sections. I start by presenting the theoretical framework of design-based research, its key characteristics, and how I adapted the design-based research framework to match with the nature of my study. I
explain the process of selecting a program for participation in the study, describe the research setting, and detail the recruitment of the research participants. The qualitative data collection methods and the approaches to data analysis are outlined, and the research design framework is then elaborated. In the final section of the chapter, I address the ethical considerations, establish the trustworthiness of the study, and identify its limitations.

4.2 A Design-Based Research Methodological Approach

Design-based research methodology originated from the design experiments approach proposed by Brown (1992) and Collins (1992) who advocated for the migration of educational research from laboratory to real world settings. The key question posed by many education researchers during that time was “How should we systematically create, test, and disseminate teaching and learning interventions that will have maximum impact on practice and will contribute significantly to theory?” (Bannan-Ritland, 2003, p. 21). Both Brown and Collins argued that traditional experimental research with its focus on measuring a limited number of variables hindered educational researchers from studying the pattern of the complex educational phenomenon that they were facing. This triggered a new movement in educational research towards an innovative, interventionist, mixed-method approach known as design-based research. The following sections detail and discuss the theoretical framework of design-based research methodology, including its terminologies, models, characteristics and the differences between design-based research and other similar participatory research approaches.

4.2.1 Terminologies

Although the term design-based research is often used interchangeably with other terms such as design experiments, design research, design studies, and educational design research, they have subtle differences in emphasis and association. The term design experiments (Brown, 1992; Cobb, Confrey, diSessa, Lehrer, & Schuble, 2003; O'Toole & Beckett, 2013) emphasizes the “engineering” part of the design which is often associated with hypothesis testing of design innovations. Design research (Bannan-Ritland, 2003) and design studies (Confrey, 2006) focus more on the design components and frameworks, and educational design research (McKenney & Reeves, 2012; van den Akker et al., 2006) is a branch of design research focusing particularly on the field of education. The current study employs the term design-based research
as a generic term to denote a research study that aims to generate both theoretical and practical contributions to the field of knowledge through design innovations. Bell (2004) summarizes design-based research as “those enterprises that involve intentional design coupled to empirical research and theorizing about what takes place in the authentic contexts where the designed objects come to be used” (p. 245). Hence, design-based research is not simply an implementation study of design activities, but an investigation into the interrelationship between design innovations and the socio-cultural context surrounding it in order to form a theoretical framework for the research phenomenon.

4.2.2 Models

These subtle differences in terminologies associated with design-based research has led to the creation of different models outlining how design-based research can be conducted. Three models for conducting design-based research are selected for a brief review in this section based on their frequency of use in research and their relevance to the current study.

In Bannan-Ritland’s (2003) Integrative Learning Design Framework, design research consists of four main stages: information exploration, enactment, evaluating local impact, and evaluating broad impact. According to this model, design-based research studies start by exploring the research problems and context, implementing the design interventions, and evaluating their impacts. Emphasis is placed on the evaluation of the design interventions, as indicated in the last two stages of the framework, to broaden the applicability and disseminate the impact of the interventions.

Another model was proposed by Randolph (2008) concerning the application of design-based research in the field of educational technology, and it consists of four main cycles of design: design, enactment, analysis, and redesign. While Bannan-Ritland’s model focuses on the evaluation of design impact, Randolph views design-based research as an iterative cycle of design and redesign and stresses the importance of design refinements and feedback loops to produce robust design products.

The most recent and probably the most comprehensive model for conducting design-based research to date is the four-stage model proposed by McKenney and Reeves
(2012). This model consists of an *analysis and exploration* stage, a *design and construction* stage, an *evaluation and reflection* stage, and an *implementation and spread* stage. Similar to Bannan-Ritland’s model, the first stage of McKenney and Reeves’ model focuses on analysing and exploring the research setting and context prior to designing and constructing interventions for the specific context. Once the interventions are constructed, they are evaluated and continually refined in the *evaluation and reflection* stage. The third stage of this model examines the implementation and spread of the design interventions in order to develop a theoretical understanding for the design-based research.

These different models project the flexibility of design-based research methodological approaches, and it can be inferred that there is no fixed model or framework for conducting a design-based research study. The framework for the current study was generated by mapping the similarities between the three models and deciding upon three discrete stages with explicit foci. The three stages that are the culmination of this process are pre-implementation, implementation, and post-implementation (see Table 4.1).

**Table 4.1 The current study framework**

<table>
<thead>
<tr>
<th>Stages</th>
<th>Aims/Foci</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-implementation stage</td>
<td>• Needs and context analysis</td>
</tr>
<tr>
<td></td>
<td>• Design and configuration</td>
</tr>
<tr>
<td>Implementation stage</td>
<td>• Adoption and enactment</td>
</tr>
<tr>
<td></td>
<td>• Adjustments to the design</td>
</tr>
<tr>
<td>Post-implementation stage</td>
<td>• Reflections on the implementation</td>
</tr>
</tbody>
</table>

At the pre-implementation stage of the current study, I combined the exploration, analysis and design elements of the aforementioned models. I then undertook a needs and context analysis based on information provided by the research participants and designed an online learning environment intervention that matched with their local needs. At the implementation stage, I studied the implementation of the online learning environment by investigating how the participants adopted and enacted it, making adjustments to the design, as needed. The final stage, post-implementation, concluded
the study. At this point I gathered the participants’ different perceptions and reflections of the online learning environment’s implementation. The activities and methods associated with the three stages are discussed later in the chapter. The activities were closely monitored to uncover the enabling and constraining factors of introducing and implementing the online learning environment intervention.

4.2.3 Key Characteristics of Design-Based Research

Despite the variety of models employed in design-based research, there are key characteristics defining design-based research methodology that are generally consistent across the models. These key characteristics are contextual, iterative, collaborative, and theory-and-practice driven.

**Contextual**

A key characteristic of design-based research is the incorporation of context as part of the research framework. Design-based research aims to understand “the messiness of real-world practice, with context being a core part of the story and not an extraneous variable to be trivialized” (Barab & Squire, 2004, p. 3). It is not simply a study of the design process and development, but most importantly a study of the interrelationship between different variables surrounding complex real-life problems in a natural setting. This contextual characteristic of design-based research matches with the purpose of the current study which stresses the importance of contextual factors in understanding the introduction and implementation processes of the online learning environment.

McKenney and Reeves (2012) state that contextual information, such as the stakeholders and the physical, organizational, and education contexts are carefully documented and analysed at the beginning of a design-based research study to identify participants’ problems and needs prior to designing the intervention. Once the design intervention is implemented, research data and variables collected throughout the implementation process are interpreted in relation to the research context and setting. The term context is defined by Oliver (2014) as “something that ‘surrounds’ activity… [and] something created through weaving together of artifacts and practices” (p. 910). In the case of the current study, context refers to both the macro level context that situates the research as presented in Chapter 2, and the micro level context in which the activities and practices associated with the implementation of the online learning
environment in an academic program were undertaken. Factors that enable or constrain the introduction and implementation processes of the online learning environment are intertwined within these contexts.

**Iterative**

Iteration is another key characteristic of design-based research as it emphasizes the vital roles of change and development processes in design-based research studies. The three models considered in Section 4.2.2 have embedded iteration in at least one of their key stages. The reason for this is because iteration not only helps enhance the robustness and sustainability of the design interventions but also allows researchers to receive constant feedback and learn from each stage of the design-based research framework. McKenney and Reeves (2012) suggest three main cycles involved in conducting design-based research: micro, meso, and macro cycles (see Figure 4.1).

![Figure 4.1 Cycles in design-based research (McKenney & Reeves, 2012, p. 78)](image)

Figure 4.1 shows design-based research as a continuum of micro stages (analysis & exploration, design & construction, evaluation & reflection), with each stage being a cyclical process in itself. Because of this continual iteration, the macro cycle of design-based research can span a lengthy period of time, and it is generally assumed that the longer the macro cycle the more refined the design interventions are.

Due to time constraints, the current study aimed to complete only the first half of the macro cycle presented in Figure 4.1. Ma and Harmon (2009) argue that a single-iteration model can fill a gap in the literature through reporting findings based on a
particular context. Drexler (2010) notes that ‘practically speaking, a single-iteration
design condenses the dissertation into a manageable timeline with well-documented
results to inform future iterations and provide implications for further research’ (p. 36).

**Collaborative**

A design-based research project is fundamentally a collaborative work between the
participants and the researchers (Bannan-Ritland, 2003; Barab, Baek, Schatz, Scheckler,
& Moore, 2008; Cobb et al., 2003; Confrey, 2006; McKenney & Reeves, 2012; Wang
& Hannafin, 2005). Participants of design-based research are usually regarded as co-
researchers working collaboratively with the researchers, not just bystanders and
subjects of the research study (O'Toole & Beckett, 2013; Randolph, 2008). Researchers
in design-based research play the role of both “detectives” – seeking to investigate
research problems – and “inventors” – seeking practical solutions to deal with those
problems (McKenney & Reeves, 2012). In effect, the role of the researchers is similar to
that of consultants in an organization who helps the participants implement an
intervention project, while simultaneously trying to understand the nature of the
intervention. In order to play these dual roles, the researchers need to understand not
only the implementation process of the intervention, but also the organizational context
and culture which govern how the organization works as a system. According to Schein
(2010), these cultural data are crucial in intervention research and “will only reveal
themselves if the researcher/consultant establishes a helping relationship with the
organization” (p. 192).

In the current study, my roles included helping the participants to identify their needs,
designing the online learning environment, and facilitating and investigating the online
learning environment implementation. These roles placed me as central to the research
context. By working in collaboration with the participants I gained a better
understanding of their concerns and expectations and of the context in which they
operated. This collaboration formed a crucial part of the study and is further elaborated
in Chapter 5, which addresses the processes and challenges of building collaboration
with the participants.
Theory-and-Practice Driven

Besides being contextual, iterative, and collaborative, design-based research is also known for being theory-and-practice driven. According to McKenney and Reeves (2012), the goal of design-based research is to develop “theoretical insights and practical solutions simultaneously” (p. 7), and this can be achieved through the formulation of ‘design principles’ that guide the intervention design processes. Van den Akker (1999) proposes a formula of design principles as follows:

If you want to design intervention X for the purpose/function Y in context Z then you are best advised to give the intervention characteristics A, B and C (substantive emphasis) and to do that via procedures K, L and M (procedural emphasis) because of arguments P, Q and R. (p. 73)

These heuristic statements encapsulate the prescriptive nature of design-based research. However, McKenney and Reeves (2012) also note that there are different variations of design-based research and that the research may be conducted on interventions, through interventions, or both. Design-based research on interventions focuses on the characteristics and nature of the intervention, as noted in the intervention characteristics of van den Akker’s formula. Theoretical and practical implications of this orientation usually include the development of domain theory, design framework, and design methodology (Edelson, 2002). In contrast, design-based research through interventions, which the current study leans towards, focuses more on the processes and phenomenon engendered by the interventions rather than on the characteristics of the interventions. The online learning environment in this study was regarded as an intervention, and the purpose of the study was to understand the factors that influenced the introduction and implementation of this intervention. In this regard, “the intervention may be viewed more as a means through which deeper insight can be gained into certain phenomena related to teaching and learning in authentic settings” (McKenney & Reeves, 2012, p. 23). The insights can be achieved by being prospective in regard to the use of theories as guiding principles and reflective of the actual implementation of the intervention (Cobb et al., 2003). The conceptualization of the design-based research and the design principles of the study are identified and discussed in Chapter 5.
4.2.4 Distinguishing Design-Based Research

By simply looking at the aforementioned characteristics, design-based research seems to also share some common characteristics with other research methodologies such as participatory action research and evaluation research. The following section compares design-based research with other approaches to indicate where differences occur.

O’Toole and Beckett (2013) refer to design-based research or design experiments as a “cousin” of action research because they share a similar pragmatic orientation towards naturalistic research. Wang and Hannafin (2005) note that the collaboration between researchers and participants in design-based research make it look very similar to participatory action research. However, “local improvements in participatory action research typically derive from participants' own research that is facilitated by researchers rather than interventions designed and progressively refined jointly with researchers” (Wang & Hannafin, 2005, p. 6). Moreover, design-based research is not inherently “emancipatory” – a salient characteristic of participatory action research according to Kemmis and McTaggart (2005).

Design-based research has also been compared to formative evaluation research because both are “naturalistic, process-oriented, iterative, and involve creating a tangible design that works in complex social settings” (Barab & Squire, 2004, p. 5). The difference between the two research approaches is that design-based research is fundamentally theory-driven with the goal of linking theories with real practices while formative evaluation is more implementation-oriented (Barab & Squire, 2004; Wang & Hannafin, 2005).

Distinguishing design-based research from other approaches can be challenging for the following reasons. First, there are many different terms and interpretations associated with design-based research that makes it difficult to clearly distinguish it from other approaches. Second, there are ongoing debates in the literature (Dede, 2004; Kelly, 2004; Reeves, Herrington, & Oliver, 2005; Walker, 2011; Wang & Hannafin, 2005) about the family tree and validity of design-based research. While similar research genres like action research and evaluation research have well-established epistemological roots, the paradigm of design-based research seems to be less explicit. Reeves (2005) implies that design-based research is a discrete research approach outside the conventional qualitative and quantitative research frameworks. However, Walker
is concerned that the lack of discussion about the epistemological orientation and paradigm of design-based research could make it even harder to distinguish design-based research from its peers. Taking these challenges of design-based research into consideration, the methodology of the study was customized to fit with the orientation and epistemology of the study as discussed in the following section.

4.2.5 A Qualitative Orientation and a Constructivist Epistemology

As signalled in Section 4.2.2, the current study’s research framework is a synthesis of different models of design-based research. It did not follow a fixed model of design-based research, but rather the study design was adapted and customized to take account of the research purpose, questions, context, and setting.

Because design-based research is iterative in nature, design-based research studies usually span a lengthy period of time and are refined over their continuous cycles. According to van den Akker et al. (2006), design-based research is a type of research that thrives when there is a prolonged time frame, and it is expected that the more cycles it goes through and the more settings for implementing the design interventions are implemented within, the better it is to generalise the design principles and findings. Edelson (2002) regards generalization as a common goal of design-based research, and many design-based research studies (for example, Barab, 2005; Squire, 2005) are leaning toward the quantitative research orientation, focusing on the “engineering” aspect of the design interventions and the generalization of research findings.

Contrary to other design-based research studies (for example, Barab, 2005; Squire, 2005) that aim to generalize design principles and findings across contexts, the current study adopts a qualitative orientation to study the research phenomenon. According to Willis (2008), a goal of qualitative research, is to find “local truth” not “universal truth”, that is “to abstract out of the detailed data collected some general explanations or theories of why things happened the way they did” (p. 133). This goal aligns with the contextual characteristic of design-based research and how it views and deals with the messiness of real-world practices, as noted earlier in the chapter. Confrey (2006) agrees that design-based research studies should strive to understand the complexity of data collected in a local setting over a period of time rather than to generalize the findings across contexts.
The core belief of the study is that technology integration is context-based, and factors surrounding its introduction and implementation need to be studied in an authentic local setting. The intent of the study is to understand how an online learning environment impacts teaching and learning and to closely examine its introduction and implementation processes. Therefore, it is better suited to a qualitative orientation which seeks “rich descriptions of the social world” (Denzin & Lincoln, 2011, p. 9) and involves “an intense and/or prolonged contact with the ‘field’ or life situation” (Miles & Huberman, 1994, p. 6). Denzin and Lincoln (2011) describe the nature of qualitative research in the following way:

Qualitative research is a situated activity that locates the observer in the world. Qualitative research consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including fieldnotes, interviews, conversations, photographs, recordings, and memos to the self. (p. 3)

This qualitative orientation influenced the choice of research methods for the data collection (Section 4.4). Qualitative methods elicit “the perceptions of local actors ‘from the inside’, through a process of deep attentiveness, of empathetic understanding, and of suspending or ‘bracketing’ preconceptions about the topics under discussion” (Miles & Huberman, 1994, p. 6). In the current study they allowed me to uncover what happened when the online learning environment was introduced and implemented in the academic program that participated in the study.

Within the qualitative research framework, the study leans towards a constructivist epistemology that believes “reality is socially constructed” (Mertens, 2010, p. 16). The interactions between the researcher and participants played a crucial role in shaping the understanding of the online learning environment implementation within the study. This social construction of reality is an essential component of qualitative research.

Qualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry. Such researchers emphasize the value-laden nature of inquiry. They seek answers to questions that stress how
social experience is created and given meaning. (Denzin & Lincoln, 2011, p. 8)

Through a constructivist lens, the different methods of data collection, including focus groups and interviews, were employed to gather different perspectives from key stakeholders. Meaning was interpreted with consideration given to context, and active participation and knowledge construction were strongly encouraged so that participants could engage in the act of implementation, as well as voice their opinions and provide feedback based on their experiences. These important aspects of constructivist epistemology resonate with the participatory and collaborative nature of design-based research which prides itself as a “socially responsible approach to instructional technology research in higher education” (Reeves et al., 2005, p. 96).

4.3 Research Setting and Participants

4.3.1 Searching for a Research Setting

The first step in this design-based research study was to search for an academic program in Cambodia that might be interested in participating in the study. When selecting the academic program, size and availability were the key selection criteria. If the program was too large, it would be hard to manage the implementation of the intervention, while if the program was too small there may not be sufficient people interested in participating, which would adversely affect the data collection of the study. Academic programs with around 50 students were therefore deemed a suitable size for the study. Other selection criteria were based on the availability of the program during the research time frame and the coordinator’s willingness to participate in the research. The goal of the search was to find a program that was interested in integrating some type of technology into its curriculum, instruction, or program management. The search for the research setting was conducted by emailing program coordinators at three major universities in Phnom Penh to enquire about the size of the programs and possible interest in the study.

Among the academic programs at the three universities, one expressed interest in being involved in the research study. The Master of Arts in Teaching English to Speakers of Other Languages (MA in TESOL) is an academic program within the Royal University of Phnom Penh’s (RUPP) Institute of Foreign Languages (IFL). The program was
interested in having a centralized online learning environment that lecturers and students in the program could use to support and enhance their teaching and learning. A formal request to conduct the study (see Appendix A) was subsequently submitted to the head of the English department that housed the program. After the request was approved, all key stakeholders including the program coordinator, lecturers, and students were invited to participate in the study (see Appendix B and C for plain language statements and consent forms).

4.3.2 The Royal University of Phnom Penh (RUPP) and the Institute of Foreign Languages (IFL)

The Royal University of Phnom Penh is the largest and oldest higher education institution in Cambodia. Formerly known as the Royal Khmer University, RUPP was established in 1960 in the capital city, Phnom Penh. A vision of the university, as stated on the university’s website, is “to be the leading higher education in Cambodia, focused on excellence in teaching and learning, committed to research for the development of the country and making a contribution to Cambodian society” (RUPP, 2015, p. 1). RUPP has three campuses. The main campus is about five kilometres north of Phnom Penh’s centre. Next to the main campus is the Institute of Foreign Languages, and about one kilometre north of the main campus is RUPP Campus II of the Faculty of Social Science and Humanities. RUPP is a member of the ASEAN University Network (AUN). It has over 450 staff (335 of whom are academics) and 12000 students studying in undergraduate and postgraduate programs across different fields of study including science, humanities, engineering, and development studies (RUPP, 2015).

As the oldest university in Cambodia, RUPP has a long history which is related to the Cambodian history presented in Chapter 2. During the Khmer Rouge Regime (1975-1979) RUPP and other education institutions in Cambodia were temporarily closed as people were evacuated from the city (RUPP, 2015). Howes and Ford (2011) note that during this period “an estimated 75% of lecturers and 95% of students were killed or left to resettle in other countries” (p. 164). Brooks and Ly opine that this loss has had a great impact on RUPP and its faculty members.

This ‘missing’ generation would have become the senior professors that carry the University’s institutional memory and culture; manage academic
structures, policies, and quality; pass on tacit and explicit professional knowledge; and mentor new generations of faculty. (2010, p. 89)

RUPP reopened in 1980 under the name of Ecole Normale Supérieure (Higher Normal College), focusing on providing teacher training for those who had survived the Khmer Rouge (RUPP, 2015). The reinvention of RUPP, as well as the whole Cambodian education system, after the Khmer Rouge is a very challenging task.

The task, which would have been complex under any circumstances, has been profoundly complicated because it has occurred simultaneously with the arrival of new forms of globalization and the consequent impacts both on Cambodian society as a whole and specifically the higher education sector. (Howes & Ford, 2011, p. 169)

Brooks and Ly (2010) note the struggle of new faculty members “to ‘invent’ the University even though it was ‘young’ and had limited experience as scholars, teachers, and academic leaders and administrators” (p. 89).

A year after the reopening of RUPP, the Institute of Foreign Languages was established to train students to be Vietnamese and Russian language teachers (RUPP, 2015). The focus on these two languages is due to the fact that the institute received technical support from Vietnam and the Soviet Union in restructuring its academic system and the capacity development of its faculty (Brooks & Ly, 2010; Howes & Ford, 2011). IFL was combined with the Ecole Normale Supérieure in 1988 to form Phnom Penh University, which changed its name to the Royal University of Phnom Penh in 1996.

IFL is now a leading language training institution in Cambodia. It has expanded into six departments: English, French, Chinese, Korean, Japanese, and International Studies. The research study was conducted in the MA in TESOL program of IFL’s English Department. The English Department consists of three key units: MA program unit, Bachelor program unit, and Research and Quality Assurance unit (see Figure 4.2). Each unit is managed by its respective coordinator, and together they form a management team with the head and deputy head of the department.
4.3.3 The MA in TESOL Program

The MA in TESOL is a postgraduate degree program established in 2006 in IFL’s English Department to provide advanced professional training to teachers of English as a Second Language (ESL) in Cambodia. The program can be completed through two years of full-time study (4 semesters). To be eligible for the award of degree, students are required to take nine core courses and five elective courses (48 credits in total) and to produce a 10,000-word research project under the guidance of their respective supervisors.

The aims of the program, as stated in the student handbook, are:

- to enable students to achieve and consolidate specialist, professional competence as practitioners in teaching and programming English;
- to develop students’ awareness of the empirical relevance and application of theoretical issues in linguistics;
- to develop students’ understanding of the linguistic dimensions of cultural diversity, globalization and social change;
- to give participants the opportunity to reflect on this professional knowledge with regard to the appropriateness of its application to a range of educational contexts; and
- to extend the participants’ ability to work autonomously in a specific area of interest to them (Institute of Foreign Languages, 2011, p. 4).
In order to accomplish these aims, it is important that students are given the optimum opportunity to socialize, share learning experiences, and discuss learning issues with other lecturers and students both inside and outside their normal classes. This explains the program’s interest in introducing an online learning environment to support out-of-classroom teaching and learning.

The main teaching method of the program was class lectures, with each class having approximately 20 to 30 students. “Teaching and learning strategies include lectures, presentations, small group work, group discussion, independent study, mini-tasks, seminars and workshops” (Institute of Foreign Languages, 2011, p. 15). Classes were usually conducted in the evening to accommodate the majority of students who had full-time jobs and had to commute long distances. The program consisted of the program coordinator, seven lecturers and 77 students at the time of the research.

4.3.4 Participants

Recruitment

Participants of the study included the program coordinator, lecturers, and students. All were the key stakeholders in the MA in TESOL program. Through the program coordinator, I obtained email addresses of the lecturers and students and then sent an invitation to them along with the plain language statement and consent form for the study (Appendix B and C). Those who were interested in the study could either return the signed consent form through email or through the program coordinator. As stated in the plain language statements (Appendix B and C), participants were able to withdraw from the study at any time. At the outset of the study, there was one program coordinator, four lecturers and 55 students who consented to participate in the study.

Program Coordinator

The program coordinator holds the highest authority in the program, and the key responsibilities of the program coordinator included organizing workshops, the timetable, meetings, the entrance exam and selection of new students, monitoring students’ progress and administration services, reporting to the English Department about any needs or issues, and dealing with public relations and the advertising of the program. The current program coordinator is a female in her 30s. She had been in this
position for about three years and had nearly ten years of teaching experience in the English Department.

Lecturers

There were seven lecturers teaching in the program, and all of them were approached at the beginning of the study by an email with the plain language statement and consent form (see Appendix B) attached, introducing them to the study and inviting them to participate. Four of the seven lecturers consented to participate in the study. The lecturers were in their 30s, held postgraduate degrees, and had at least six years of teaching experience. All of them worked full-time, which meant they had to teach approximately 20 hours per week. They taught both Master and the Bachelor level courses, depending on the course availability and their specializations. A summary of the lecturer participants is presented in Table 4.2.

Table 4.2 Summary of lecturer participants

<table>
<thead>
<tr>
<th>Lecturers</th>
<th>Gender</th>
<th>Age</th>
<th>Qualifications</th>
<th>Teaching experience</th>
<th>Teaching Loads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturer A</td>
<td>Male</td>
<td>32</td>
<td>B.Ed., M.A.</td>
<td>7 years</td>
<td>Full time</td>
</tr>
<tr>
<td>Lecturer B</td>
<td>Female</td>
<td>30</td>
<td>B.Ed., B.S., M.A.</td>
<td>6 years</td>
<td>Full time</td>
</tr>
<tr>
<td>Lecturer C</td>
<td>Male</td>
<td>30</td>
<td>B.Ed., B.B.A., M.A</td>
<td>6 years</td>
<td>Full time</td>
</tr>
<tr>
<td>Lecturer D</td>
<td>Male</td>
<td>37</td>
<td>B.Ed., M.Ed.</td>
<td>15 years</td>
<td>Full time</td>
</tr>
</tbody>
</table>

Students

From the 77 students in the program, 55 students agreed to participate in the study. The ages of the student participants ranged from 22 to 34, and 15 of them were females. The low number of female participants is attributed to the fact that less than a quarter of the students in the program were females. Students in the program came from various backgrounds including ESL teachers in public schools and employees in non-government organizations. To be eligible for the program, they needed to hold an undergraduate degree in TESOL or social sciences with a good academic record, have at least one year of teaching experience, and have a good command of English.
4.4 Data Collection Research Methods and Data Analysis Techniques

The research employed a variety of data collection research methods that included a student survey, focus groups, interviews, field journal notes, and analysis of online records. The data collection was conducted in English. Each method had its purpose and rationale and was selected and designed based on its relevancy, practicality, and appropriateness for the context of the study.

4.4.1 Survey

A survey was employed in the pre-implementation stage as part of the context and needs analysis of the study. A survey is one of the most popular research methods because of its efficiency (McMillan, 2008; Walter, 2010). It can be administered rapidly and does not require much time from the participants to complete. Walter explains that a survey helps provide snapshots of the research phenomenon, which makes it suitable for capturing students’ background, needs, and expectations prior to the design of the intervention.

The survey was designed with the aim of learning about students’ experiences in using web-based technologies, their learning habits, and their expectations of technology integration within their program. This was clearly stated in the plain language statement given to students and on the survey questionnaire itself to ensure that students were fully aware of its purpose. The 2-page survey (see Appendix D) took approximately ten minutes to complete and consisted of ten questions grouped into three categories: technology, learning, and online platforms. In the technology category, there were four multiple-choice questions asking students about their frequency in using the internet, where they usually accessed it, what they used it for, and how they rated their computer and internet skills. The second category focused on student learning habits asking them about how many hours they spent on self-learning activities, the type of self-learning activities they usually engaged in, and their communication with lecturers and classmates. Questions in the last category enquired about whether students had used any online platform for learning purposes, their expectation of the online platform, and how it supported their learning.

The survey was first distributed online through email invitation. However, due to the low return rate responses (five responses), it was switched to a paper-based format.
After consulting with the program coordinator about the return rate issue, one class of 20 students was selected as a convenience sample of the cohort. I visited the class to talk briefly about the research project and distribute the paper-based survey to students. Twenty survey responses were collected from the visit.

**The Analysis of the Survey Data**

To analyse the survey findings, I manually coded and analysed the responses according to the different question types. For close-ended multiple choice questions, the number of selections for each option were calculated into percentages to compare and rank the popularity of each option. For example, in the technology category:

Question 1: How often do you use the internet?

Option A: Rarely (0 response = 0%)

Option B: Once or twice a week (3 responses = 15%)

Option C: Everyday (17 responses = 85%)

For open-ended questions, all the responses for each question were listed under the question, and overlapping responses were combined. For example, in the learning category:

Question 2: What types of self-learning activities do you engage in?

Responses: Doing research and assignments; reading study materials and work on and offline; read books, research articles, and do assignments; watch video related to learning; reading journal articles and write report; search info on Google; reading books at the library and news and research paper via the internet; independent reading; learning through Wikipedia.

The analysis of open-ended questions was conducted through in vivo coding which is “based on the actual words used by participants themselves” (Saldana, Leavy, & Beretvas, 2011, p. 128). First, the key terms in the written responses were highlighted, and then similar key terms were grouped into categories. For example, the grouping of responses in Question 2 resulted in the following list.

Question 2: What types of self-learning activities do you engage in?

- Reading: journal articles, books, and other study materials
Online search: Google and Wikipedia
Doing class assignments

The lists of responses collected from the survey were compiled into a single file under the headings of “students’ background and experiences in using web-based technologies”, “students’ learning habits”, and “students’ expectations of the technology integration within their program”, which were the aims of the survey.

4.4.2 Focus Groups

Various researchers (including, Cousin, 2009; Liamputtong, 2011; Morgan, 2002; Travers, 2010) recommend the use of focus groups for research studies which aim to gather rich, concentrated data from a group of participants. Liamputtong (2011) notes that

[f]ocus group methodology is useful in exploring and examining what people think, how they think, and why they think the way they do about the issues of importance to them without pressuring them into making decisions or reaching a consensus. (p. 5)

These attributes align with the constructivist epistemology of the research study as noted in Section 4.2.5. Focus groups provide an opportunity for participants to not only voice their opinions but also to interact with other participants. Therefore, meaning is constructed through social interactions in which the participants share, compare, and co-construct their knowledge and understanding (Cousin, 2009). “The discussion between participants provides the researchers with an opportunity to hear issues which may not emerge from their interaction with the researchers alone” (Liamputtong, 2011, p. 4).

In this study, a one-off focus group was conducted with the program coordinator and lecturers in the pre-implementation stage, and serial focus groups were conducted with students in the implementation stage. The aims, recruitment, and procedure of these two types of focus groups are discussed in the following sections.

Focus group with the program coordinator and lecturers

Like the survey, this focus group was part of the context and needs analysis of the study conducted in the pre-implementation stage. While the survey assessed the needs and context from the students’ perspectives, the focus group looked at needs from the
lecturers’ perspective. The choice of focus group, rather than other research methods, was not only because of the small lecturer cohort but also because of my intention to get to know the lecturers as they shared and discussed their intentions of using the online learning environment with the program coordinator and me. As Liamputtong (2011) mentioned, a focus group is a “useful research tool when the researcher does not have a depth of knowledge about the participants” (p. 6). The focus group employed a “less structured approach” as suggested by Morgan (2002) and included the following attributes:

- Goal: Understand participants’ thinking
- Participants’ interests are dominant
- Questions guide discussion
- Fewer, more general questions
- Flexible allocation of time
- Moderator facilitates interaction
- Moderator can explore new directions
- Participants talk to each other. (p. 147)

The program coordinator and all of the lecturers were invited to participate in the focus group. However, due to conflicting schedules only the program coordinator and two of the lecturers (Lecturers C and D) were able to participate. The focus group duration was approximately an hour and was conducted in an informal, participatory, and interactive environment with the aim of exploring the needs and issues surrounding the context of the study. The focus group used general guiding questions (see Appendix E) to open up discussion about the context and needs of the program. Questions asked during this focus group meeting included inquiring about the lecturers’ experience in using web-based technologies for teaching purposes, what they thought were the challenges in their teaching, and how the use of technology could help address these challenges. At the end of the focus group meeting, I showed the coordinator and lecturers different types of online platforms (EDU2.0, Moodle, and Edmodo), which could be used as the online learning environment in the study. Each platform was reviewed with the program coordinator and lecturers to assess their potential and drawbacks. A detailed description of the outcomes of this review is elaborated in the Chapter 5.
During the focus group meeting, I played the dual roles of researcher as detective – asking questions and facilitating the discussion – and researcher as participant – working collaboratively with the lecturers and program coordinator to identify issues and discuss the context and needs of the program. These multiple roles reflected the collaborative nature of design-based research (McKenney & Reeves, 2012; O'Toole & Beckett, 2013) and helped me establish a good relationship with the participants. The discussion during the focus group was not voice-recorded in order to provide a relaxed and welcoming environment for participants, but with permission from the participants I took some notes about the discussion for later review and analysis. These notes were used in combination with the survey findings to contextualize and discuss the needs of the program from their different perspectives.

**Serial focus groups with students**

Conducting focus groups with students allowed me to gather their “shared lived experiences” (Liamputtong, 2011) after they started using the online learning environment. During the implementation stage, four student focus groups with three-to-four week intervals were conducted with different groups of students. The aim of this serial focus group was to get students’ feedback and comments on the online learning environment. The focus group lasted approximately an hour and consisted of two to four students per group. Ideally, the size of the focus groups was four students per group, but student turn up rate varied due to different circumstances. Students were selected randomly from the pool of students who consented to participate in the study. Table 4.3 provides a summary of the student participants and the date and venue of each focus group.

**Table 4.3 Summary of student focus groups**

<table>
<thead>
<tr>
<th>Focus Groups</th>
<th>Date</th>
<th>Venue</th>
<th>Participants (profession, semester in the program)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus Group 1</td>
<td>06/04/2013</td>
<td>Cafe</td>
<td>• Student 1.1: English lecturer, second semester</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Student 1.2: English teacher and part-time translator, first semester</td>
</tr>
<tr>
<td>Focus Group 2</td>
<td>02/05/2013</td>
<td>Cafe</td>
<td>• Student 2.1: high school teacher, third</td>
</tr>
</tbody>
</table>
| Focus Group 3 | 25/05/2013  | Cafe | • Student 3.1: teacher, third semester  
• Student 3.2: full-time student, first semester  
• Student 3.3: high school teacher, fourth semester  
• Student 3.4: high school teacher, fourth semester |
| Focus Group 4 | 28/06/2013  | Cafe | • Student 4.1: high school teacher and part-time teacher at an international organization, first semester  
• Student 4.2: civil servant, third semester  
• Student 4.3: administrator, fourth semester |

The focus groups started by asking students to introduce themselves, and give their background and experience in using online platforms for learning purposes, and also to offer their views on the online learning environment (see Appendix F for guiding questions). The focus groups allowed students to raise their concerns and challenges with using the online learning environment, consider what they would like to be improved, and most importantly how they thought the online learning environment would impact their learning. Students were encouraged to add or comment on each other’s responses so as “to explore and clarify their points of view” (Liamputtong, 2011, p. 5).

With students’ permission, the focus group discussions were recorded. The recorded discussions were transcribed and analysed to find common themes that reflected student
perspectives of the introduction and implementation of the online learning environment in their academic program.

**The Analysis of the Focus Group Data**

The data analysis was conducted by following a thematic analysis guideline suggested by Grbich (2007). I first read the transcripts and highlighted themes that emerged from the discussions. The themes, which were driven by the data and the focus groups’ guiding questions, were categorized and organized into a concept map using a web-based concept-mapping tool, Coggle, to help me visualize the connections between the themes. For example, in Focus Group 1 (FG1) students discussed their experiences of using Facebook for learning purposes. From the discussion, I noted an emergent theme of students “drawing on similar experience in using Facebook”. This theme was then grouped into the main theme of “Facebook” as shown in Figure 4.3.

![Figure 4.3 A segment example of the concept map of student focus groups](image)

Once the whole concept map was constructed, I revisited each theme to verify it with the voice recordings and transcripts. I also noted my reflections and interpretations of the themes on the concept map.

**4.4.3 Interviews**

In the post-implementation stage of the study, semi-structured interviews were conducted with the program coordinator and lecturers. Semi-structured interviews help “develop in-depth accounts of experiences and perceptions with individuals” (Cousin, 2009, p. 71). They usually include focus questions, probing questions, and follow-up questions (Rubin & Rubin, 2005). In this study, focus questions were framed to guide
the discussion (Appendix G), and probing and follow-up questions were asked when necessary. The purpose of the interviews was to gather different perspectives on the impacts of technology integration on teaching and learning practices from the program coordinator and lecturers who had been involved in the development and implementation of the research project.

The program coordinator and two lecturers agreed to participate in the interviews. They were asked to elaborate on their impression of this technology, its integration into their program, the benefits and challenges involved, and their recommendations and suggestions for future improvement. Each interview took approximately 30 minutes and was voice-recorded. The interviews were transcribed, and the interview data were analysed using the same procedure as undertaken for the focus groups.

4.4.4 Field Journal

A field journal is typically used in ethnographic research as a tool for field researchers to record their emotions and challenges during their fieldwork (Hennink, Hutter, & Bailey, 2011; Punch, 2012). Although some researchers might choose to keep their field journal private, Punch strongly encourages the inclusion of field journal extracts in the research report. She argues that:

Many methodological and ethical accounts of fieldwork become sanitised and smoothed over particularly because they tend to be written several months after the field work has taken place. They often lose the immediacy and emotional impact of the field work, which is why a field diary can be essential. (Punch, 2012, p. 86)

In the current study, this “immediacy and emotional impact of the field work” played a crucial role in studying the introduction and implementation processes of the online learning environment, during which there was a prolonged period of engagement with the participants. My lived experience as a participatory researcher is reflected in the field journal in which I recorded the “ups and downs” of conducting design-based research and how I dealt with different challenges that emerged. This on-going personal reflection not only helped me develop a deeper understanding of my multiple roles, but it also helped uncover the research activities and decisions “behind the scene” which other data collection techniques such as the survey, focus groups, and interviews were
not able to capture. The field journal was written in a uniform format consisting of date, title, and entry. The written entries were unstructured and sometimes focused on different emerging topics. Some entries could be considered as preliminary analysis of the research activities and were used to support, verify, or challenge the research findings collected from other methods.

4.4.5 Online Records

Online data records generated from the participants’ activities on the online platform such as the number of registrations, login dates and times, and online posts and discussions were another data source. Once the implementation stage started, online data were generated and incremented as the research progressed. These data were recorded on the online system and were regularly backed up to Word and Excel documents for later analysis. Like the field journal data, online data were used to complement the findings collected from other methods, and importantly to help uncover the nature of the lecturers and students’ participation and engagement within the online learning environment related to their online teaching and learning practices. My preliminary analysis of the online data during the implementation stage was conducted through reviewing the backed up documents and noting my observations of the online records. In the post-implementation stage, a final back up of the data was conducted, and graphical representations of the data were generated using Excel to create graphs of the number of student registrations and number of logins. A social network visualization tool, Gephi, was also used for creating graphical representations of online discussions.

4.5 Research Design and Framework

The research methods described in the previous sections were integrated into the three-stage design-based research model (pre-implementation, implementation, and post-implementation) discussed earlier in the chapter. These stages served as the framework for the current study, and the following sections discuss the key activities in each stage and how the research methods were intertwined with these activities.

4.5.1 Pre-implementation Stage

The pre-implementation stage could be referred to as the surveying and planning stage of the research project, as it aimed to explore the local context and involved collecting data to be used for the design of the online learning environment. Bannan-Ritland
and McKenney and Reeves (2012) agree that seeking information through a needs and context analysis can assist design-based researchers define legitimate problems and design interventions that address any problems which are identified. In the current study, this information was obtained through two key research methods: a survey for students; and a focus group with the program coordinator and lecturers. With the data collected from these research methods, I conducted the context and needs analyses for the study (detailed descriptions of the analyses are elaborated in the next chapter).

The outcome of the analyses suggested the need for an online platform that could assist with resource sharing, learning support, and socialization within the MA in TESOL program. EDU2.0, a cloud-based e-learning platform with free plan and unlimited data storage, was chosen as the platform for the online learning environment as most of its functionalities met with the needs of the stakeholders. The platform was employed for two key purposes: to support social and learning networks between students in the program and to assist lecturers in organizing class activities online such as lessons, assignments, and discussion forums.

When signing up to use EDU2.0, I created a school with the domain name iflmatesol.edu20.org (see Figure 4.4 for a sample portal home page). The program coordinator and I were the administrators of the online platform, and we were able to configure the platform, invite lecturers and students to join, and monitor their general activities.
Each participant had a profile page as shown in Figure 4.5, which included both account and basic profile information. Participants could also search for their friends, view their friends’ profiles, and send friend requests and messages to others.

Figure 4.5 Profile page

Once the participants had created their accounts and were able to log in, they would see a home page similar to Figure 4.6. On the top of the page there was a menu bar (home, classes, people, groups, and resources), message box, calendar, and search button. On the left hand side, there were four buttons with the following functionalities:

- News: for posting and receiving news and announcement
- Dashboard: for showing your class and class catalogue
- Message: for receiving new messages
- Calendar: for adding and viewing events

Figure 4.6 User home page

Although all homepages employed this basic template, each individual homepage was slightly different depending on the classes and groups they joined, and users could also configure their page according to their individual needs.

After the online platform had been developed and configured, all students were invited to participate in a training workshop at which I formally presented the platform to students and showed them how to use it. The workshop was conducted prior to the start of the new semester to ensure that students would be able to use the online platform for their classes in the upcoming semester, and approximately 20 students attended the workshop.

4.5.2 Implementation Stage

The implementation stage of the study ran concurrently with the new semester of the program. As mentioned, design-based research is an iterative process of design/re-design, implementation, and evaluation (Bannan-Ritland, 2003; McKenney & Reeves, 2012). From a technical perspective, the implementation stage aimed to deal with issues, needs, and changes to the online platform after it had been employed, while from a research perspective it aimed to collect data from online activities and feedback from the lecturers and students who had been using the online platform.

Regular informal meetings with the lecturers were conducted throughout this implementation stage to follow-up on their implementation and to get their feedback. Meanwhile, small focus group interviews with students were conducted monthly to get student feedback and perspectives on the use of the online platform to support their
learning. Within the five-month implementation, four focus group interviews were conducted with students.

On-going feedback collected from the program coordinator, lecturers, and students formed an iterative cycle of re-design and evaluation. It also triggered the changes in behaviour, perception, and expectations form the online learning environment. Preliminary analysis was conducted every month, in which data collected from the online platform combined with the feedback were reviewed and analysed.

4.5.3 Post-implementation Stage

Post-implementation, which was the last stage of the research project, started immediately after the semester ended. At this point in time, all of the focus group interview data and online data collected in the implementation stage were gathered for the final analysis. The aim was to reflect on the processes and lessons learned from this research project. Bannan-Ritland (2003) calls this stage the evaluation of broad impact, while McKenney and Reeves (2012) refer to it as the maturing intervention and the theoretical understanding. One key reflection source came from individual interviews with the program coordinator and lecturers. A paper-based survey was intended to be distributed to students in the post-implementation stage for documenting their final reflections. However, due to conflicting timelines and the hectic end to the semester, it could not be administered, but reviewing the field journal and online records provided a useful alternative reflection source.

4.5.4 Timeline

The research spanned an eight-month period: pre-implementation stage (two months), implementation stage (five months), and post-implementation stage (one month). The timeframe was designed so that the implementation stage covered a semester of the MA in the TESOL program (March to July) and so that there was enough time for planning in the pre-implementation stage and concluding the research data collection in the post-implementation stage. A summary of the key stages, activities, and timeline of the study is presented in Table 4.4.
Table 4.4 Research activities

<table>
<thead>
<tr>
<th>Stages</th>
<th>Activities</th>
</tr>
</thead>
</table>
| Pre-implementation (Jan – Feb 2013) | • Distributing the survey to students  
|                               | • Organizing focus group meeting with the program coordinator and lecturers  
|                               | • Designing the online learning environment  
|                               | • Organizing training workshop for students  |
| Implementation (March – July 2013) | • Monitoring and facilitating online activities  
|                               | • Conducting individual meetings with lecturers  
|                               | • Conducting focus group interviews with students  |
| Post implementation (August 2013) | • Conducting individual interviews with the program coordinator and lecturers  |

4.6 Ethical Considerations

The research project was approved by the Human Research Ethics Committee of the University of Melbourne, and the research processes adhered to the ethics guidelines outlined in the University of Melbourne’s Human Research Ethics information kit. The Head of the English Department at the Institute of Foreign Languages of the Royal University of Phnom Penh granted approval for the study to be conducted in the MA in TESOL program (see Appendix A), and plain language statements (Appendix B and C) were provided to the coordinator, lecturers, and students outlining the aim of the study, what was required of the participants, and the confidentiality of the data collected. It was clearly stated in the plain language statements that the participants could choose to withdraw from the study at any time and that confidentiality would be respected and all participant names would be replaced by pseudonyms to protect their identities.

4.7 Trustworthiness

As a design-based research with a qualitative orientation, the study employed three strategies to ensure trustworthiness, following Lincoln and Guba’s (1985) evaluative criteria. The first strategy was prolonged engagement with the research project and participants. I spent eight months working with the participants in developing and refining the online learning environment while collecting and analysing the preliminary research data simultaneously. The rapport and collaboration between me as a researcher
and the research participants developed throughout the three stages of my design-based research framework. As mentioned in Section 4.2.3, collaboration is a characteristic of design-based research and by working as a facilitator in the organization over a prolonged period of time I was able to uncover not only the practicalities of the intervention but also the cultural context of the research phenomenon.

The second strategy to maintain trustworthiness in my study was triangulation (Merriam, 2009). Multiple data sources and methods that included a student survey, focus groups, and interviews were conducted at different points of time throughout the study, and data were collected from the different stakeholders – the program coordinator, lecturers, and students. The triangulation of sources and methods helped to enhance the richness of the data by generating different points of views and insights into the introduction and implementation of the online learning environment.

The third strategy entailed reflexivity through the use of a field journal which allowed me to observe, reflect on, and keep records of the research processes throughout the study. The journal data complemented the data collected from other sources, thereby forming a triangulation of sources. This reflexive practice assisted my analysis as I recorded not only what worked but what did not work during the implementation of the intervention and my journal entries are embedded in the presentation of my findings.

4.8 Limitations of the Study

Like any research, this study had its limitations. First, this was an in-depth study of online learning environment implementation involving only one academic program in a higher education institution in Cambodia. Although the study sought participation from different stakeholders in the academic program, their perceptions and responses were accordingly restricted to their backgrounds and the local context. The participants were volunteers and therefore were not representative of the whole population of stakeholders in the academic program or institution. As discussed in Section 4.2.5, the study had a qualitative orientation, and the local truth uncovered in this particular setting might not necessarily reflect the universal truth of technology integration in the broader higher education context of this educational institution. However, lessons learned and implications of the findings are likely to be of interest to other local tertiary institutions in Cambodia.
In addition, due to the PhD’s time constraints only one macro cycle of design-based research was employed in the study, and this could affect the robustness of the design-based research methodology whose framework relied on continual refinement to produce a better intervention (Bannan-Ritland, 2003; McKenney & Reeves, 2012; Randolph, 2008). A future large scale study might want to focus on reiterating the cycle until the design-based research reached its maturation stage or include more academic programs in the study to compare and contrast different cases.

As a researcher with multiple roles from designer to investigator, I was aware of the pro-innovation bias (Rogers, 2003) and the subjectivity of qualitative study (Merriam, 2009; Willis, 2008), which affected how I chose to conduct the study and interpreted the research findings. The research methods I employed also had their limitations, so the data needed to be treated and analysed with care to ensure their trustworthiness. While the collaboration in this design-based research study helped build rapport between me and the participants, this collaboration also made it challenging for me to maintain a neutral position and detached myself from the research phenomenon. As Schein (2010) argues:

> We [researchers] presumably want to understand a system as it exists in the present. This is not only impossible because our very presence is an intervention that produces unknown changes, but if we attempt to make helpful changes, we will enable the system to reveal both its goals and its defensive routines, essential parts of its culture (p. 185)

It is indeed the goal of this study to develop helpful changes, despite the acknowledged limitations.

### 4.9 Chapter Summary

This chapter has presented the theoretical framework of design-based research, the research context, and the research framework and methods adopted for this study. Design-based research was selected as the most suitable approach because of the way it incorporates research with development and how it positions context at the centre of research, and most importantly because of the way it involves participants in the development of the study. Different models of design-based research were synthesized to form a three-stage research framework for the study: pre-implementation,
implementation, and post-implementation. The qualitative data collection methods were selected and adapted to match not only with the purpose of each stage of the study but also to align with its overall aims and the research questions.

While this chapter discusses the theory and framework that guides design-based research, Chapter 5 engages with how this theoretical framework translated into practice when the research project commenced. It uncovers the processes behind the formulation of the design-based research in its pre-implementation stage from the context and needs analysis to the configuration of the online learning environment.
Chapter 5: The Commencement of the Design-Based Research Project

5.1 Introduction
This chapter examines the initiation of the design-based research project and the online learning environment in its pre-implementation stage. It looks into the actions, perceptions, and challenges behind the context and needs analysis and the configuration of the online platform prior to its implementation. Through examining design-based research in action, the chapter serves the dual purpose of first presenting how the online learning environment is initiated and introduced to the participants, and second analysing the processes involved in conducting the design-based research project to show how they are intertwined with the introduction of the online learning environment in this study.

The chapter is organized into four sections. The first section presents and discusses the participants’ expectations of the online learning environment in the pre-implementation stage and how they reflected their needs and the situational context. In the second section, I further analyse the local context and provide a snapshot of the ICT infrastructure on campus, the participants’ ICT proficiency and experience, and the communication medium between the lecturers and students in the academic program. I then present the design and configuration of the online learning environment informed by the participants’ expectations and the context analysis. In the last sections of the chapter, I reflect on conceptualizing the design-based research study, discuss the tensions between different epistemic stances in design-based research (educational design, educational research, and educational change), and present how those epistemic stances converged to form the roadmap of this study.

5.2 The Participants’ Expectations of the Online Learning Environment
The initial contact with the MA in TESOL program, as noted in Chapter 4, was through the program coordinator who expressed interest in the research project. In an email correspondence on 30th March 2012, she stated that the idea of introducing an online
learning environment in the program had been discussed among the lecturers in their meeting a few months earlier.

We [the program coordinator and lecturers] have talked a lot about [having] blog and materials so that students could use [them] for learning and sharing. It’d be great if there is online learning environment for MA students and lecturers.

She hoped to have a centralized online learning environment which lecturers and students in the program could use for:

- information and resource sharing;
- discussing learning issues and topics of interest;
- collaborating on class projects or group assignments; and
- social networking and communication.

According to the program coordinator, these ideas were neither fully conceptualized nor implemented because of financial and human resource constraints. The introduction of the online learning environment in this setting, therefore, needed to take into consideration these constraints when searching for the appropriate online platform for this academic program.

In the focus group meeting with the program coordinator and lecturers (see Section 4.4.2), different low cost and open-sourced online platforms such as EDU2.0, Moodle, and Edmodo were reviewed. The pros and cons of each platform were assessed, and Edu2.0 was selected as the online platform to be used in the study because it was easy to set up and free for schools with less than 2000 students. The platform required minimum configuration and had a good user interface that would work as an online learning environment with various tools such as announcement, forum, group, wiki, and blog, which lecturers could use for designing class activities to support students’ learning. These functionalities presented an opportunity for implementing this platform as the online learning environment in the context where financial and human resources were considered to be the key issues.

While the email correspondence with the program coordinator suggested some of her expectations for an online learning environment, it was uncertain if the intended uses aligned with the needs and expectations of lecturers and students. Therefore, data
collected from the student survey (Appendix D) and lecturers in their respective focus group (Appendix E) were analysed to clarify the expectations and intended uses of the online learning environment, and to provide some contextual background of the participants in the study. The data revealed three common expectations of the online learning environment shared among the students and lecturers:

- simple and easy to use;
- free and accessible to everyone; and
- a fast and easy way to share learning resources.

The majority of the students surveyed wanted the online learning environment to be uncomplicated and easy to use. This expectation was supported by responses such as “simple application”, “comfortable to use”, and “easy to use for those who have average IT skills”. Being simple and easy to use might appear to be a typical response or a desirable characteristic for any application. However, what the responses from this student population suggest is that for students who have limited experience with online learning this characteristic is particularly important. According to the survey results, 90% of the respondents reported that they used the internet every day, but their engagement was generally confined to the use of search engines and social networking, and they had very limited experience with online learning. Their lack of exposure to an online learning environment meant they were more likely to value simplicity and convenience as this would enable them to adapt to a new learning environment more readily. The need for simplicity and convenience support Roger’s (2003) proposition that people tend to adopt an innovation faster if it is easy to use and learn.

These characteristics were also noted by the lecturers in the focus group as they agreed that they would consider adopting the online learning environment for their classes if it assisted them with administrative activities such as posting assignments, collecting student submission, and recording student marks. Lecturer D, who acknowledged that he had only a limited knowledge of technologies, suggested that the online learning environment should have a simple and user-friendly interface. While Lecturer C, who appeared to be more confident in using technologies, wanted the online learning environment to include different functionalities that could assist him with class management and administration. The lecturers’ responses show that their confidence
and competence of ICT linked their expectations of what ICT could be used for and how that might benefit or improve their teaching pedagogy.

Bingimlas (2009) has noted that confidence and competence in using ICT are very important when considering a teacher’s uptake of the technology as those with low confidence also tend to have low competence which generally leads to low uptake. Peeraer and van Petegem’s (2011) study found that teacher’s confidence in using ICT is related to not only ICT skill training, but also self-training and pedagogical training. From these findings, confidence and competence in using ICT are not independent factors, and they need to be discussed in relation to other factors surrounding the context in which ICT is used. In the current study, different confidence and competence levels resulted in different expectations of ICT as those with low confidence and competence (such as Lecturer D) emphasize simplicity and ease of use more than those with higher confidence and competence (such as Lecturer C).

In addition to simplicity and convenience factors, students also wanted to have free and open access to the online learning environment. A few students suggested that the online learning environment should be similar to some open-access web applications that they were familiar with such as Facebook or blogs. Despite the fact that many students had limited experience with online learning, students reported the following usage: Facebook for online discussion; Skype for chat; Google Scholar for searching documents; and Wiki and blog for online reading and writing. Their experience in using these free/open applications informed their expectations of the online learning environment. For instance, students who acknowledged that they were familiar with Facebook expected the online learning environment to function in a similar fashion to Facebook in the way it handled certain functionalities such as being able to comment on other people’s posts and receiving “updated news”. A student who was familiar with Moodle responded that the online learning environment “should be like Moodle” and should include functionalities such as “categorize and upload documents” and “allow students to submit their assignments online”.

These responses indicate that although students were invited to suggest their expectations of the online learning environment through the survey, their expectations reflected and were limited by their past experience of using other online applications. These findings align with Conole, De Laat, Dillon, and Darby’s (2008) conclusion that
the use of tools for social activities and other purposes is interrelated to the use of similar ICT tools for academic purposes. Past experience with other tools assisted students in forming their expectations of how the online learning environment should function. This finding is significant with regard to understanding the introduction of ICT in the Cambodian context. Although previous literature (Dionys, 2012; Peou & Lwin, 2011; Richardson, 2008) often mentions the lack of ICT infrastructure in the school/university context as a constraint, to date the interrelationship between ICT uses inside and outside school/university context has not been considered. Insights into students’ past experience with technologies help uncover what might influence their expectations prior to their implementation of ICT for academic purposes.

Both lecturer and student participants also expected to use the online learning environment for resource sharing purposes. This expectation can be attributed to the fact there were limited online database and journal subscriptions for students within the program. During the focus group discussion, the lecturers expressed the need for a centralized digital resource sharing system within the academic program to which they could upload learning resources and materials to share with the students in their classes. As one lecturer remarked, “I normally used emails for sharing journal articles with students, but it is time consuming and I cannot send large files”. He hoped the online learning environment would allow him to distribute learning materials to his students more effectively. Students, as reported in the survey, wanted to have an online learning environment where they could “store a collection of research conducted by other students”, “share documents”, “get free learning resources”, and “help students improve their reading and writing skills”. The strong focus on resource sharing and distribution reflects the deficiency in the area of learning resources currently available to staff and students.

The limited access to resources in the developing world is also noted by Umar, Kodhandaraman, and Kanwar (2013) who point out that open educational resources and resource sharing are vital for enhancing teaching and learning in the developing world context. In well-funded higher education institutions in developed countries, the library is the major repository of digital and non-digital learning resources, and this plays a critical role in supporting students’ learning and staff’s knowledge development. On the other hand, in a low-funded university, as in the case of the current study, learning resources are very scarce, and students usually rely on their lecturers to be resource
collectors and distributors. This explains why both lecturer and student participants stressed the importance of digital resource storage and distribution.

These three expectations – simple and easy to use, free and accessible to everyone, and a fast and easy way to share resources – reveal that the participants’ expectations of the online learning environment were related to not only individual characteristics such as their background and prior experience in using other tools, but also to contextual factors such as the limited availability of learning resources in their educational environment. Whilst the participants’ prior experience with technologies enabled them to form different expectations of the online learning environment, their expectations were also limited by their experience. It is understandable that forming expectations when they have little or no prior experience is challenging, and therefore most participants expected the online learning environment to be similar to the tools they liked or with which they were familiar. The limited access to learning resources in this context was a constraint for students, and having access to more learning resources was what the students expected from the online learning environment. However, while there is a plethora of digital resources on the internet that could support students’ learning, not all of them are open-accessed resources, and copyright is an issue that needed to be considered in this context.

This section presented the analysis of student and lecturer perceptions of their needs in relation to an online learning environment. The following section analyses the local context at the micro level, as opposed to the macro analysis of the Cambodian context that was provided in Chapter 2.

5.3 Understanding the Local Context

In his discussion on fostering relevant research into learning and teaching with educational technology, Oliver (2014) addresses the importance of contextual relevance in studying technology applications in local contexts. He argues that “no research outcomes are universally relevant, but instead will need to be recontextualized each time they are applied” (p. 910). Context plays an important role in understanding the introduction of the online learning environment in this setting; it is also an essential part of the design-based research methodology framework of the study. In Chapter 2, the context for this study was presented in the form of a broad overview of the Cambodian context and how the historical, sociocultural, and developmental background of the
country influences the Cambodian education system. While Chapter 2 looks into context at the macro-level, the contextual analysis in this section has a narrower scope and focuses on the nuances of context relevant to the academic program and the participants of the study such as ICT infrastructure and internet access, the participants’ ICT proficiency and experience, students’ self-learning, and lecturer-student communication.

5.3.1 ICT Infrastructure and Internet Access

An important issue discussed among the program coordinator and lecturers in the focus group related to concerns about the ICT infrastructure within the institution and internet access for lecturers and students. This physical infrastructure context is also noted in the literature (Abrahams, 2010; Bates, 2000; Bingimlas, 2009; Tearle, 2003) as an important enabling factor for ICT usage and implementation in an institutional setting. In the case of the current study, to introduce the online learning environment in this setting, there needed to be some reassurance that the lecturers and students would have adequate access to computer devices and the internet.

According to the information provided by the program coordinator, most of the lecturers had their own laptops or mobile devices, and the department provided free Wi-Fi access to lecturers with a 2GB per month limit. The department was restructuring its ICT infrastructure and internet service to provide broadband internet for lecturers in their offices. For students, there was a small computer lab on campus with about 20 personal computers, and students had to pay for the internet service available on those computers at a cost of about 0.30 AUD an hour, which was an affordable rate for most students. However, since most of the computers in the lab were old and slow, many students accessed the internet on campus through a mobile phone internet service or a 3G modem connected to their laptops.

As the student survey revealed, nearly 90% of the students reported that they used the internet every day while the remaining 10% used it only once or twice per week. In respective order, popular internet access points among the surveyed students were from a mobile phone (65%), their workplace (50%), home (45%), and internet cafés (40%). The popularity of mobile phone internet might be due to the fact the average number of mobile subscriptions per person in Cambodia is 1.5 (Kemp, 2015). As of March 2015, approximately 20% of mobile connections in Cambodia were broadband (Kemp, 2015).
In addition to accessing the internet from mobile phones, half of the surveyed students had access to the internet from their workplace. Most of the students held full-time or part-time jobs, so it is not surprising that they used the internet at work. Students also accessed the internet from home (45%) and internet cafés (40%). According to we are social (2012), there were approximately 304 web cafés in Cambodia in 2012, and the growth rate was 33%. The increase in internet service providers and the affordability of home internet broadband also meant that more students could access the internet from home.

These figures relating to students’ internet usage show that many students had regular access to the internet from multiple access points outside of the campus. Yet the lack of Wi-Fi on campus might have caused inconvenience for some students. Nevertheless, since many students spent most of their time at work and not on campus, the lack of Wi-Fi on campus is unlikely to be a substantial issue. Students were still able to access the internet using other sources (mobile internet or 3G modem), and from other places off campus.

5.3.2 The Participants’ ICT Proficiency and Experience

In the survey, students were asked to rate their computer and generic internet skills in order to provide some information relating to their ICT proficiency and to ascertain how much training they might need prior to implementing the online learning environment. Approximately 75% of the surveyed students rated their computer and internet proficiency as intermediate, 20% rated it as basic, and 5% rated it as advanced. It is not surprising that many students reported themselves to have intermediate computer and internet skills as studying in higher education would be likely to require them to do research online or to use email for online communication. As many students were in the workforce, they would also need these skills to perform their job functions. The common internet activities reported by the students included:

- email (100%);
- search engine such as Google or Yahoo (100%);
- social networking such as Facebook (95%);
- online videos (40%);
- online chat such as Skype (40%);
- online discussion (15%);
• wiki (15%); and
• blog (5%).

These results suggest that most of the students’ internet activities were related to communication, social, and leisure purposes. They accord with the findings of Peou and Lwin’s (2011) study that internet is widely used by university students in Cambodia, but its use is mainly for entertainment rather than academic purposes. When asked if they had used any types of online platform for learning purposes, students reported different online platforms and learning activities such as using:

• Facebook to “discuss questions posted by lecturers”, “chat with friends”, and “discuss assignments”;
• email to “send documents”;
• Skype to chat; and
• Google Scholar, wiki, and blog.

What can be noted from these activities is that they were conducted outside classrooms, are informal learning activities, and are not very much different from the general internet activities reported earlier. In addition, approximately 15% of the surveyed students reported that they had never used any online platform for academic purposes. The limited use of the internet for academic purposes may be related to the limitation of ICT and internet infrastructure in their institution and the lack of online database and resources to support students’ learning. Consequently, the use of the internet for teaching and learning within and outside formal classes is also considerably limited.

In relation to using ICT for academic purposes, lecturers who participated in the focus group claimed that they also had some prior knowledge and experience in using computers and the internet to support their teaching. Lecturer C had used Google Doc for sharing documents with his students and had a Facebook group for online discussion while Lecturer D usually used email for communication purposes and sharing learning resources with his students. These findings match with the students’ responses in the survey indicating that their prior experience in using online platforms for learning purposes involved activities such as using “Facebook to discuss questions posted by lecturers” and using an “email group or a mailing list for online discussions”. These activities suggested some prior, albeit limited, experience among lecturers and students.
in using ICT to enhance their communication and support their teaching and learning activities. These experiences, along with the previously self-reported rating of students’ computer skills, show that the participants had some ICT proficiency and skills that prepared them for learning within an online platform.

5.3.3 Students’ Self-Learning

As graduates, students were expected to spend some time engaging in self-learning activities beyond simply attending their normal classes. The importance of self-learning was also stressed by the program coordinator and lecturers who hoped that the introduction of the online learning environment would enhance lecturer-student communication and encourage students to engage in more learning-related activities outside of their normal classes. The survey results show that about half of the students reported that they spent two to four hours per week engaging in self-learning, about 30% spent less than two hours, and 20% spent more than four hours each week. This amount of time was considered to be low according to the program coordinator and lecturers, but considering that many students also worked either full-time or part-time in addition to studying, it is understandable that time constraints could be a significant issue for them.

The different types of self-learning activities that were reported by students in the survey included: “doing research and assignments”; “reading study materials, books, and research articles”; “watching videos related to learning”; and “searching for information on Google”. Most of these activities are individual or task-related activities, and some of them are conducted via the internet or through using online applications. However, when asked how they thought the online platform could support their learning, students reported activities that mostly involved working or communicating with others such as “discussing lessons with classmates”; “social communication and learning”; and “getting updated information from lecturers and friends”. From this, it can be inferred that students associated the online learning environment with social learning activities more than individual learning activities.

5.3.4 Lecturer-Student Communication

The survey results also show that mobile phone, email, and social networking were popular types of communication medium with the lecturers and classmates outside of
class hours. Mobile phones were reported as the most commonly used point of internet access, so it is logical that students prefer to use them for everyday communication as well. According to recent statistics from we are social (Kemp, 2015), the mobile connection rate in Cambodia was 157% of the total population in March 2015 (it is not unusual to own more than one mobile phone in Cambodia), and about half of the web traffic was from mobile phones. The popularity of mobile phones in Cambodia explains students’ preference to use them for both communication and internet access. However, although the majority preferred using mobile phone for long-distance communication, a few students mentioned that they preferred using email for communicating with lecturers and Facebook for communicating with classmates. This shows that in addition to having access to different communication mediums, some students are also selective of the medium depending upon with whom they intend to communicate.

This contextual analysis of ICT infrastructure and internet access that included the participants’ ICT proficiency and experience, their self-learning, and the lecturer-student communication mode was presented to the program coordinator and lecturers in the focus group meeting. It was agreed that there was a possibility of introducing an online learning environment to the academic program. ICT infrastructure and internet access on campus might be limited in this institution setting, but most of the lecturers and students had their own laptop and mobile devices and had regular access to the internet off campus. Most of the lecturer and student participants also reported themselves as having an intermediate level of computer and internet proficiency to teach or learn with and through the online platform. In the context of self-learning and online communication, most students had experienced using the internet for self-learning activities and had used mobile, email, and social media to communicate with their lecturers and classmates. However, despite this promising scenario for introducing an online learning environment in this context, there was some concern expressed by the program coordinator and lecturers that students would need to rely on their own means for internet access on and off campus. Therefore, it was agreed that the use of the online learning environment would not be compulsory for lecturers and students in the program. Lecturers and students who thought that the proposed online learning environment might benefit them and their students were welcome to utilize the online platform for their classes, and those who wished not to participate could choose not to do so.
5.4 The Design and Configuration of the Online Learning Environment

The analysis of the participants’ expectations and the local context provided crucial information for the design and configuration of the online learning environment. In collaboration with the program coordinator and the lecturers, two design domains were created as a result of the analysis: a program-based domain and a class-based domain. The program-based domain focused on the use of the online platform among the coordinator, lecturers, and students within the entire academic program, while the class-based domain focused on the use of the platform in specific classes. The following sections briefly introduce the scope and aims of these two domains.

5.4.1 Program-Based Domain

As mentioned in Section 5.2, one of the expectations from using the online learning environment was its capacity to share learning resources online with other people within the same academic program. The program-based domain was created to serve this purpose. Within the program-based domain, a MA in TESOL group was created as a space for participants to connect, learn, and share resources with others within the same program. The establishment of this program group was informed by the theoretical framework of connectivism (Downes, 2007; Siemens, 2004) and personal learning networks (Carter & Nugent, 2011; Rajagopal, Verjans, et al., 2012), which emphasize the importance of individuals in directing their learning and developing their own learning networks.

The design principles underpinning the design of this program-based domain include that learning is context-based, and learners are their own knowledge creators (Downes, 2007; Siemens, 2004). Therefore, the design of the MA in TESOL group had a strong focus on knowledge sharing between students by first creating an open online space where students could share online contents (Kim & Stefanone, 2010; Olaniran, Burley, & Chang, 2010), and then allowing students to establish informal online connections with other students outside their classes (Ala-Mutka, 2010; Cluett & Skene, 2011). The design of the group page (see Figure 5.1) included tools which allowed members to post comments and announcements, upload and share their resources, and participate in online activities such as discussions, chats, and blogs. It was hoped that by participating in this group the student participants, who were mostly teachers themselves, would be
able to engage in a community of practice (Brown & Duguid, 1991; Wenger, 1998),
develop their learning networks (Brown, 2001; Lock, 2002; Palloff & Pratt, 2005; Riel & Polin, 2004; Tu, 2004), and build their social capital (Chui, Hsu, & Wang, 2006; Hopkins et al., 2004) through their online communication and resource sharing.

![Figure 5.1 MA in TESOL group](image)

Given that this semi-formal MA in TESOL group was created within a formal university program, the program coordinator and lecturers also played important roles in modeling and guiding the knowledge and resource sharing processes. The group was co-administered by the program coordinator and me, and the lecturers were strongly encouraged to contribute to the ‘resources’ section and give suggestions on how this online group space could benefit their students’ learning and professional development.

One of the perceived challenges arising from establishing online groups or communities, as noted in research literature (e.g. Hoadley, 2002; Lock, 2002; Riel & Polin, 2004; Wegerif, 2007), is that learning networks and communities cannot be precisely designed to meet a community’s needs. According to Lock (2002), “a community is not an entity or product. Rather, it is a process, which is fluid in nature” (p. 395). The online system elements such as news, resources, forums, chat, and blog can be designed and configured to support the development of the community, but whether or not and how they are utilised depend on the performance capacity and self-directedness of the group members (Carter & Nugent, 2011; Rajagopal, Brinke,
The Technology Appropriation Model proposed by Carroll et al. (2001) notes that technology-as-designed (what the designers want it to be used for) can be different from technology-in-use (how it is actually being used for) as shown in Figure 5.2. As the technology undergoes the process of appropriation, it can be modified to fit with the users’ needs, and this is part of the iterative process of design-based research.

![Technology Appropriation Model](image)

**Figure 5.2 Technology Appropriation Model (Carroll et al., 2001)**

Many scholars (e.g. Burke, 2014; Hall & Hord, 2006; McKenney & Reeves, 2012; Schein, 2010; Trowler, 2008) agree that implementing education initiatives is rarely straightforward or predictable. The online group page, as designed in this study, served as a space for conducting online activities, but how it was adopted and appropriated was open to change once the participants started to use it. The next chapter explores the adoption and appropriation of this program-based domain.

### 5.4.2 Class-Based Domain

The class-based domain derived from the need to use the online platform to support class activities. The design principle used to inform the format of this class-based domain is the principle of online collaboration (Harasim, 2012; Ko & Rossen, 2010; Palloff & Pratt, 2005; Tu, 2004) which stresses the importance of social interactions, co-construction of knowledge, and peer-to-peer support among students. It was expected that this principle would guide the instructional design and the facilitation of class activities.
The four lecturer participants had expressed interest in having this online learning environment to supplement their face-to-face classes. They hoped to create their classes online and use the platform as a space for uploading lessons and learning materials and conducting online discussions. In order to design the online learning environment so that it met with the needs of their individual classes, a scheduled meeting/training session was conducted with each lecturer. I now briefly introduce each lecturer and outline their plans for designing and utilising the online learning environment for their classes.

*Lecturer A*

Lecturer A had used Edmodo for his class in the previous semester and consequently had some familiarity with an e-learning platform and learning management system. He had used Sakai as an e-learning platform when he did his postgraduate study and was interested in applying a similar concept to his teaching practices. He planned to integrate the online platform into his instructional design by organizing online spaces and opportunities for students to discuss their reading materials and reflect on their face-to-face class activities. He was also interested in uploading reading materials before class in order to reduce the number of hard copies of reading materials that needed to be printed, and through this to better prepare students for the upcoming class.

*Lecturer B*

Lecturer B was familiar with Moodle and had experience in using Facebook for class discussions. He usually conducted online discussions by posting questions online and set clear guidelines for what he wanted students to discuss and how he would assess their discussions. He believed that critical thinking played an important role in online discussions, and he encouraged students to not only participate in the discussions but also to critically analyse other people’s responses. He hoped to design a similar online discussion activity for his class on the EDU2.0 platform.

*Lecturer C*

Like Lecturer B, Lecturer C also had some experience in using Facebook for online discussions. She hoped to experiment with the online platform first and then introduce it at a later point to her class. Her main goal in employing the online learning environment
was for resource sharing with students, but she did not have any plan for introducing other online activities for her face-to-face class.

*Lecturer D*

Lecturer D had some basic knowledge of an online learning environment. His interest was in the online learning environment’s capacity to save time in sending emails to students and to manage his class. Like lecturer C, he planned to use the platform mainly for resource sharing purposes. He normally shared resources with students through emails and hard copies, and he thought that it would be more efficient and less time consuming if he could share resources online.

After the individual meetings with the four lecturers, class group web pages were created for each class so that the lecturers could pilot the online platform and browse its functionalities. Lecturers were assigned as the administrators of their classes, and they could add or organize the tools according to their needs. A sample class group web page is shown in Figure 5.3 showing some of the basic tools such as news, lessons, calendar, and assignments.

![Sample class group web page](image)

*Figure 5.3 Sample class group web page*

The individual discussions with the lecturers had provided some insights into their intentions of designing and organizing the online learning environment for their classes,
and this collaboration with the participants was an important aspect of the design-based research framework (McKenney & Reeves, 2012). According to Schein, shared values and goals are the key drivers for collaboration between the researchers (outsiders) and the research participants (insiders):

The intervention goals must be jointly shared by the outsider and insider. If the [researcher] tries to change the organization in terms of his or her own goals, the risk of defensiveness and withholding of data rises dramatically. If the [researcher] is helping the organization to make some changes that it wants, the probability rises that organization members will reveal what is really going on. (Schein, 2010, p. 186)

In the case of the current study, a good working relationship with the participants was needed to develop shared goals and their collaboration. Nevertheless, collaboration was also challenged by constraints such as time availability and the heavy teaching loads of the lecturer participants. While the lecturers were interested in being involved in the project, two lecturers claimed they did not have much time to pilot the platform or meet up to discuss the development of possible design options for their classes. Some lecturers were scheduled to teach four or five classes per semester, and it was evident that their heavy teaching loads affected their involvement and participation in the design-based research project, which required the researcher and the participants to share goals and responsibilities. These constraints also affected the feedback loop of design-based research (Bannan-Ritland, 2003; McKenney & Reeves, 2012; Randolph, 2008), which involved the iterative processes of piloting, evaluating, and redesigning.

The plan of having the lecturer participants piloting the online learning environment prior to introducing it to their classes was modified according to the time and workload constraints of each lecturer. To address these constraints, I introduced a selection of flexible ways the lecturers could get involved without having to invest too much of their own time. For those who often worked on campus, I scheduled occasional short meetings in order to get their feedback, and for those who preferred online communication I sent emails asking for their ideas or suggestions.

The configuration of the program-based and class-based domains was a collaborative effort with the program coordinator and lecturers. Fostering collaboration was a slow process and was more challenging than anticipated since both the situational and
individual constraints of the participants needed to be taken into consideration so as to find a balance between what myself as the researcher and the participants sought from the online learning environment and the practical ‘on ground’ considerations. Despite the challenges, the participants acknowledged that they valued being included in the decision-making processes and in determining the configuration of their own online learning environment.

5.5 Reflecting on the Conceptualization of the Design-Based Research

The identification of the participants’ expectations, the analysis of the study’s context, and the configuration of the online learning environment served as starting points for the project. Through analysing the participants’ expectations and the contextualisation of the program, I gained some understanding of the participants and their perceptions of this technology integration project. At first glance, both the analysis and the design appeared to be simple, straightforward processes involving identification of the needs or problems and the subsequent determination of design interventions. While different models of design-based research (Bannan-Ritland, 2003; McKenney & Reeves, 2012; Randolph, 2008) suggest some helpful guidelines for conducting the analysis and intervention design within the study, the practices of analysis and design were less well-defined and considerably more complex than simply following a model’s guidelines.

According to Akkerman, Bronkhorst, and Zitter (2013), the complexity of design-based research rests upon the fact that design-based researchers need to operate under three different epistemic stances: educational design; educational research; and educational change, with each having different goals or motives. From an educational design perspective, the goal is to develop an integrative design that meets practical educational needs. Educational research has a slightly different focus as it entails working towards an understanding of teaching and learning while educational change concentrates on the change process as the design or teaching and learning practices evolve. These discourses did not always speak in a harmonious voice, and this had a significant impact on the conceptualization of the research project, as well as on my role as a design-based researcher. The following sections explore some of the tensions between these different epistemic stances using examples from my fieldwork experience.
5.5.1 Educational Design and Change

The educational design of interventions is widely acknowledged in the literature (for example, Cobb et al., 2003; Edelson, 2002; McKenney & Reeves, 2012) as a core component of design-based research, which aims to generate both theoretical and practical contributions to the field of knowledge through design innovations.

Educational design is usually intentional with a clear set of purposes and strategies formulated to deal with education issues. This rational-purposive approach to design makes the formulation of a design-based research appear to be a straightforward process involving a clear identification of research problems and the design of interventions to address those problems. However, in reality it was considerably more complicated than it seemed initially. Design-based research is based on real world practices (Anderson & Shattuck, 2012; Bannan-Ritland, 2003; Barab & Squire, 2004; Collins, Joseph, & Bielaczyc, 2004; Edelson, 2002; Hoadley, 2002; McKenney & Reeves, 2012; Reimann, 2011), but things do not always go according to plan in the real world. In the following excerpt, Akkerman, Bronkhorst, and Zitter (2013) describe a case example of a researcher, Ilya, in coping with the formulation process of her design-based research project.

[Ilya] approached the first case according to what she perceived as a common order of steps in doing design research. First, she started with gaining scientific insights. She did so by systematically scrutinizing the literature, selecting a certain theoretical model and by conducting a Delphi study in which experts were questioned about how this model could inform educational practice. This should have formed the basis for formulating design principles, which she aimed to evaluate by implementing these in educational practice. In the meantime, she kept visiting the meetings with the teachers and coordinators involved and informed them about the research process. However, about half-way in the process of the Delphi study, she was confronted with a more or less final draft of the educational design that was developed by the teachers and coordinators themselves. This design did not closely relate to the theory she departed from or the design principles that she was about to develop. (p. 425)
My story of formulating the design-based research project was very similar to Ilya’s. When I first planned the pre-implementation stage, the goals were to explore the context of the study and the needs of the participants, define key problems, and design interventions using previous literature as my guide. As a novice design-based researcher, it was easy to adopt this rational-purposive mindset, assuming that by following the steps in conducting design-based research (Bannan-Ritland, 2003; McKenney & Reeves, 2012; Randolph, 2008) the research problems would emerge from the analysis, and the design would address the problems and consequentially link theories to practices. What I had not anticipated was the involvement of the educational change elements in the design-based research, such as the unpredictability of the design outcomes and the adjustments made to the research design, which created a tension in the coupling of educational design and change.

While analysing the participants’ expectations (Section 5.2), a research problem or constraint that emerged from the analysis was the limited access to learning resources in this education context. The design of the program-based domain (Section 5.4.1) aimed to tackle this problem by creating an MA in TESOL group using the principles of connectivism and personal learning networks as its guidance. However, as noted in Section 5.4.1, while the design element was able address the issue of limited access to learning resources by creating a platform for resource sharing, it was unable to predict the implementation of the MA in TESOL group in terms of its adoption or appropriation. In the following excerpt, McKenney and Reeves (2012) explain why coupling design and change is a challenge for design-based researchers:

Educational systems are organic. While some patterns can be observed, they do not have a mechanistic nature that would allow great predictability. In part, this is due to the fact that, while some contexts may evidence higher degrees of stability than others, the educational systems are dynamic. The constant, sometimes dizzying, pace of change in primary, secondary, and tertiary education is far reaching. It concerns: learners, teachers, leaders; texts, curricula, exams; policies, funding, resources; expertise, priorities, accountability structures; and much, much more. This is both a blessing and a curse for the design researcher who wishes to make change … but also study how it works and why … It can help to remember that change is a process and not an event. (p. 171)
The rationale-purposive approach to design, in which clear research problems and objectives need to be defined at the early stage, might not necessarily align with the principle of educational change, which views problems as things that emerge through the change process rather than at a single point of time. In the case of the study being reported here, the identification of clear problems early in the pre-implementation stage was challenging. A problem such as the limited access to learning resources rarely stood on its own, and such problems were usually related to other contextual constraints such as socioeconomic issues, which the educational design was unable to tackle. In addition to the complexity of the research problems, the cultural context in which people do not usually openly address or discuss education issues also hindered the process of working in collaboration with the participants to identify the research problems. For instance, I got blank stares from the lecturers when I tried to discuss any problems and challenges they experienced in their teaching practice. It was understandable that they did not want me to question their practices, and as the researcher I did not think that I was in a position to assess their practice, let alone make suggestions about what that they should or should not be doing.

When such issues emerged, I often referred to the literature for guidance in dealing with the tension between educational design and change, only to find that the guidelines in conducting design-based research did not always apply to my study’s context. As a design-based researcher, I needed to learn to make adjustments myself so that the project would work for the participants and the context. One such adjustment I made was to focus on the participants’ expectations and needs (see Section 5.2) instead of trying to identify “legitimate problems” in the early stage as suggested in the design-based research literature (Anderson & Shattuck, 2012; Bannan-Ritland, 2003; Barab & Squire, 2004; Collins et al., 2004; Edelson, 2002; Hoadley, 2002; McKenney & Reeves, 2012; Reimann, 2011). Such an adjustment was sometimes made with uncertainty about whether the design-based research was conducted in the ‘right’ way. I wondered if it was appropriate to make such an adjustment and whether such adjustments could be made while still maintaining the integrity of design-based research. As noted by Ilya, sometimes “it [is] difficult to evaluate whether this could be considered an appropriate methodology” (Akkerman et al., 2013, p. 427). The tension between the rational-purposive approach of educational design and the complexity and uncertainty of undertaking educational change made conceptualizing design-based research a
challenging task. Yet the flexibility to make adjustments, which DBR encourages, was essential for the participants’ adoption of the online learning environment and affirmed my choice of methodology.

5.5.2 Intervention Design Processes and Research

It is typical in design-based research that multiple data sources or variables are collected at different points of time throughout the research (Confrey, 2006; McKenney & Reeves, 2012; Randolph, 2008; Wang & Hannafin, 2005). Some data are collected through formal education research methods such as the survey and focus group results (Sections 5.2, 5.3) while others emerged from informal meetings with the lecturers (Section 5.4.2) that were integral to the intervention design processes.

When there are data collected from different sources— the formal education research data and the informal education design data— what should be considered as data is potentially confusing for design-based researchers. In my study, while working with the lecturers to determine the design principles for their classes (Section 5.4.2), informal data from interactions and email correspondence with the same lecturers emerged from the collaborative process, and I was uncertain at that time whether they should be considered as part of my research data. This uncertainty is shared in the following story of Ilya’s experience:

Retrospectively, [Ilya] finds it difficult to determine her data. Does or does it not include the design process? Considering the research tradition, she argues that it would have been better to track more closely the more informal design process that lead to the educational designs. At the same time however, her reason not to do so was that a recording of spontaneous talks could have easily harmed the informality and the process of gaining trust and authority. (Akkerman et al., 2013, p. 436)

Determining what data to include in design-based research is part of the tension between the educational design aspect of the online learning environment and the educational research aspect of it. In educational research, data are usually collected from carefully designed research methods, while in educational design data usually derive from design processes and activities, which are mostly informal and unplanned for. When planning the design-based research study, I had always thought data could only
be collected from carefully planned research methods and did not expect data to come from informal interactions with the participants through the intervention design processes. I later realized that the informal educational design data were very useful in helping me construct a narrative of my study and understand the process of conducting design-based research which combines the epistemic stances of educational design and educational research.

5.5.3 How Much Should I Intervene? Educational Research and Change

Design-based research is basically a participatory type of research (Confrey, 2006; McKenney & Reeves, 2012; Wang & Hannafin, 2005) whether or not the goal is to study the design of an intervention or the phenomenon caused by enacting the intervention. In traditional education research, researchers’ participatory intervention might affect the validity of the research study, but in design-based research the intervention is integral to the participatory researcher’s role.

At the commencement of the pre-implementation stage, I was conscious of the effects of my participatory intervention on the participants and the study context. It was not simply a matter of whether or not to intervene, but rather the extent of my intervention in the design-based research processes. Throughout the analysis and design processes of the study, the participants’ voices were always given serious consideration, and the participants were strongly encouraged to become actively involved in these processes. The needs and context analysis (Sections 5.2, 5.3) were conducted using the data collected from the program coordinator, lecturers, and students. The design of the program-based domain (Section 5.4.1) was discussed with the program coordinator and the class-based domain (Section 5.4.2) was constructed collaboratively with the lecturers. However, deciding to what extent I should intervene in these activities was one of the challenges when educational research and change were merged. According to McKenney and Reeves (2012), through conducting design-based research researchers are intervening in the social system, and the multiple roles they play can have different impacts on the contextual realities of the study. They provide some examples of how contextual factors of the social system are altered through researchers’ interventions, such as “when researchers teach lessons instead of teachers [or] when only exceptional teachers comprise the sample…” (p. 170).
My participatory intervention in the research processes varied according to different situational contexts. For the needs and context analysis, I compiled the findings of the student survey and presented and discussed the findings with the program coordinator and lecturers, so my intervention involved facilitating and documenting the needs and analysis processes. For the design of the program-based domain, I took the lead role in designing the platform and co-facilitation of the MA in TESOL online group with the program coordinator. For the design of the class-based domain, I took a step back to allow the lecturers to lead the design of their classes’ online activities while I provided consultation and technical support. The variation of my intervention did have some effect on the nature of the design-based research project. Too much intervention could lead to less involvement of the participants, and too little intervention could potentially lead to more responsibilities for the participants, who were already devoting a considerable amount of their valuable time and effort in order to participate in the study.

The tensions between educational design, research, and change that have been discussed reflect the key challenges I faced when I started my fieldwork and adopted the role as a design-based researcher. They also revealed a practical side to design-based research that is different to what is generally portrayed in the literature. Through reflecting on and critically analysing the processes of conducting a design-based research, it appears that there is more to design-based research than simply following the steps of linking research with practice (Anderson & Shattuck, 2012; Reeves et al., 2005). As noted by McKenney and Reeves (2012), “there are no one-size-fits-all steps for tackling different design challenges within the context of educational design research. There are, however, processes and activities which are often useful” (p. 107).

Conducting design-based research means navigating between the epistemic stances of educational design, educational research, and educational change while dealing with uncertainty and switching between different roles along the way. In the next section, the three epistemic stances of design-based research are revisited to help construct a conceptual roadmap of my study.

5.6 The Roadmap of the Study: Converging Educational Design, Research, and Change

Viewing my study from the three epistemic stances of design-based research, I noticed that my prior analysis of the local context and needs was predominantly from the
educational design discourse, which focused on how to design and configure the online learning environment to meet with the participants’ expectations and context. Although this epistemic stance allowed me to communicate effectively with the participants, it was limited in conceptualizing design-based research that required the converging of multiple epistemic stances. To move the research to the next level, I referred back to the findings around the participants’ expectations (Section 5.2) and the local context (Section 5.3) to identify the needs and intended uses of the online learning environment. These findings suggest three possible key usages of the proposed online learning environment: file storage and management; social networking and communication; and extending and supporting classroom learning. I then further developed them using the perspectives from educational design, research, and change to form a roadmap of my study.

5.6.1 File Storage and Management

The first category of need which the participants expressed through making their expectations explicit is related to file storage and management. It was expected that the online system would be a centralized digital resource sharing system which allowed lecturers to upload and store learning resources and materials and share them with students in their classes. The use of the online platform for file storage and management suggested the potential for an investigation into resource sharing and the development of a culture of sharing within the academic program. Viewing file storage and management from an educational design perspective necessitated creating a space and tool that the program coordinator, lecturers, and students could use for uploading, storing, and sharing their files. However, having the space and tool was no guarantee of its use and how people used it might vary its use according to individual needs and preference. This was where educational research came into play. From an educational research perspective, I looked into the concept of resource pooling and sharing within this educational institution and people’s perceptions of sharing in this online context. The underlying purpose of this resource sharing space was not only to make sharing more convenient but also to develop a culture of sharing over the long term. This involved viewing resource sharing from an education change perspective as an evolving process that required active participation and the contribution of individuals within the organization.
5.6.2 Social Networking and Communication

The participants also expressed the need for social networking and online communication between lecturers and students. It was expected that the platform would help students develop and broaden their learning community online. Lecturers and students had experienced using a variety of other platforms for communication, but they hoped by having an online learning environment they could communicate more easily and effectively. The use of the online learning environment for networking and communication suggested the potential for an investigation into the topics of socialization and learning community. The role of education design in supporting this need was to create a platform that the program coordinator and lecturers could use for making announcements, and students could use for connecting with their lecturers and classmates. From an educational research perspective, this required looking at socialization within the online learning environment. The online platform was employed to gain deeper insights into the ways in which the program coordinator, lecturers, and students communicated with each other. Educational change in this context was looking at how the online learning community developed as the research progressed and the way different stakeholders participated in this community.

5.6.3 Extending and Supporting Classroom Learning

The last category of need relates to the intended use for extending and supporting classroom learning. Lecturers wanted to have a platform where they could post assignments, collect student submission, and record student marks. In this regard, the online learning environment had to play a similar role to a learning management system in helping lecturers manage their classes online. As for students, they wanted to see their marks online and to get support from their peers and lecturers outside class hours and beyond the normal classroom setting. The use of the online learning environment for supporting class activities suggested the potential for an investigation into learning support and expanding learning space. Education design in this context required collaboration between the researcher and lecturers to design a learning space for different class activities. My focus as an educational researcher was to investigate the use of this online learning space to support students’ learning and how it might influence the teaching and learning practices in this context. This also triggered the
education change process in the way teaching and learning were transformed in relation to the expansion of the learning space.

Table 5.1 shows the potential transformation of the themes, combining multiple perspectives in design-based research: educational design, educational research, and educational change. This conceptualization of design-based research through the convergence of different perspectives provided a conceptual roadmap for the initial development of this design-based research project.

Table 5.1 The convergence of educational design, research, and change

<table>
<thead>
<tr>
<th>Educational Design</th>
<th>Educational Research</th>
<th>Educational Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>File storage and management</td>
<td>Resource sharing</td>
<td>Developing a culture of sharing</td>
</tr>
<tr>
<td>Networking and communication</td>
<td>Socialization</td>
<td>Strengthening the learning community</td>
</tr>
<tr>
<td>Extending and supporting class activities</td>
<td>Learning support</td>
<td>Expanding the learning space</td>
</tr>
</tbody>
</table>

5.7 Chapter Summary

This chapter has explored three important processes of the design-based research study in its pre-implementation stage: the analysis of the participants’ expectations, the analysis of the local context; and the configuration of the online learning environment. The findings of the participants’ expectations indicated that despite their limited experience in using technologies for academic purposes they had some prior experience in using technologies for communication and leisure purposes, and those experiences influenced their expectations of engaging with the online learning environment. The analysis of the local context provided some useful information of the study context and the background of the participants. The participants’ regular access to the internet and their self-reported ICT proficiency bode well for introducing the online learning environment in this context. However, there were also some emerging constraints that needed to be considered, such as the limited ICT infrastructure on campus, and the participants being time poor given heavy teaching loads and employment outside the university to supplement their wages. The previously described needs and context analysis led to the creation of two design domains underpinned by design principles:
program-based and class-based domains, both of which are explored further in the following chapters. In the last sections of the chapter, I reflected on the conceptualization of the design-based research study in its pre-implementation stage through the lens of educational design, educational research, and educational change. These epistemic stances reflected the complexity of conducting design-based research in regard to conceptualizing and adjusting the project to match with the situational needs and context.

In the next two chapters, I present the findings and analysis of the implementation of the online learning environment. Chapter 6 explores the adoption, appropriation, and adaptation of the online platform while Chapter 7 examines the teaching and learning practices within the class-based domain of the online learning environment.
Chapter 6: The Adoption, Appropriation, and Adaptation of the Online Platform

6.1 Introduction

McKenney and Reeves (2012) define implementation as “what happens when the intervention is set in motion” (p. 160). My study of the implementation started when the online learning environment was launched and continued over the duration of the university semester. In this chapter, I investigate the participants’ adoption, appropriation, and adaptation of the EDU2.0 platform as integral phases of the implementation process. As used in this chapter, the term adoption refers to the uptake of the online platform as a result of the participants’ decision making. After deciding to adopt the online platform, the participants started to appropriate it based on personal beliefs about their own needs and the needs of their classes. This appropriation led to both the adaptation of the online platform to align with their needs, and the adaptation of the participants themselves to the online practices and the changes triggered by the intervention.

The data presented in this chapter and the following chapter were collected from five different sources and are allocated the following codes for identification purposes:

1. online records collected from the platform, which consists of usage statistics and online posts: [OP-date];
2. student focus group interviews, which were conducted regularly throughout the implementation stage: [Student, FG-date];
3. individual interviews with lecturers and program coordinators: [Interviewee, I-date];
4. email communication [E-date]; and
5. journal records [J-date].

Although participants’ responses are in English, they are second language responses. I have opted not to use (sic) throughout the transcriptions, but occasionally I have inserted words in square brackets to support the reading process. Different theoretical frameworks discussed in Chapter 3 such as the Diffusion of Innovations (DoI) theory, the Technology Acceptance Model (TAM), and the Concerns-Based Adoption Model
(CBAM) are referred to in this chapter to interpret the participants’ decisions and behaviours as they progressed through the implementation trajectory.

This chapter is organized into four major sections. The first chapter section provides an overview of students’ general adoption of the online platform, using the data collected from the online records to identify different types of adopters and their login frequencies. The second section identifies the factors influencing students’ adoption decisions using the data collected from student focus groups to provide more detailed insights into why they chose to adopt the online platform. The third chapter section discusses the factors that determined how the online platform was appropriated and then adapted, using the two design domains – the program-based and the class-based domains – as its framework for investigation. In the last section, the concepts of adoption, appropriation, and adaptation are discussed in relation to the implementation trajectory, focusing on three key themes: the shift of individual perceptions; the complexity of change; and the online social practices behind the adoption.

6.2 Student Adoption of the Online Platform

The implementation stage of the research project started on the 20th March, 2013 along with the semester commencement of the academic program. A week prior to this, emails were sent to students to introduce them to the online platform and inviting them to a training workshop (see Section 4.5.1). Students who were unable to attend the workshop were sent guidelines on how to use the platform and how to sign up and create their accounts. After they had received the guidelines, students could decide whether or not to sign up for the platform as registration was not mandatory.

In order to find out how many students decided to adopt the platform, I referred to the online records which showed the number of registrations after the online platform was launched. Students’ registrations marked their intention to use the platform, and the total number of registrations represents the student adoption count. There were 77 students in the program and 55 registered to use the online platform. Figure 6.1 shows the number of registrations from commencement (Week 0 signalling the week email was sent out) to Week 7. Student registrations started in Week 0, and the number of registrations continued to increase during the first two weeks of the semester. From Week 3 onwards, the number of registrations rose slightly; and after Week 7 there were no new registrations; accordingly the remaining weeks are not represented.
Figure 6.1 Student registration for the online platform

This graphical representation of student registration indicates the different points of time when students made their decisions about whether or not to adopt the platform. The sharp increase in student registrations between Weeks 0 and 3 suggests that the majority of students made their adoption decisions during the pre-implementation and early implementation stages of the study. The data displayed in Figure 6.1 show that 10 students registered before the semester started (represented as Week 0 in the graph), 34 students registered in Weeks 1 and 2 of the semester, and 11 students registered after Week 2. From this point onwards, these three groups of students will be referred as the early adopters, typical adopters, and late adopters. According to Rogers (2003), the time in which people start to adopt an innovation can indicate their categorisation as an adopter. Early adopters are often associated with good attributes such as having better access to information and being more open to change than late adopters (Rogers, 2003; Straub, 2009). In the current study, student records show that many of the early adopters participated in the training workshop conducted in Week 0, suggesting an interest in the platform even before their classes started. It can therefore be assumed that their adoption decisions were based primarily on the information they received from the email invitation and/or the training workshop, rather than their lecturers or classmates’ suggestions. As for the typical and late adopter groups who adopted the platform after their class started, different sources of information such as emails, lecturers, and classmates were the most likely influences on their adoption decisions.
Although early adopters might have shown initial interest in the platform and made their decisions independently, data collected from students’ login records show that early adopters are not necessarily frequent users of the platform. Based on the average number of times they logged in per week, students’ login frequencies can be categorized into three separate groups: frequent users; neutral users; and less frequent users. Frequent users are those who logged in more than three times per week, neutral users logged in two or three times per week, and less frequent users logged in once or less per week. Table 6.1 shows the types of adopters in relation to their login frequency.

Table 6.1 Types of adopters and login frequency

<table>
<thead>
<tr>
<th>Types of adopters</th>
<th>Frequent</th>
<th>Neutral</th>
<th>Less frequent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early adopters</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Typical adopters</td>
<td>8</td>
<td>18</td>
<td>8</td>
<td>34</td>
</tr>
<tr>
<td>Late adopters</td>
<td>0</td>
<td>3</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>23</td>
<td>21</td>
<td>55</td>
</tr>
</tbody>
</table>

The data in the table indicate that half of the early adopters were less frequent users, while the other half were frequent or neutral users. These figures suggest that early adoption does not necessarily correlate with frequent usage. Since the login frequency is based on the average number of logins during the fifteen-week implementation period, rather than individual adoption trends, it is possible that some of the early adopters might have discontinued using the platform after a period of time, which made them fall into the less frequent user group despite their early adoption. Discontinuance (Rogers, 2003) or ‘disappropriation’ (Carroll et al., 2001), which occur when users decide to stop adopting or using an innovation, are not uncommon phenomena. As Rogers (2003) states, adoption can fall into one of these four trajectories:

- adopt and continue to adopt;
- adopt and discontinue;
- reject and later adopt; and
- reject and continue to reject.
Early adopters who later decided to discontinue their adoption fall into the second trajectory. Those who adopted the platform and continued their adoption throughout the implementation stage fall into the first trajectory, and late adopters who might have first rejected but later decided to adopt the innovation are in the third trajectory. It should be noted that the data collected cannot provide insights into the fourth trajectory as it concerns non-users who chose not to use the platform or participate in the study. Although the study did not continue to explore in detail individual adoption trends throughout the implementation stage, Rogers’ adoption trajectories help explain the pathways through which the different types of adopters progressed.

The data shown in Table 6.1 also revealed some characteristics of the typical adopter group. Only about a quarter of typical adopters are in the less frequent user group, making them the group with the largest proportion of frequent and neutral users. It can be inferred that typical adopters are more likely to continue using the platform throughout the implementation stage. This might be due to the fact that typical adopters, along with their classmates, adopted the platform when their class started, and this sense of belonging to the group made them less likely to discontinue their adoption. Also, for some classes it was compulsory for students to register and participate on the platform, and hence most of the students who registered in the first few weeks of the semester (typical adopters) continued to use the platform throughout the implementation stage as part of their class requirements.

In contrast to the typical adopters, none of the late adopters were frequent users as the majority were in the less frequent user group (see Table 6.1). This indicates that late adopters are less likely to use or continue using the platform. Late adoption might be related to different factors such as their lack of interest in the online platform, lack of initial information from lecturers and classmates, and their lack of understanding of the purposes for the platform. These factors might have led to late adoption and subsequently resulted in discontinuance of the online platform.

By viewing adoption of the online platform in terms of categorizing adopters and their login frequency, the study was able to uncover the different points of time students made their adoption decisions and the trajectory of adoption in relation to usage frequency. The data analysis affirms the Gartner Hype Cycle (Linden & Fenn, 2003) that there are often high expectations of technology at the early stage of implementation,
but after a period of implementation expectations start to lower as different issues emerge. Therefore, adoption should not be viewed as a fixed decision at a specific point of time, but rather as a decision that might change over the timeframe of the implementation process. This dynamic of adoption in relation to the implementation trajectory is discussed further in relation to the shift of individual perceptions and the complexity of change during the implementation stage later in the chapter (see Section 6.5).

While the findings reported in this section provide snapshots of students’ registrations and their login frequencies, they do not explain what factors initially led students to adopt the platform. Literature related to adoption and diffusion of innovations (Davis et al., 1989; Hall & Hord, 2006; Rogers, 2003; Straub, 2009) suggest that adoption is a personal choice and adoption decisions relate to people’s expectations, perceptions, and inner beliefs. In the previous chapter, students’ expectations of the online platform were presented as part of the needs analysis of the study, and these expectations included the online platform being simple and easy to use, being free and accessible to everyone, and also being a fast and easy way to share resources. These expectations, which were collected from the student survey, generally related to the usability of the online platform, and very little can be inferred as to why students decided to adopt it. The following section explores the factors influencing first-time adoption using the data collected from student focus groups, which were conducted after students started to adopt/implement the online platform.

### 6.3 Factors Influencing First-Time Adoption

For many student participants, this was their first experience in having access to an online platform that was intended to support their learning. Unlike the data from the student surveys, data collected from the student focus groups suggested factors that might have triggered the initial adoption of the platform that included: the communication channel; the perceived novelty; and the perceived usefulness of the online platform.

Rogers (2003) noted that communication channels play an important role in information circulation within a social system and this affects an individual’s decision to adopt or reject an innovation. In the current study, students learned about the online platform from at least one of the following channels: an email invitation; the training workshop;
or communications with their lecturers and classmates. The email invitation and the training workshop occurred prior to the start of the semester and involved interactions between myself as the researcher and the students. As mentioned, these two channels had a particular influence on the decision-making of the early adopter group. Besides these formal information distribution channels, the interpersonal communication channel between lecturers and students also played a role in informing the students about the platform, which subsequently helped influence their adoption decisions. Several students participating in the focus groups reported that they learned about the platform when their lecturers introduced it to their classes, and later they decided to sign up for it as Student 4.2 indicates: “My lecturer really encourages students to explore and use the platform, and this makes us” [Student 4.2, FG4-28/06/13].

The high level of trust students placed in their lecturers was an important influence on students’ adoption decisions. Yet, it was peer influence that was of particular importance for the late adopters group. This group was more reliant on their friends and classmates to help them make their adoption decisions. A few students who regarded themselves as late adopters reported that they learned about the platform through their friends and decided to adopt it because of their recommendations.

Although the communication channels (the email invitation; the training workshop; and lecturers and peers) were important factors that led to students’ adoption of the platform, it became clear during the student focus group interviews that the perceived novelty also played a role in their adoption decisions. This is revealed in the following responses when they were asked about their general views of the platform.

   This is new to me, and I want to try it out. I want to use this platform for my own class as well. [Student 4.2, FG4-28/06/13]

   I like using new technologies, and I find it easy to learn. [Student 3.4, FG3-25/05/13]

Both these responses suggest a level of enthusiasm and positivity towards what they perceived as new technologies. Student 4.2, who was a teacher, expressed interest in experimenting with the platform and wanted to learn more about how to implement it in her classes. Student 3.4 adopted the platform because he enjoyed learning with new technologies. Literature related to innovation adoption (Rindova & Petkova, 2007; Wells et al., 2010; Wells et al., 2008) suggests that when adopters see an innovation as
novel, they might want to experiment or learn about it. These studies also suggest that the novelty effect of an innovation, which includes affective impacts such as enthusiasm, interest, and excitement, is a common phenomenon when people first adopt an innovation. In turn, this matches with The Gartner Hype Cycle’s (Linden & Fenn, 2003) “peak of inflated expectations” stage which occurs after the technology becomes available. However, the researchers also caution that the novelty or honeymoon effect can deteriorate over time, and it is essential that when people adopt an innovation, it is not simply because of its novelty but because it holds certain attached values. The participants’ enthusiasm could be attributed to this novelty effect, and it was important to investigate if there were factors which influenced their decisions other than the novelty effect.

Another factor that emerged as an influence on students’ adoption decisions relates to their perceived usefulness of the platform. According to a student in the first focus group interview, the platform helped broaden her opportunity to connect and socialize with other students, and that connection and friendship were perceived to be enabling factors for her learning.

This platform is another step that can help you to improve your friendship. If you have more close friends and then you enjoy learning more and more because you feel like okay this is something that is happy to learn together to learn with someone you’re close with. [Student 1.1, FG1-06/04/13]

Other perceived benefits reported by students include the ease of resource sharing, the ability to receive updated news from their classes, and the ability to communicate asynchronously outside classroom settings. As one student expressed:

It is easy to share resources with everyone. If you miss class, you can still check the updates on the platform. [Student 2.1, FG2-02/05/13]

Rogers (2003) believes that an innovation is more likely to be adopted if it is perceived as useful. Perceived usefulness is also one of the two key determinants of the original Technology Acceptance Model (Davis, 1989), which suggests that this can influence people’s attitude towards technologies and their intention to use it. The other determinant of the model – perceived ease of use – was not reported by students in the current study. This is probably due to the fact that most student participants reported that this was their first use of an online learning environment, so they might not have
been able to determine the perceived ease of use when they first adopted it, nor had a clear idea about its intended use at the outset.

Yet, the student focus groups revealed that despite not having experience with online learning, many students were familiar with social networking sites such as Facebook. During the first focus group interview, students recalled their experiences in using Facebook and their perceptions of its usefulness as this excerpt reveals:

Moderator: Is this the first time you used an online platform for learning purpose?

Student 1.1: To me I can say that it is the first time I use an online platform for learning purpose, but as I have experienced [using] Facebook. Last year, I joined a group called IFL teaching practicum… I used those groups for sharing experience or doubt. For example, one lady she was curious about whether it’s okay for teachers to have bad writing skill, and then we started to discuss and share ideas. [I] tried to comfort her, and gave her as much good advice as possible.

Student 1.2: […] In my class, since the beginning of the first year until fourth year in the university, we have created a [Facebook] group so that we can share documents and questions. Lately I have shared some documents too… The purpose of that is that we can learn from each other. Sometimes we don’t know the information, but when we login to the group we can learn mutually. [FG1-06/04/13]

These responses suggest that although students were new to the EDU2.0 platform, the notions of online socialization and online knowledge sharing were not new to them. Student 1.1 provided an example of how peer-to-peer support happened within a Facebook group “IFL teaching practicum”, and Student 1.2 reported his experience of file sharing and learning through student-created Facebook groups. The student comments suggest that given their prior experiences and perceptions of online socialization and knowledge sharing gained through Facebook they are positively predisposed to online learning and the proposed EDU2.0 platform. Their comments imply that ‘perceived usefulness’ is not applied exclusively to a particular tool as suggested in previous studies related to the TAM model (Davis, 1989; Lee, 2003; Legris et al., 2003; Venkatesh et al., 2003), but can also be transferrable from one tool to
another given that in this instance students referred to their prior perceived usefulness of a similar tool to inform their adoption decision regarding a new tool.

This section has identified factors that were present in first-time adoption situations including: peer influence, the identity effect, and the platform’s perceived usefulness. Although usability factors such as simple and easy to use, free and accessible to everyone, and a fast and easy way to share resources were reported by students in the pre-implementation stage as their expectations of what the online platform should deliver, they were not raised by students in the later focus groups as the reasons for their adoption. This implies that what students expect from the online platform might not necessarily be their reasons for adoption. Usability factors might be regarded as the “attracting” factors, but to understand why people adopt a certain technology requires looking beyond these attractors to what informs or grounds their perceptions and beliefs.

6.4 Appropriation and Adaptation of the Online Platform

In Chapter 5, two design domains, program-based and class-based, were created as a result of the needs and context analysis in the pre-implementation stage of the study. These domains suggest the intended use of the platform and were designed in collaboration with the program coordinator and lecturers as part of the design-based research process. While these domains were designed to meet the needs of the academic program, it was impossible to foresee how they would be appropriated until the online platform implementation commenced. The following sections address the appropriation and adaption of the online platform by the students, lecturers, and program coordinator in the implementation stage of the study, using the two design domains as the analysis framework.

6.4.1 The Practices of Sharing in the Program-Based Domain

The program-based domain comprised the design and facilitation of the MA in TESOL group that was accessible to the program coordinator, lecturers, and all students in the program. Online records showed that among the 55 students who registered on the online platform, 40 of them joined this group. The MA in TESOL group was expected to strengthen and support the existing face-to-face community and help promote learning by sharing in the academic program. The group page provided access to a set of
tools (News, Resources, Forum, Chat, and Blog) designed to support learning within the academic program. Of these tools, the ‘news’ and ‘resources’ were the two tools used frequently by participants. The ‘news’ section was used by students for technical issues such as asking about class codes and the location of certain features, as these posts indicate.

Anyone here knows the code to 512 class? [OP1-25/03/13]

In my class I attended, I did not find the Assignment, attendance, and Resources, so please help me to find those icon in my class. [OP4-25/03/13]

The program coordinator also used this space to post announcements for students:

It's now May. Let me remind those who are to submit their proposals and projects, the due date is May 25, 2013. Good luck! [OP18-03/05/13]

Thus, the online platform became a communication tool for the program coordinator, lecturers, and students in addition to their face-to-face communication.

Another important tool for this program-based group was the resources section where group members could upload and share their learning resources. Figure 6.2 shows different learning resources that have been uploaded into this page of the online platform.
Figure 6.2 Resources page in the MA group online platform

According to the program coordinator, this resource sharing process was crucial for distributing learning resources within the program and was deemed to be convenient for both her and the students.

We can upload different types of resources for the students, and many students are happy. Usually we depend a lot on the library, but not many students are able to come and sit in the library for many hours. They are working, and when we have this website, they can access it from anywhere when they have time, so they can get a lot of benefits from this one. And it is easier for me as well that I can upload materials in one place and students can [have] access to it. I don’t have to worry about whether to send them the documents all the time… [Coordinator, I1-23/07/13]

Data collected from online posts and focus group interviews suggest that many students found the resource sharing space very useful and were appreciative of the uploaded learning materials.

Thank you for inviting me to join the group. I hope I will get more knowledge on this online platform. [OP5-26/03/13]

I particularly like the uploaded sample research papers in the resource section. [Student 3.3, FG3-25/05/13]
Despite the acknowledged importance of resource sharing, a concern noted by the program coordinator and lecturers was that student contributions in the resource section were somewhat limited. The aim of this resource sharing was to promote students’ contribution through a two-way sharing process, but online records showed that there were very few resources uploaded by the students. One student suggested that the program coordinator and lecturer should be the main contributor to this sharing section stating that “for me the lecturers or those who are involved in the platform should post or attach useful or interesting documents” [Student 4.2, FG4-28/06/13]. According to the program coordinator, students appeared to expect their lecturers and the program coordinator to share learning resources with them but were reluctant to share their own learning resources with their peers. When asked why she thought students were reluctant to share, the coordinator mentioned the hidden costs of using the online sharing tool among some students.

Most MA students are not rich. Most of the time they support their learning by themselves. They work and then they earn and pay the school fees by themselves. When we ask them to log in to the webpage, they need to use the internet, so they have to pay certain amount of money. A few dollars might not be a problem for us, but it is for them because the school doesn’t provide free internet access for them. [Coordinator, I1-23/07/13]

Lecturer A also referred to the interrelationship between internet access and socioeconomic constraints as a possible reason for students’ limited contributions. While socioeconomic constraints might not have been foreseen as a challenge during the needs and context analysis at the pre-implementation stage, it might have influenced students’ adoption and appropriation of the online platform in several ways. First, it is possible that students might not want to adopt the online platform because they needed to pay for their own internet access. The pre-implementation student survey suggested different internet access points (workplace, home, mobile, and cafes), most of which students need to pay for in order to obtain access. Second, socioeconomic constraints can also limit the number of hours students spend online, and this might have implications for the learning activities assigned to students. Students who accessed the internet from their workplace (50%) and mobile phones (65%) might not be able to spend long hours online engaging in online learning activities compared with those who have internet access at home (50%). According to Student 4.2, “in Cambodia, internet
access is not widely available for students. So, access could be a problem for some students” [FG4-28/06/13].

Accessibility was not the only constraint for participating in the sharing practices. Some students also added that attitudes towards technology and disinterest in the sharing tool as factors that could prevent students’ participation, as these comments suggest.

I don’t have a good knowledge of IT, and I don’t know how to use the sharing tool. [Student 4.2, FG4-28/06/13]

I think it’s the lack of interest. Just like [Student 4.2] said she was not a computer person, and [like] many students study in the course. [Student 4.3, FG4-28/06/13]

The lack of interest factor is mentioned in the “awareness stage” of the Concerns-Based Adoption Model (Hall et al., 1977; Hall & Hord, 2006). The model also suggests that as the adopters progress through the implementation, their concerns will shift from personal concerns to other concerns relating to consequences of the innovation and collaboration with others. In the current study, consequence and collaboration concerns were not raised in student focus group interviews. Instead students addressed an underlying concern relating to the concept of sharing, which they perceived as an important force behind participation in the resource sharing practice. Student 3.3 referred to “the culture of sharing” and the feeling of inferiority in the following excerpt from the third focus group:

I think it might be related to the culture of sharing. Some like to share and others don’t like to share. It is really hard when we talk about sharing. Some feel inferior to share. [Student 3.3, FG3-25/05/13]

This student’s comment implies that sharing is not only related to an individual’s decisions but also to the cultural context in which those decisions are made. In a collectivist society like Cambodia, the practice of sharing is strongly encouraged and has a deeply embedded cultural value. However, the strong social hierarchy embedded within culture practices also suggests that sharing is a one way process from those at the higher end of the social hierarchy to those at the lower end of the social hierarchy. In the Cambodian education context, this translates as teachers sharing with students, but not
vice versa. In their article on the Royal University of Phnom Penh, Howes and Ford (2011) commented:

The concept of a good student is one who learns the knowledge already acquired by his or her teacher. The recent concept of constructivist learning, with its emphasis on the autonomy of the individual and the individual nature of learning, is anathema to a culture that sees more value in collective, proven wisdom than individual, new ideas. (p. 169)

Thus, there is a high expectation and trust placed on the lecturers as the knowledge holders and distributors. As a student in the third focus group expressed:

The reverse process [where students play the role as the distributors] is hard … Focusing on the students’ side will be chaotic. [Student 3.4, FG3-25/05/13]

If this comment can be taken as representative, it can be inferred that in order to understand why students were reluctant to share in the context of this study requires considering both the individual perceptions and the cultural values behind sharing practices. Much literature relating to knowledge sharing (Ardichvili et al., 2006; Hwang & Kim, 2007; Li, Ardichvili, Maurer, Wentling, & Stuedemann, 2007; Wang & Noe, 2010) addresses the importance of cultural force on sharing practices and mentions that cultural characteristics such as trust, reciprocity, and competition can influence an individual’s approach to knowledge sharing.

Although the sociocultural framework might affect an individual’s sharing practice, not all students in the study had the same interpretations of the cultural force of sharing practice. In the following conversation, Student 2.1 interprets the practice of sharing as a change process rather than as a national stereotype.

Moderator: One of the aims of this online learning environment is to encourage knowledge sharing between students […] we want to encourage students to share resources with each other without just depending on the lecturers. If you need anything, just ask out. Maybe other students can help you with that.
Student 2.1: I think it’s not easy to do in Cambodian culture […] they don’t want anyone to be more superior to them. When they have resources, they don’t want to share.

Moderator: Do you support or [are] against that?

Student 2.1: I don’t. Okay, for the first time I used to be like that. When I had something good, I didn’t want to share with anyone. But when I studied at […] I met a lecturer who explained me the benefits of sharing. When you give something to someone, he or she will give you back. This is the benefit of sharing. [FG2-02/05/13]

Student 2.1 argues that an individual’s mindset can change and might not necessarily align with cultural stereotypes. This adds support to the previous discussion (Section 6.3) that identified the embedded values of an innovation, in addition to its novelty. The conversation with Student 2.1 also shows that sharing practice appears to be more complicated than it initially appears. The theoretical concepts of connectivism (Downes, 2007; Siemens, 2004) and personal learning networks (Carter & Nugent, 2011; Rajagopal, Verjans, et al., 2012), which were employed as the theoretical framework in the design of the program-based domain in this study, do not sufficiently address the complexity of sharing. The general assumption of the literature review for this research project is that sharing practice is inherent in each individual, and as a consequence the emphasis in the literature is placed on creating an environment that promotes this practice rather than on understanding people’s concerns. The findings of the current study suggest that in order to promote learning through personal learning networks, such as the MA in TESOL group, there needs to be discussions about the benefits gained from sharing practice, as well as the cultural challenges surrounding this practice.

6.4.2 The Adaptation “of” and “to” the Online Platform in the Class-Based Domain

While the previous section investigated the appropriation of the MA in TESOL group and the challenge in cultivating a culture of sharing, this section looks into the appropriation of class groups created by the lecturer participants. There were the four lecturers who expressed interest in the online platform, and three of them (Lecturers A, B, and C) adopted the platform to support their face-to-face classes. Due to a high
teaching load, the other lecturer (Lecturer D) opted not to employ the platform for his class.

Platforms were created for Classes A, B, and C (see Figure 6.3 for a sample class online page), and the learning space was designed to match the needs of the individual classes. The three classes are introduced by presenting the different tools employed in each class, what students were expected to do, and the perceived challenges of the online platform appropriation. In-depth discussion on the learning environment is presented in the next chapter.

![Image of EDU2.0 interface](image)

**Figure 6.3 Class A online News page**

Lecturers were free to choose their own suite of tools from those provided in the EDUC2.0 environment. All three lecturers used the resources tool, which in the case of Class C was the only tool chosen. Classes A and B both made use of news, resources and forums while Class A also made use of the lessons tool.

In Class A, students were required to write a reflection on the class reading materials and upload it to the platform before the class started. They were also required to participate in the online discussion forums that accounted for 10% of the total marks for the subject.
In Class B, students could access the class reading materials uploaded by their lecturer from the resources section. Students used the news section to communicate with their classmates, and they were also required to participate in the class online forum by posting responses to the discussion questions. Students received bonus marks for active participation.

In Class C, the online platform was used mainly as a space for distributing learning resources to students. Participation by students was optional and was not part of the class assessment. A summary of the tools and how they were used in each class is shown in Table 6.2.

**Table 6.2 Class usage of online tools**

<table>
<thead>
<tr>
<th>Class</th>
<th>Tools</th>
<th>Usage Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>News</td>
<td>- Class notification, announcement, and assignment reminder from lecturer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Students’ impression of the class</td>
</tr>
<tr>
<td></td>
<td>Lessons</td>
<td>- Lecturer uploaded weekly reading materials before class</td>
</tr>
<tr>
<td></td>
<td>Assignment</td>
<td>- Reading responses</td>
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<tr>
<td></td>
<td></td>
<td>- Discussion forum</td>
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<tr>
<td></td>
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<td>- Midterm exam</td>
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<tr>
<td></td>
<td></td>
<td>- Presentation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Research paper/project</td>
</tr>
<tr>
<td></td>
<td>Resources</td>
<td>- Course outline</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Research project guideline</td>
</tr>
<tr>
<td></td>
<td>Forums</td>
<td>- Students posted a weekly reflection following their class</td>
</tr>
<tr>
<td>Class B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>News</td>
<td>- A student asked for help regarding copying a video from the lecturer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- A student expressed satisfaction with his quiz result</td>
</tr>
<tr>
<td></td>
<td>Resources</td>
<td>- Course outline</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Reading materials</td>
</tr>
<tr>
<td></td>
<td>Forums</td>
<td>- Students responded to discussion questions posted by lecturers</td>
</tr>
<tr>
<td>Class C</td>
<td>Resources</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------------</td>
<td></td>
</tr>
<tr>
<td>(19 students)</td>
<td>- Marking criteria</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Reading materials</td>
<td></td>
</tr>
</tbody>
</table>

SAMR model maintains that the extent to which technology is used in classroom practice reflects different stages of integration: Substitution, Augmentation, Modification, and Redefinition (Puentedura, 2014). Based on this four-stage model, Class C could be identified as being in the substitution stage as the online platform was employed merely as a tool for resource distribution, and there was no functional change to any learning tasks. Class B fell into the augmentation stage because online discussions were incorporated into the learning tasks, and the online platform helped support this type of learning task. Class A could be identified as somewhere in between the augmentation and modification stages because key learning tasks, such as students’ responses to the assigned reading materials and online reflections of their classes, were designed and incorporated to become part of learning within the online environment.

These categorizations suggest that the lecturers did not simply use the online platform as it was designed, but they also adapted it to match with their course objectives and the perceived learning needs of their students. Carroll et al. (2001) refer to this as the technology appropriation process, in which the technology is adapted to different usages and contexts. “The users trial and evaluate the technology, select and adapt some of its attributes and so take possession of its capabilities in order to satisfy their needs” (p. 5).

Data collected from student focus groups and lecturer interviews indicate that adaptation is not always a straightforward process. The lecturers and students were not only adapting the online platform to match with the needs of their classes (adaptation “of” the online platform), but they were also adapting themselves to the online platform (adaptation “to” the online platform). Individual interviews with the lecturers revealed some insights into the adaptation to the online platform from their perspective. In the following excerpt Lecturer C indicates how she engaged with the adaptation process.

Lecturer C: At first, I find it hard to go to the assignment section and see what I should do with it. It’s not really simple unless I need to go through it a few times. Then I find it easier.

Interviewer: Does it take a lot of time to browse through it?
Lecturer C: Not so much time, but it takes time. [Lecturer C, I3-06/06/13]

In another interview with Lecturer A, he suggests that it took a lot of effort by the lecturers to help students, as this involved assisting them to learn about the platform before it could be introduced and used in his classes.

First time, there were lots of complaints. I myself tried to familiarize myself with the platform, and the students tried to familiarize themselves with the platform. They asked me questions that I could not answer so I have to wait to make confirmation in class, and I had to tell them I’m learning how to use the platform too. [Lecturer A, I2-05/08/13]

Palloff and Pratt (2005) referred to this process of learning to familiarize oneself with the tools as the ‘create an environment’ stage of online collaboration. It came after lecturers and students understood the purposes of the tools and the importance of the learning community. While the ‘create an environment’ stage is an important component of technology integration, it could also be challenging for lecturers. Maor (2003, p. 129) notes that even though it is part of a lecturer’s role to support students this is not always easy. This resonates with the experiences of the lecturers in the current study who, by their own admission, had to learn a lot about the online environment before they could support students’ use of it.

Responses from students during the fourth focus group interview suggest that adaptation was not only challenging for lecturers but for students as well. Some students struggled with the technicalities and novelty of the platform when they first started using it.

Honestly speaking, for the first few weeks I complained a lot. Why do we have this platform? It’s difficult to use… Later, I get more familiar with it. [Student 4.2, FG4-28/06/13]

In the beginning, I have a lot of difficulties. When I first login, I don’t know where to start because there were so many things. [Student 4.3, FG4-28/06/13]

From these responses, it can be inferred that the adaptation ‘to’ the online platform might be as challenging as, or even more challenging than, the adaptation ‘of’ the online platform. There were many technical and emotional challenges that students had to overcome when they tried to adapt to using and learning through the platform. These
challenges were also raised by Abraham (2010) in his study on technology adoption in higher education, but how the adopters could overcome these challenges was not clearly identified. Findings in the current study also indicate that student adaptation to the platform was linked to that of their lecturer as they were all trying to adapt to both learning and using the online platform. Students expected the lecturers to be leaders and to be more proficient, while in reality some of the lecturers were still learning to use the online platform themselves.

By looking at adaptation from different perspectives, it can be inferred that to understand technology appropriation requires looking at both the adaptation “of” the technology and the adaptation “to” the technology. The Technology Appropriation Model proposed by Carroll et al. (2001) has covered the adaptation “of” the technology within the technology appropriation process, but there is little mention about the challenges users face when adapting “to” the technology. The findings from this study suggest that the challenges of implementing the online platform involved not only the adaptation “of” the online platform but also the adaptation “to” the online platform and the new practices it might have engendered. The complexity of this adaptation in relation to the teaching and learning practices of the online learning environment is elaborated in the next chapter.

This section has examined the appropriation of the program-based and class-based domains created in the pre-implementation stage of the study. It has revealed the complexity of appropriation in relation to two key aspects: the cultural context (Section 6.4.1) and the adaptation to the online platform (Section 6.4.2). Culture plays an important role in understanding the practice of sharing within the program-based domain, and it might also be regarded as a constraint in applying the theoretical framework of connectivism and personal learning networks in the Cambodian education context. How people adapted to the online platform was also a challenge that needed to be considered when implementing the online platform. As part of the design-based research, the goal is not only to study how the participants appropriate the online platform, but also to understand the change processes associated with the implementation and the extent to which they might promote or hinder full achievement of integration. In the next section, the dynamics of adoption, appropriation, and adaptation are discussed in relation to the holistic implementation trajectory of the study as the participants and I reflected on the online platform implementation.
6.5 The Dynamics of Adoption, Appropriation, and Adaptation

As noted in Section 6.2, adoption is not necessarily a fixed decision. The participants might decide to adopt the online platform earlier or later than others, and they might also choose to discontinue their adoption during the implementation stage. Adoption is related to the processes of appropriation and adaptation, and as the participants started to use the online platform they reflected on its implementation. Their decisions and behaviours could change as the implementation stage progressed and as they learned to adapt to the tool they were using. The following sections discuss three emerging themes relating to the adoption, appropriation, and adaptation of the online platform within the implementation trajectory: the online social practices that underpin adoption; the shift of individual perceptions; and the complexity of change. Some themes were mentioned earlier in the chapter, and the following sections extend the discussion of how decisions and behaviours hold or evolve over time and contribute to acquiring an understanding of the dynamics of adoption, appropriation, and adaptation of the online platform in this study’s context.

6.5.1 The Online Social Practices behind Adoption

In Section 6.3 I briefly referred to Facebook to argue that students’ perceived usefulness of the online platform when they first decided to adopt it was drawn from their experience in using social networking sites like Facebook. However, the perceived connection between the two applications, as observed throughout the study, did not end when the student participants first adopted the online platform. Although the participants were not specifically asked about their use of the social networking site, Facebook was frequently mentioned in student focus group interviews as well as in individual interviews with the program coordinator and lecturers.

In the wrap-up interview with the program coordinator, Facebook is merged into a discussion of concerns relating to managing online posts and sustaining an online community. The program coordinator mentioned how a lecturer had set up a Facebook site but that it had not been sustained, and she expressed concern that the same thing would happen with the online platform.

When we create web page, to a certain extent students have freedom to post and if we can’t monitor them carefully, it will become a crisis. I raise one
example. Some of the lecturers created a Facebook page called the… It was so lively [at the beginning], but after one month it became so quiet … I’m worried [that similar things might happen to this online learning environment]. [Coordinator, I1-23/07/13]

During an interview with Lecturer A, he stated that he used the online platform in a way that was similar to Facebook. For example, he usually logged in every day to “see if there’s anything new”, and he checked students’ comments in the discussion forums in the same way he did with Facebook. Comparisons were also made between Facebook and the EDU2.0 platform by students. Some students thought that the two platforms were similar, and others thought that they were different since one was mainly used for educational purposes while the other was used for social purposes.

[The platform] is quite similar to Facebook. Facebook doesn’t provide enough functions like this platform. I have never used an online learning environment like this before. [Student 4.3, FG4-28/06/13]

Unlike Facebook, the platform has educational focus. [Student 1.1, FG1-06/04/13]

It was not a coincidence that Facebook surfaced in many of the conversations with the participants. It has been shown that there has been an influx of Facebook use in Cambodia particularly among university students (Saray, Chea, & Peou, 2010; we are social, 2012), and this use was acknowledged by Student 1.1 who noted that “most students in Cambodia are familiar with Facebook” [Student 1.1, FG1-06/04/13]. The frequent references to Facebook in the interview data and its mention in the student survey reported in the previous chapter suggest that despite their limited experience with online learning environments many participants were familiar with online social networking. Their online social practices in this case appeared to be a step ahead of their online educational practices. Conole et al. (2008) note that students gain skills from using technology in their everyday lives, and “the distinction between using technologies for learning as opposed to other purposes is eroding” (p. 522). The discussion with students, lecturers and the program coordinator indicate that this is certainly the case in the context of Cambodian higher education.

The use of Facebook was the only reference point to social networking, but it provides some insights into how people perceive and make connections between two different
technology applications. For those who have experienced learning or teaching in an online environment, the online system EDU2.0 used in this study might be compared with Blackboard, Moodle, or Sakai since they are in a similar group of applications. For example, in an interview with Lecturer A, he mentioned, “when I did my MA [abroad], the university used Sakai, so it’s very similar to EDU2.0” [Lecturer A, 12-05/08/13]. Because lecturer A had used Sakai, he could draw a connection between EDU2.0 and Sakai. However, for many participants with limited experience in using other technology applications for educational purposes, their social use of Facebook became their only point of reference when discussing learning with technologies and was continually referred to throughout the implementation stage.

These findings relating to Facebook and online social practices have implications for how the lecturer and student participants viewed, adopted, and appropriated the online platform. As identified in Section 6.3, the participants’ experience in social networking influenced their perceptions of the usefulness of the online platform, and the comparison between Facebook and the online platform suggests that there is a blurring line between social and educational uses of technology. Summing up, the participants’ background and experience in using social networking sites were important enablers for their adoption of the online platform.

### 6.5.2 The Shift of Individual Perceptions

Another noticeable aspect of the adoption and appropriation of the online platform is related to the shift in the participants’ perceptions during the implementation stage. Their perceptions and concerns played an important role in understanding adoption in relation to the implementation trajectory of the research project. As Trowler (2008) mentions, “implementing an initiative in some way ‘creates’ it: a project’s meaning develops as the project develops. That meaning will be different in different places” (p. 145). The long-term engagement with the participants allowed me as a researcher to investigate their perceptions and concerns with this technology implementation over time.

Throughout the implementation stage, focus group interviews with students were conducted to collect their feedback on the online platform and their perspectives on the technology integration within their academic program. At the end of each focus group meeting students were asked what aspects of the website or platform they thought
should be improved. In the third focus group, one student provided an insightful remark stating:

The site shouldn’t be improved, but the human should. The participation of our lecturers and students is very important. It is the mechanic force. Even if we have a good site, but people don’t use it then there’s no use at all.

[Student 3.4, FG3-25/05/13]

Another student in the second focus group shared a similar view that: “the online platform is just a tool, and it depends on how people want to use it” [Student 2.4, FG2-02/05/13]. These remarks resonate with the notion of prioritizing teaching and learning over technology, which is often mentioned in the educational technology literature (for example, Spector, 2012; Trucano, 2005; Wagner et al., 2005; Watson, 2001). Most importantly, they encapsulate a deep understanding on the students’ part of their roles and responsibilities in participating in and constructing the online learning environment.

These remarks prompted a reflection on the implementation issues that emerged and changed over time. Those issues, as recorded in my fieldwork journal, included dealing with technical difficulties of assignment submission [J-04/04/13], turning lecturer expectations into action [J-15/04/13], dealing with change and commitment [J-26/04/13], and sustaining the intervention [J-22/05/13]. It is clear from my journal records that many of the issues were human-related rather than technology-related, and they also required considerable time to address. The challenge of dealing with the human aspect of implementation is often acknowledged in literature relating to organizational change (for example, Burke, 2014; Schein, 2010; Trowler, 2008).

According to Burke (2014), “an intervention into a system causes disequilibrium and the normal reaction to seek equilibrium” (p. 254). From his perspective, implementation issues such as change resistance and conflicting values are natural human reactions to change initiatives and are part of how we seek equilibrium.

To gain a better understanding of the implementation issues from the student perspectives, I asked the students in the focus groups about the challenges they faced or the concerns they had during the implementation. The following excerpts from their responses are indicative of how they perceived the implementation challenges over time.
Focus Group 1: I can’t attach file using iPad [Student 1.1, FG1-06/04/13]. It is hard to read online documents [Student 1.2, FG1-06/04/13].

Focus Group 2: Slow internet connection makes it difficult to download documents [Student 2.3, FG2-02/05/13].

Focus Group 3: If I take three courses, I want the three courses to use the online platform. And I want all courses to be active [Student 3.1, FG3-25/05/13].

Focus Group 4: The online platform lacks interactions and feedback [Student 4.2, FG4-28/06/13].

In the interviews, when asked about the challenges they experienced, students in the early groups, focus groups 1 and 2, tended to raise issues relating to technical difficulties and functionalities of the online platform. By contrast, students in the later focus groups, focus groups 3 and 4, were more concerned with issues relating to participation and interaction. It should be noted that the focus group 1 and 2 interviews were conducted one month and two months respectively after students had started using the platform. At that point of time the students were relatively new to the platform and were still in the process of learning how to use it, so their concerns were mostly about the functionality of the tool. In addition, students in that early implementation stage had not yet had much opportunity to apply the tool in their learning context.

As students became more familiar with the tool and technological difficulties were addressed, human-related issues started to emerge and overshadow the technical issues. The shift of concerns during implementation is also addressed in the seven stages of the Concerns-Based Adoption Model (Hall et al., 1977; Hall & Hord, 2006): awareness, informational, personal, management, consequence, collaboration, and refocusing. According to the model, each individual involved in change implementation can undergo the different stages of concern, reflecting the affective side of change. The concerns collected from student focus groups in the study cannot possibly fit into all of these stages. However their concerns not only reflect the affective side of change, but also how students perceived the change caused by technology integration over time and how those concerns shifted from focusing mainly on external factors (like technology) to focusing on internal factors (like themselves and other people within the organization system).
These findings provide new insights into the relationship between the participants’ perceptions and their sustained adoption of the online platform. The effectiveness of the online platform implementation in the study was, to some extent, influenced by how well the participants were able to engage with the change processes, rather than use the platform because they were required to do so. The shift in the participants’ perceptions through the implementation stage indicates that they internalized the change through their concerns.

6.5.3 The Complexity of Change Implementation

Change is a complex process (Burke, 2014; Trowler, 2008), but it is also an important component of the design-based research framework and the adaptation process discussed in Section 6.4.2. This section looks into different perceptions of change and the complexity of change implementation.

Discussions with the program coordinator, lecturers, and students suggest different points of view regarding change implementation in the organizational context. For the program coordinator and for the students, the lecturers were deemed responsible for initiating the change required for introducing the online learning environment.

Interviewer: When we look at the whole organization system (management, lecturers, students), which party should we encourage first?

Program Coordinator: I always believe that teachers lead the students because it is how we organize our own lessons our own teaching contents. So if we know how to integrate it, students will join to a certain extent. [Coordinator, I1-23/07/13]

Students in the focus group interviews share a similar view to the program coordinator in regards to the role of their lecturers as the change leaders.

[Lecturers] should involve students in the platforms. It should start with lecturer first. [Student 4.1, FG4-28/06/13]

Lecturers should be the main actor. For instance, when lecturers post questions on the platform, students are more likely to response. [Student 3.4, FG3-25/05/13]
These responses raise assumptions the participants made in relation to the roles each stakeholder played in this organizational context. From the students’ perspectives, there appeared to be a strongly held belief that lecturers should take the initiative first, as implied in the previous comments. This belief was grounded in their trust and reliance on their lecturers’ authority and expertise.

Only lecturer can clear our doubt and misunderstanding. [OP-29/04/13]

To me group work is good, but it should be shorter so that we could save sometime for lecturing from teacher; it is more accurate. [OP-29/04/13]

However, interviews with the lecturers suggested that in their view students should also take an active role in this change process.

Interviewer: What other steps that needed to be considered before using the platform?

Lecturer C: For teachers, this [online platform] is okay. But for students, probably you can [ask] students [to create] more networks on it. Probably they can see how interesting it looks. Students can have more networks in it so that they can have more motivation. [Lecturer C, I3-06/08/13]

These conflicting points of view suggest the complexity of making changes in this organizational context. The program coordinator and students place responsibility for the management and implementation of the online platform squarely with the lecturers. However, they do not appear to take into consideration time constraints due to their lecturers’ already heavy workloads.

In the previous chapter, staff workload issues were discussed, but it should be acknowledged that in addition to their workload some lecturers were also engaged in external part-time work, as the program coordinator concedes.

Some lecturers are very busy with translation [work]; some travel a lot; some have sick leave often … We need time to get our students and lecturers ready for [implementing the online platform]. [Coordinator, I1-23/07/13]

Lecturers’ lack of time not only affected the implementation process of the online platform, but can also students’ motivation to go online, as this interview excerpt reveals.
Most of the time, the lecturers do not have time to access to the website by himself or herself. That’s the problem because when students are more active on the website [than lecturers], it is a bit demotivating. But if the lecturers are online regularly, I believe that it is more helpful or motivating for them when they are discussing. At least, they see that the lecturers are reading or considering their comments or their discussions. [Coordinator, 11-23/07/13]

The lack of time has been identified in dePaula and Fischer’s (2005) study as a barrier for implementing change. “Time pressure often hinders any attempt or willingness to find, learn, and use new technologies. Due to ongoing time pressures, teachers are more likely to see high costs in the use of a technology” (p. 45). These issues of time and workload were important contextual constraints in the implementation of the online platform. They suggest that change implementation involves more than determining who should take ownership of leading the change process, but practical contextual constraints, which make it hard for lecturers to lead the change, also need to be considered.

6.6 Chapter Summary

Three key aspects of the implementation process have been discussed in this chapter: adoption, appropriation, and adaptation. I started by investigating student adoption of the online platform through their registrations and login frequencies using the data collected from the online records. One of the key findings from the data analysis is that early adoption does not necessarily lead to frequent or sustained usage of the online platform. When asked why they decided to adopt the online platform students reported factors relating to the communication channels, the novelty, and the usefulness of the online platform. However, there was minimal mention of the usability-related factors of the online platform, which were reported in the previous chapter as what the students and lecturers expected from the online platform. According to the Technology Acceptance Model (Davis, 1989), adoption is referred to as an acceptance of a particular technology, and this acceptance comes from adopters’ perceptions, attitudes, and intention of use. The findings of the current study indicated that the way in which the participants perceived the technology influenced their decisions to accept or reject the
Adoption is not a fixed decision and is deeply connected to the appropriation and adaptation processes. The online social practices behind adoption, the shift of individual perceptions, and the complexity of change are part of the dynamics of adoption, appropriation, and adaptation that were uncovered over the course of the study. The participants’ perceptions of the online platform’s usefulness were influenced by their background and past experience in using Facebook, and this was an important enabler for the adoption of the online platform. The shift of individual perceptions and the complexity of change were part of the dynamics of technology appropriation and adaptation in the study. The participants were not simply using the online platform; they drew meaning from it as reflected in their concerns, and that meaning in turn shaped their practices and might have influenced their ongoing adoption.

Individual, cultural, and situational constraints were taken into consideration when implementing the online platform in this context. The issues of time, workload, and the cultural concept of sharing hindered the participants’ engagement with the online learning environment. These issues did not necessarily appear to be important in the pre-implementation stage of the study, but were magnified when the participants implemented the online platform. To some extent, their implementations was affected by practical considerations on the ground and the hidden cultural force embedded in their perceptions and practices.

The next chapter continues the investigation of the online learning environment implementation by exploring the teaching and learning approaches and practices associated with the online environment.
Chapter 7: Teaching and Learning in the Online Environment

7.1 Introduction

As noted in the previous chapter, the three classes of the MA in TESOL program adopted the online platform for different purposes. This chapter extends the discussion of the class-based domain appropriation by looking at the lecturers’ pedagogies and students’ approaches to learning within the context of their classes. The online platform, in this regard, is referred to as an online learning environment since it was not only a virtual space but also a space where a range of teaching and learning activities occurred. The analysis of the teaching and learning aspects of the online learning environment in this chapter considers the fact that the lecturers and students had their own teaching and learning practices prior to the study’s intervention, and these would possibly influence their subsequent behaviour and activities within the online learning environment.

The chapter begins with an examination of the program coordinator’s and the lecturers’ espoused pedagogies and the students’ preferred approaches to learning. These insights, gained through data analysis, provide a contextual background for subsequent sections that discuss specific online activities undertaken by each class. The online activities are considered with regard to how the lecturers integrated online and in-class activities and the students’ participation in the online learning environments. The chapter concludes with a discussion of the rhetoric and reality of becoming a learning community.

7.2 Espoused Pedagogies and Learning Approaches

It is beyond the scope of the current study to investigate the teaching and learning practices within the wider academic program in detail. However, to study the implementation of the online learning environment in this context required some understanding of the lecturers’ pedagogies and the students’ preferred ways of learning.

An interview with the program coordinator revealed there were strongly embedded pedagogical practices in this institutional context. She gave an example of how adapting to the teaching approaches and learning expectations in this institution could be a challenge for new students.
New students who had never studied in this institution before needed at least two semesters to adapt to the [teaching and learning practices] here. They could get totally lost. They didn’t know how to learn or could not catch up with other students who used to study here because we used a lot of independent learning strategies here. [Coordinator, II-23/07/13]

According to Trowler (2008), “workgroups which engage together on common projects over extended periods of time develop a set of contextually specific characteristics which could be described as a culture or subculture” (p. 51). In the context of the current study, the lecturers and students had their own subculture which was embedded in their everyday teaching and learning practices. Some characteristics of these subcultural practices, such as rules and regulations, were explicitly stated in the student handbook and course syllabuses while other characteristics, such as what were deemed to be appropriate or inappropriate practices, were implicit. Uncovering the participants’ espoused beliefs and values was challenging not only because they were often tacit but also because the participants were not necessarily aware of why they practised the way they did. As Schein (2010) notes, “cultural forces are powerful because they operate outside of our awareness” (p. 7). Data presented in this section were collected from the program coordinator, lecturers, and students. Interviews, focus groups, and informal discussions data provided insights into the lecturers’ pedagogical practices, students’ learning approaches, and lecturer-student communications.

Although a wide range of literature on Cambodian education (for example, Ahrens & McNamara, 2013; Chen et al., 2007; Howes & Ford, 2011; Kwok et al., 2010; Sam et al., 2012) addresses the prevalence of rote learning in Cambodia, the lecturer participants in the study seemed to favour a student-centred approach rather than a teacher-centric focus. While elaborating on how the online platform matched with his existing teaching practice, Lecturer A referred to some student-centred learning aspects of his teaching such as encouraging students to self-direct their learning and having them work and interact with one another.

I don’t think I have to adjust my teaching [approach] on this online platform because I already have [a similar approach]. My teaching approach is to get students to do things by themselves and communicate with each other. So
this [platform] is convenient for my teaching practice. [Lecturer A, I2-05/08/13]

Although he did not explicitly refer to his teaching approach as “student-centred”, Lecturer A’s focus on students’ interactions and self-directed activities aligns more with a student-centric approach to learning. In another interview, I asked Lecturer C about her teaching approach and the learning activities she usually assigned to students in her classes.

Interviewer: What is your teaching approach?

Lecturer: Student-oriented, of course. I ask students to read [before they come to class]. They can then present [what they learned from the readings] and have discussions in class.

Interviewer: What are the types of activities you commonly have in class?

Lecturer: Mostly discussions. We also have debates and presentations. [Lecturer C, I3-06/08/13]

The learning activities that Lecturer C enacts in her classes indicate an emphasis on student voice, which she associates with a student-centred approach to teaching. Course syllabuses collected from different classes in the program showed that these activities were often embedded in the course objectives, the subject outline, and the assessment practices. Students were usually required to read the assigned reading materials before class so that they could come prepared for in-class discussions and presentations. Some lecturers assigned small writing tasks, such as summary writings or reflections, as homework and distributed in-class quizzes to ensure that students read the assigned materials. One lecturer also added that there was strong competition among students in this institution; therefore, he graded the assigned tasks or quizzes to motivate students. The lecturers’ prioritization of these self-directed learning tasks can be attributed to time constraints and their awareness of graduate students’ capacity to direct their own learning.

In the survey distributed to students in the pre-implementation stage, student responses reported that the most common self-learning activities were related to lecturer directed reading and written tasks associated with the assigned reading materials. Only a few students reported that they read books or online articles which were not specifically
assigned by the lecturer. An informal discussion with Lecturer A revealed an important underlying cultural practice, which he referred to as “the culture of reliance on teachers as the source of knowledge”. Accordingly, students usually relied on their lecturers to tell them explicitly what to read and where to direct their focus. This issue is also noted in the discussion on sharing practices in the previous chapter (Section 6.4.1).

Overall, the students revealed a low tolerance of ambiguity, and students believed that it was the lecturers’ role to clarify any ambiguity. This low tolerance of ambiguity was also noted in Richards’s (2004) study on the dilemma between old and new learning in the Asian context. Richards observed, “learners often want more hands-on, learner-centered and outcomes-oriented approaches …, but [they also] want the ‘right answers’… to pass the examinations or bypass the learning process” (p. 341). In the current study, although the lecturers’ espoused pedagogy was student-centred, there remained a tension between the rhetoric and reality of student-centred teaching practices. The enactment of student-centred pedagogy was to some extent constrained by the underlying cultural recognition of the teacher as the source of knowledge and students’ conflicting expectations of this approach.

Another subcultural practice in the context of the study relates to the communication between lecturer and students. Approximately half of the surveyed students reported that they rarely communicated with their lecturers outside class about their studies, preferring instead to communicate with their classmates. A review of course syllabuses showed that some classes did not have consultation time for students, but for those classes with dedicated lecturer consultation time the lecturers reported that students rarely made good use of this allocation. An explanation for this could be that students are more comfortable interacting with their peers than with their lecturers, who they perceive as having a higher status than themselves. In this regard, a strong adherence to social hierarchy and respect for their teachers (Ahrens & McNamara, 2013; Ayres, 2000; Chandler, 2008; Howes & Ford, 2011; Pellini, 2005) may have created barriers that prevented more effective communication. Online networking and communication was one of the expectations of the online learning environment as identified in the pre-implementation stage of the study. It was hoped that the online medium would not only make communication more convenient for both lecturers and students but also help strengthen the learning community through online interactions.
Yet, how the lecturer participants applied and adapted their practices to the online context was likely to differ, not only because of individual differences in their pedagogical practices but also with regard to the situational context of each class. The enactment of the lecturers’ pedagogies and the students’ approach to online learning opportunities are discussed in the following section, which examines the implementation of the teaching and learning activities within the online platform.

7.3 Teaching and Learning Activities in the Online Learning Environment

Of the three classes that adopted the online platform, two (Classes A and B) assigned online activities for students to complete. In Class A the lecturer employed an online reflection technique using the online forum space for students to post their reflections. In Class B the assigned online task was in the form of a discussion question activity which involved the lecturer posting questions in the forums for students to answer. In all of the three classes, students could post miscellaneous questions and comments in the news and announcement section, and this too could be regarded as engagement with online activities even though participation was voluntary and not graded. Three online activities are now discussed: online reflections in Class A, discussion question activities in Class B, and miscellaneous questions and comments posted by students in different classes.

7.3.1 Online Reflection

An online activity in Class A was for students to post weekly reflections about their learning in their face-to-face classes. Figure 7.1 shows a screenshot of the online class forums which categorized the reflections for each week into different sub-forums (for example, Week 1 Reflection, Week 2 Reflection). Each week after class students were required to post their reflections on to the sub-forums where they could also read and comment on each other’s reflection posts. Their participation in this activity accounted for 10% of their total marks.
This practice of online reflection is to some extent similar to journal writing, a widely practised learning activity used by many classes in the department. While paper-based journal writing restricts the number of students with whom they can share their hardcopy journals, online reflection allows students to share their journal writings with the entire class. A study by Bye, Smith, and Rallis (2009) which compared two groups of students engaging in online versus hardcopy journal reflection activities found that “students in the group who participated in the weekly online [reflections] with peers indicated higher rates of accomplishing what they hoped to gain from the course than those who turned in weekly hardcopy reflections with one-time feedback from the facilitator/instructor” (p. 841). Although reflection activities can take different formats, learning through reflection is fundamentally based on the same assumptions that learning derives from prior experience and that it is an active process in which learners engage in their own learning processes (Boud, 2001). The adaptation of online reflections from paper-based journal writing in this context might be referred to as “augmentation” in the SAMR model (Puentedura, 2014) since the original concept of learning through reflection remains the same, but the use of technology enhances the functionality of the learning task.
The online records collected from the class forums showed that there were different types of reflections shared among students, including:

- summarizing what they learned in class;
- reflecting on their feelings, emotions, and learning behaviour;
- addressing doubts and asking for clarification;
- expressing satisfaction or dissatisfaction about class activities and suggestions for improvement;
- denoting changes in perception; and
- articulating optimism and what they would like to learn in their next class.

These reflections can be categorized into two major groups: reflecting on the learning contents; and reflecting on the class activities. The following sections explore these categorizations using examples from the students’ weekly posts.

**Reflecting on the Learning Contents**

The majority of students’ online reflections in the discussion forums related to the class lesson contents. Consequently students reflected on what they had learned each week, what interested or perplexed them, and what they wished to learn or further research as the following excerpts of students’ reflections posted in the Week 2 and Week 3 forums reveal.

> Post 2.2 at April 1, 1:47 pm

I have learnt many things from this session. First, I know the definition of SLA which refers both to the study of individuals and groups who are learning a language subsequent to learning their first one as young children, and the process of learning that language. Second, I have learnt about 3 basic questions, the definitions and the differences of L1, L2, foreign language, library language and auxiliary language. Third, I have learnt the main professional fields which SLA originated from linguists, psychologists and psycholinguists, sociolinguists and social psychologists who have different emphases on SLA due to their own fields …

> Post 3.18 at Jul 16, 12:41 am
From this session, I have learnt some key terms and theories such as comprehensible input, cognitive theory and Universal Grammar (UG). Through my own understanding from the whole class discussion, comprehensible input is the input that is learnt and understood by the children when they acquired the language so input is very important which means that without the input the children cannot learn the language at all. Another one is cognitive theory which claims that infants learn from everything around them through active experimentation and construction. For example, the child knows that a knife is sharp and dangerous thing because he/she experienced in cutting himself/herself previously. Next, UG is inborn knowledge which makes the children learn L1 acquisition naturally. However, I am still not sure about other things like connectionist models, learning theory and social interaction theory.

In Post 2.2 the student reported three main points he learned in Week 2, focusing on definitions and factual information, while in Post 3.18 the student explained some key terms used in the lesson but acknowledged some uncertainty regarding the models and theories that were introduced. Most of the students’ reflections in the class forum followed a similar format to these examples. Students usually reported and summarized the learning content without drawing any connection to themselves or critically analysing the lesson’s content. Although some research studies (for example, Boud, 2001; Boud, Keogh & Walker, 1985; Bye et al., 2009; Holly, 1984; Walker, 1985) note the benefits of reflective writing for students’ personal growth and freedom of expression, reflections which are based solely on the learning content lack the personal and analytical elements expected from a reflection writing task.

There were, however, a few students in the forum who managed to link what they learned from class to their own experience. In the following excerpts the students not only explained the learning content, but they also expressed how they could relate to those concepts through their personal experience as a teacher, a student, and a father.

> Post 5.9 at May 6, 10:55 am

… I am also more aware of the concept of grammaticalization. It refers to the development process in which a grammatical function is conveyed by shared extralinguistic knowledge and inference based on the context of
discourse, then by a lexical word, and later by a grammatical marker. I find this concept very useful because my students usually make mistakes when they try to construct past tense sentence since their cognitive process is not high yet which makes their automatization work slowly. This may cause errors in the process …

> Post 4.8 at Apr 28, 10:12 pm

Chapter two has improved my understanding of language acquisition. I have known that children have different rate (speed) in learning language, so as a teacher I cannot force children to learn what we really want them to learn. They need time to improve. This can be illustrated by a real example from my son. However, children usually follow a similar order in acquiring a language …

> Post 3.2 at Apr 2, 5:01 pm

[Reflecting on a video shown in class] … One last thing that I have to agree with … is the case of Japanese girl who had a language explosion … after being silent for 5 months. It did not really surprise me though. I experienced the same phenomenon. I did not realize I received the input from reading newspapers/novels, watching or listening to English speaking programs on tv/radio until I one day produced it in my writing/speech. I did not know where the phrases or vocabulary came from. They just came out of nowhere! I never seemed to make any conscious effort in learning them also. It is amazing how the brain works. It actually receives the information, stores it in a place we never know, and ready to be retrieved later.

In Post 5.9 the student drew on his experience in teaching the past tense to explain the concepts of ‘grammaticalization’ and ‘automatization’. As an English teacher, he found these concepts and terminology very useful for his teaching. In this instance, the student did try to connect the learning contents to his own teaching experience. Likewise, in Post 4.8 the student noted the implications of language acquisition for teaching English to children and the application to his son’s learning processes. Although he did not elaborate on the connection between language acquisition and his experience, the student’s reflection indicated that he had thought about implications for his teaching practice.
Post 3.2 was based on the student’s personal learning experience, her understanding of subconsciousness, and how the video shown in class related to that experience. The connections between the learning content and the students’ experience can be best explained in relation to Piaget’s (1968) concept of assimilation in which students add the new learning content to their existing knowledge or schema. Boud et al. (1985)’s study on learning through reflection reaffirms the notion of assimilation by adding that “individuals engage to explore their experiences in order to lead to new understandings and appreciations” (p. 19). In addition to linking their reflections to their past experience, some students noted the changes in their perceptions and understanding as part of the assimilation or learning process. The following posts show some examples of students reporting their changing perceptions.

> Post 2.8 at Apr 1, 2:40 pm

[T]he questions and answers that were introduced by lecturer during the second session of the day surprised me in the sense that they give me some useful knowledge of which I have not thought and I think that such knowledge is really invaluable for our present and future career. The answers have changed my prior understanding related to SLA settings …

> Post 2.14 at Apr 3, 10:10 am

… [T]he lesson have cleared my misunderstanding in the past since I used to think that SLA focuses exclusively on 'Acquisition' not 'Learning', but now I know that it involves both components …

> Post 2.17 at Apr 28, 11:21 pm

During the week 2, I have learned some key points from the lecture. First, I have realized that no matter how many languages we learn after the L1 is called the second language. This is in contrast to what I have always thought in the past that only one language that we learn after the first language is called the second language while other languages that we learn after the second language is called the third or the fourth language and so on …

The students used the phrases ‘I have not thought’, ‘now I know’, and ‘this is in contrast to’ indicating their new interpretation or understanding of the learning content. These
comments indicate changes in their understandings and perception, confirming the importance of reflection as noted in Bye et al. (2009) that through engaging in the reflective practice students can link old and new knowledge and consequently gain a better understanding of what they have learned. As the students re-evaluated their existing knowledge and schema, they also engaged in the assimilation and accommodation processes (Piaget, 1968), in which new learning content helped to clarify their prior misunderstandings and tentative perceptions, broadening their conceptual frameworks.

**Reflecting on Class Activities**

The second category of student reflection involved reflection on class activities. In this category, students reflected on their face-to-face class activities, commented on learning activities they thought were or were not useful and suggested how those activities could be improved in future classes. In the following excerpts, students used their online reflections to provide feedback on their class activities to the lecturers.

> Post 2.1 at Mar 25, 7:01 pm

I like the lecture. There were some activities that I found interesting. One of them, you let us introduce ourselves at the start of the class, and we enjoyed expressing ourselves to classmates. Another one was the assignment orientation that let us have time to prepare and learn more, and the last one was the true/false group discussion. However, I found that the lecture was a bit too long. You should reduce the time focus on this by letting our classmate share their ideas about …

> Post 2.6 at Mar 31, 8:58 pm

Through class discussion, I felt that I had developed better relationship with some of my classmates, and I was happy about it. In addition, True/False activity was also interesting because it helped me think more deeply about what I have already known …

> Post 5.6 at May 5, 12:23 pm

Sessions after sessions, I have learned more and more knowledge in relation to SLA, but last week session the lecturer applied a new technique to get students engaged in Chapter 3. What I like is that first I had read the chapter
and answered the discussion questions individually. Then in class we were divided into groups, each of which had their own responsibility to answer the provided questions. After the discussion, the lecturers clarified the key points of the lesson. Class lecture helped me understand what I was doubtful of when reading the chapter individually and discussing in groups. I like the way our lecturer applied his teaching technique last week.

In the three student posts, the students responded very positively to the class activities. Posts 2.1 and 2.6 identified activities that they found helpful with regard to relationship building with their fellow students. By contrast, Post 5.6 provided very specific feedback about the strategies his lecturer adopted that assisted him to clarify his understanding of key points in the readings. In addition, in Post 2.1 the student offers the lecturer some constructive feedback about the length of his lecture. This constructive student feedback was potentially helpful for the lecturer when planning future classes. Moreover, in a cultural context where challenging one’s teacher is not encouraged (Ahrens & McNamara, 2013; Howes & Ford, 2011), the reflection forum gave students the opportunity to express their thoughts in writing which is less confronting than giving verbal feedback. For example, in the following online reflection a student expresses his dissatisfaction with the lecturer’s strategy for grouping, which he clearly might not feel comfortable or have the confidence to express in the face-to-face class:

> Post 1.3 at Mar 28, 10:51 pm

I really liked [the subject]. I am a very new student in this field, so every bit of information in the book is precious to me. In my group last session, we spent a lot of time answering the true/false questions because there were a lot of confusing terms … Everything went well until group assignment came. You asked us to form our own groups, and I didn’t know who to turned to. I am very new here. This is my second week in the program. I heard people around me whispered about how good they felt about being able to choose their group members. They might have known each other for quite sometimes already, but I don’t know anyone here. So, I really hope you would assign the group member randomly next time.
Here, as with Post 2.1, prior to commenting on an aspect that could be improved, the student first offers some positive feedback about the class activities. His reflection provided the lecturer with insights into how the group arrangement was perceived from a student’s point of view. By reading students’ weekly reflections on their face-to-face classes, lecturers could then potentially reconsider and refine their pedagogy for the next class. Ko and Rossen (2010) and Maor (2003) agree that teaching online can heighten teacher awareness of classroom teaching practices as they can immediately access and reflect on responses to the learning activities recorded on the online platform, as was evidenced in the current study.

**From Online Reflections to Discussion Threads**

While individual benefits of reflective writing are widely discussed in the literature (for example, Boud, 2001; Boud et al., 1985; Bye et al., 2009; Holly, 1984; Walker, 1985), the findings of the current study indicate that student reflections in the discussion forums had a ripple effect on the readers – the lecturers and other students.

An excerpt from the Week 3 sub-forum shows a good example of how a student’s discussion forum reflection impacted another student’s reflection post and the potential ripple effect of a single reflection.

> Student A at Apr 3, 12:16 am

[…] What I mentioned above is what I learned in class, but before writing my own reflection, I have also read other reflections posted on the forum. All of you have done a very good job because you have added new knowledge to what I learned in the books and from in-class discussion.

Two students who had read Student A’s reflection expressed their appreciation of the reflection and commented on what they had learned from it.

> Student B at Apr 3, 1:44 am

Wow, you learned a lot from the last class. I enjoyed reading your reflection, and I also learned from it as well.

> Student C at Apr 3, 8:54 am

I really appreciate your Week 3 reflection. I did not listen carefully to the video shown in class and hence could not remember it well, but your
reflection raises some interesting points and help me understand the concept of second language learning.

Student A replied to both students and made the following comment to Student C.

> Student A at Apr 3, 9:15 am

I can’t remember everything in class as well, but our classmates have done a very good job in explaining the lesson. I also learned from their reflections.

As more students read and commented on the original reflection, the ripple effect of the reflection was experienced, revealing how a single reflection can develop into a discussion thread. Figure 7.2 shows a visual representation of Week 2’s discussion threads generated by the interactive visualization software Gephi, using the data collected from the discussion forum. During Week 2 twenty students posted their individual reflections on the forum page (represented by the twenty dot points in the figure), and five of those reflections developed into discussion threads (represented by the lines connecting the dot points).

![Figure 7.2 Week 2 discussion threads](image_url)

The discussion pattern in Week 2 was relatively simple as there were only two or three students involved in each discussion thread. Most of the students’ comments were short replies to their peers’ reflections such as ‘nice reflection’ or ‘thanks for the reflection’.
In Week 4 and Week 5, however, the thread patterns were more complex and more students were involved in the discussions, as Figure 7.3 and Figure 7.4 reveal.

**Figure 7.3** Week 4 discussion threads

**Figure 7.4** Week 5 discussion threads
In the following example from the Week 4 discussion forum, Student 1 posted his individual reflection for that week and identified some key terms he was unsure about, and other students then helped with answering his question.

> Student 1 at Apr 23, 4:45 pm

…What I found really interesting in week four class was to learn some new key terms in SLA. However, some of the concepts of child learning are new to me, and I need some more explanation on the concepts of microsocial and macrosocial. If anyone understands these concepts, please share.

> Student 2 at Apr 23, 9:29 pm

Great findings. I'll try to review what I have noted on the day lecturer explained us, and I'll post my reflection tomorrow. Great job man.

> Student 3 at Apr 29, 10:11 am

I personally think that microsocial here refers to speech acts, conversational analysis, speech events, and sequencing of utterances. However, macrosocial refers to language planning and language policy, and language attitudes.

> Student 4 at Apr 29, 12:12 pm

Hello Student 1, I have just read your questions and I feel that they are interesting so I will try to answer them. First I will give the definitions from the book. Macrosocial means … and micro social means … These can help you understand the concepts. Let me try to explain this, for example, …

This example shows that students were able to add to each other’s reflections to engage in a conversation or form a dialogue. Mercer (2000) refers to this type of dialogue as cumulative talk in which students “build on each other’s contributions, add information of their own and in a mutually supportive, uncritical way construct shared knowledge and understanding” (p. 31). Most of the dialogues in the forum were in the form of cumulative talk rather than the disputational or explorative talk in which students respectively argue or critically construct their arguments based on different perspectives.

Online records collected from the discussion forum also suggest that the number of discussion threads developed from individual online reflections varied from one week to
another. Figure 7.5 compares the number of discussion threads with the number of individual reflections each week. In Week 2 and Week 14 only about a quarter of the reflections developed into discussion threads while in other weeks such as Week 4 and Week 6 about three quarters of them did so.

![Discussion threads and individual reflections](image)

**Figure 7.5 Discussion threads and individual reflections**

This variation in the number of discussion threads can be attributed to reasons such as the content of the online posts or reflections and the lecturer’s intervention. As Lecturer A expressed, students tended to respond to the reflections they liked. In addition, early posts and posts that directly asked for feedback received more comments or responses than other types of posts. Some examples of those posts include:

- Any comments, don't hesitate, start doing now, I will appreciate any of comments, positive or negative, and I will learn from your comments. [OP-02/04/13]

- I am still not sure about … Therefore, if anyone has strong understanding of these points, please share. [OP-25/04/13]

Some students also used the forum to ask each other questions that they did not have time to ask in class, as shown in the following student dialogue in Week 12.

> Student 1 at Jun 27, 11:21 am

[In class], the first group has presented the topic … The second group has presented another interesting topic … I also wanted to ask the second group
a question but I failed to ask because of the time constraint. My question is "What should the teacher do if a student or a group of students just come to the class with little motivation to learn?" … Please, kindly share your idea and experiences. Thank you very much!

> Student 2 at Jul 3, 11:00 am

Let me try to answer your question. In this situation, teachers have built a very good relationship with that group of students…

In this example, Student 1 posted a question he did not have time to ask in class, and Student 2 then tried to answer the question. While students’ use of the forum to ask each other questions was infrequent, it revealed the discussion forum’s potential for students to support each other’s learning in the dialogic space the forum provided.

In addition to the content of the reflections, the lecturer’s intervention played a significant role in improving the number of discussion threads. The ripple effect of online reflections (as represented by the discussion threads) did not emerge or improve simply as a matter of course. After implementing this online reflection technique for two weeks, the lecturer observed that there was little interaction between students in the forums and that most of the students’ reflections were addressed to him. For example, a student’s reflection started with “Dear Lecturer, I am writing my reflection on Week 2. In this week, I learned about …” [OP-31/03/13]. The lecturer stated that his goal in setting the online reflection forum was not only for students to reflect on their learning, but also for them to interact with other students through their dialogues. This goal aligns with Wegerif’s (2007) concept of dialogic education in that “dialogue is not primarily a means to the end of knowledge construction, or the acquisition of skills and identities, but is to be seen as an end in itself” (p. 28).

One of the issues the lecturer noted was “[students] think that when the class is over, they don’t want to talk about it even though [participating] in the discussion forums [is] a requirement” [E-08/05/13]. Lecturer A raised this issue in class and tried to encourage students to not only complete their individual reflection tasks but also to take time to read and comment on other students’ reflections. Figure 7.5 shows that there were some improvements in the number of discussion threads in later weeks compared to Week 2, but the number started to slowly decrease after Week 7. The research data did not suggest why this was the case, but a logical explanation for this could be the increase of
academic demands on students from mid-semester onwards, which limited their availability to engage and be active in the discussion forums. The potential spread of the effect of online reflections is based on the assumption that students read and respond to each other. In a class of 22 students this means more work for students as they not only have to write their own reflections but read and comment on what others write as well.

When asked whether the online reflection forum met his expectations, Lecturer A discussed his perceptions of what he had achieved and the challenges he had faced in implementing this technique.

Interviewer: Does the online reflection forum meet your expectation?

Lecturer A: I can say 60% or 70% … I know that not many students would want to go online and write [their reflections of the class], but they did and all of them did. So, I think I’ve achieved my goal. What I think I did not achieve is they should have written more. There were students who wrote a lot and students who didn’t, and those who didn’t write much had been like that for the whole semester. I feel like those who wrote a lot, they like the forum and that is why they express themselves more. Those who, you know, write little they just do it for the score. They don’t have the motivation; they don’t have real interest in communicating. So I wish that the communication had been more authentic from the students’ interest not for the purpose of posting comments for the score. [Lecturer A, 12-05/08/13]

Lecturer A’s response raises a legitimate concern about the authenticity of student participation in the forum. While the task has achieved the goal in terms of the percentage of students involved, it appeared that some students participated merely because they were required to, and this affected the quality of their written reflections. Walker (1985) cautions that reflective writing can become a superficial learning activity when students write simply to complete the task or to get the mark. The issue of superficiality is also raised in Salam’s (2011) study which argues that although sharing one’s reflection can benefit both the writer and other readers, some reflections are superficial as they only summarize or repeat what others have said. The implementation of this online reflection technique therefore needs to consider not only the number of student participants and the discussion threads that emerged but also the authenticity of student participation.
7.3.2 Discussion Question Activity

A discussion question activity was implemented in Class B to provide students with the opportunity to discuss the learning materials beyond the content of the physical classroom environment. In this activity, the lecturer posted discussion questions in the class’s online forum for students to respond to as his instructions and encouraging comment reveal.

Read the following questions and share your comments accordingly. In your response, if you want to answer any of the below questions, you should start by writing Q1: .... or Q2: ..... 

Question 1: As a teacher of English, describe your philosophy of language teaching and learning.

Question 2: Why do you think teachers of English should be aware of the concepts and theories in Applied Linguistics?

Enjoy the discussion [OP-18/03/13].

The discussion questions were intended to engage students with the learning content as well as to promote online student dialogue. However, an analysis of students’ responses to the discussion questions suggested a common pattern in which students answered question 1 first and then question 2 with very limited interaction with one another, as this forum excerpt shows.

> Student A at Mar 22, 9:59pm

Q1: As a teacher of English, I believe that using variety of methods is a better way to achieve teaching objectives; I choose the methods that work for my objective …

Q2: Obviously, teachers of English should be aware of the concepts and theories in Applied Linguistics …

> Student B at Mar 24, 10:46pm

Q1: I mostly agree with what has been earlier raised regarding the first question. I believe that as a teacher …

Q2: An individual should not only be competent in theoretical views but practical views are also essential …
In these responses, Student A answered the two questions, and Student B briefly expressed agreement with Student A and then provided his responses to the questions. Jaques and Salmon (2007) refer to this pattern as a one-way participation pattern in which students respond mostly to the discussion questions posted by the lecturer. This kind of interaction is described in the research literature with Hew and Cheung (2012) noting that some students are “content in merely answering queries” (p. 16) and see no reason in extending the discussion to engage in what Mercer (2000) refers to as exploratory talk. In his study, Wegerif (2007) proposed that perhaps students “did not want to take the risk to put forward new ideas that might be criticized or to challenge others when they could not be sure what the response would be” (p. 243). These explanations are relevant in the case of this class given that students only answered what was asked, and in this cultural context in which saving face is important (Ardichvili et al., 2006) it was safer to simply answer the discussion questions rather than commenting on or challenging each other’s ideas.

Online records also showed that student participation in the discussion question activity was low compared to the online reflection activity in the other class. Less than half of the students in this class participated in the forum despite the linking of participation to bonus marks. As one student pointed out, students are afraid that if they do not participate in this, they will not get any bonus marks [Student 3.2, FG3-25/05/13], which is consistent with Lecturer A’s earlier comments about the granting of extra marks. In this class, the awarding of extra marks was insufficient in itself to ensure higher student participation or interactive discussion. What appeared to be missing in this discussion question activity was the crucial “interactivity in dialogue” component (Mayes, 2006), which many scholars (Irwin & Berge, 2006; Jaques & Salmon, 2007; Mayes, 2006; Salam, 2011; Wegerif, 2007) believe can enrich the discussion and create deeper knowledge construction. To enhance the interactivity in dialogue in this context, there first needs to be an online social presence of both lecturers and students. In a face-to-face classroom, students can detect social cues and feel the social presence of others through observations and verbal communication, but in an online class the absence of these factors can be challenging for students.

In the first few weeks after the implementation of this learning activity, a student addressed the issue relating to online presence and the lack of updates and interactions in his class, noting “When I logged in, there was nothing new” [Student 3.1, FG3-
The lack of presence of others in the virtual space can make students feel disconnected and as if they are the only ones in the learning environment (Reupert & Maybery, 2010; Wegerif, 2007). The program coordinator acknowledged that the online presence of the lecturers also played an important role in improving students’ online presence stating, “If the lecturers are online regularly, I believe that it could motivate students in their discussion. At least, they see that the lecturers are reading or considering their comments or their discussions” [Coordinator, 11-23/07/13].

In Class A, the lecturer’s online presence took the form of class announcements, assignment reminders, and other notifications while in Class B the online presence of the lecturer was limited to posting discussion questions in the forum. The lack of lecturer presence in Class B supports Reupert and Maybery’s (2010) argument that “technology does not replace the lecturers’ role as active and meaningful facilitators of the learning environment” (p. 205). To implement this activity effectively required more than simply posting the discussion questions online. Consequently, with a one-way interaction pattern and limited socialization, the activity lacked the “dialogic space” (Wegerif, 2007) which could transform discussion into a higher-level knowledge construction activity.

7.3.3 Miscellaneous Questions & Comments

Miscellaneous Questions & Comments in this study referred to questions and answers posted by students in the announcement and news section. Unlike the online reflection and discussion question activity, miscellaneous posts were not part of the students’ assigned learning tasks or assessment. Data collected from the three online classes showed a range of miscellaneous posts from everyday conversations to asking questions and responding to learning content.

In some of the miscellaneous posts that are learning content related, students explained to each other the key concepts they did not understand:

Student A: I really like reading the text for homework in week 3. However, I don't really understand some points. What is operant conditioning? [OP-01/04/13]

Student B: In response to [Student A’s] question, I think Operant Conditioning, based my group discussion yesterday, is a type of learning in
which learners try to learn the language through rewards or encouragement from other people. [OP-01/04/13]

Other miscellaneous posts were about everyday conversations and requests:

I will appreciate if group 2 upload their presentation slides of chapter 12 to the Resources Section, and it will be useful resources to our class. So please do it. If you don't know how to upload, send your slides to my mail… I will post for you as a favour of our classmates. Thanks. [OP-12/07/13]

Despite the fact that many of the miscellaneous posts were simply part of students’ everyday conversations, some researchers (for example, Collison et al., 2000; Garrison & Anderson, 2003; Irwin & Berge, 2006; Tu & McIsaac, 2010) agree that this act of online socialization can provide a foundation for learning in an online context. A student shared her idea on the notion of learning through friendship and connection by stating:

This platform is another step that can help you to improve your friendship. If you have more close friends, you [will] enjoy learning more. [Student 1.1, FG1-06/04/13]

Lecturer A also elaborated on how online socialization can help develop a friendly learning environment:

When they ask each other questions online, and when they come to class, [particularly] during the break, they will go to each other and talk to each other for clarification. [This helps build up] friendship or a friendly learning environment. [Lecturer A, I2-05/08/13]

In the previous section, the limited interactions between students in the discussion question activity were raised in relation to the issues of responding only to the discussion questions and the risk of being criticized or challenged. In the case of the miscellaneous questions and comments, these factors did not appear to be an issue. Student participation through posting questions and comments in the news and announcement sections was voluntary and not graded, so the risks associated with participation were also lower compared to those of the assigned learning tasks. However, this does not mean that all students were active in posting miscellaneous questions and comments. Data collected from the online records across the classes
showed that the number of miscellaneous posts fluctuated throughout the courses, and that they slightly increased in the last quarter of the programs. There was not sufficient data in the study to explain why students participated more towards the end point of the courses. However, Collison et al.’s (2000) study of online facilitation proposed that students’ interactions in an online context generally increased as the course progressed and students became better acquainted and developed more trust in one another.

In addition to online socialization, students also learned to help and support their peers through asking and answering each other’s questions. The conversation previously presented about operant conditioning between Student A and Student B provides an example of how students can learn from their peers. Students in the second focus group conveyed some of the learning implications of this peer-to-peer support practice:

If there is something I really don’t understand, I can post … so that my friends and lecturers can share with me. I can learn from that. This is a kind of communicative learning, right? [We] can share and talk about that. [Student 2.1, FG2-02/05/13]

Someone’s question may help you to research more […] For example, [Student 2.3] doesn’t understand a key point of a lesson. [Student 2.3’s question] encourages me to read more in order to help him. This is a good point that I need, and I did it by helping him. […] Sometimes listening to your classmates explaining things to you is much easier to understand than the explanation from lecturers. [Student 2.2, FG2-02/05/13]

According to the lecturer, this practice of peer-to-peer support from miscellaneous questions and comments served as another layer of support in addition to the support from the lecturers.

When [students] ask each other questions online, and when they come to class, [particularly] during the break, they will go to each other and talk to each other for clarification … They don’t need to ask me all the time. They can go to good learners and ask for explanation. [Lecturer A, I2-05/08/13]

As a low-risk, informal, and unstructured activity, miscellaneous questions and comments have the potential to develop an open learning environment as discussed in the literature (for example, Boling & Beatty, 2010; Collison et al., 2000; Lear et al.,
Within such an environment, students “feel safe to express themselves openly and work through their personal and conceptual uncertainty” (Collison et al., 2000, p. 30). However, the extent to which students can benefit from the open learning environment depends on their willingness to participate in this miscellaneous questions and comments activity and how they value peer-to-peer sharing and support.

The three online activities presented and discussed in this section demonstrated different ways in which teaching and learning took place in the online learning environment. Some activities, such as the online reflection and discussion questions, were well-structured and graded while activities such as miscellaneous questions and comments were more informal and loosely-structured. Students’ level of participation in these activities also varied according to the learning tasks and the extent to which the class had developed as a community of practice. This variation affirms Dillenbourg et al.’s (2002) argument that an online learning environment is not simply a set of web pages but a co-constructed social space. Embedded within this social space were the subcultural, pedagogical, and learning practices which influenced how the lecturers facilitated the learning activities and how the students participated in the learning tasks. The culture of reliance on the lecturers and the hesitancy to challenge others, as mentioned earlier in the chapter, were reflected in some of the students’ online interactions. However, lecturer encouragement in the case of Class A and peer-to-peer support in the case of the miscellaneous questions and comments activity had the potential to help students overcome the cultural constraints and build a more open learning environment and a stronger learning community.

7.4 Emerging Teaching and Learning Practices

This section takes a closer look at the teaching and learning practices of the lecturers and students to find out if the introduction of the online learning environment, with its social constructivist orientation, has led to any transformation of their practices. It examines the lecturers’ teaching practices with consideration given to how they integrated online and in-class activities, and it examines the students’ learning approaches as they participated in the online and classroom learning environments.
7.4.1 Blended Learning: Integrating Online and In-Class Activities

In this study the implementation of the online platform was not intended as a replacement for the physical classroom, but rather to offer support and to enrich the in-class teaching and learning practices. In this regard, the online learning environment was not detached from the classroom learning environment. In their article about virtual learning environments Dillenbourg et al. (2002) noted the overlap between virtual and physical environments. They argued that “there is no need to draw a boundary between physical and virtual [learning environments], the key is to integrate them, not to separate them” (p. 9). The notion of integrating online and in-class activities is not a new concept and is often discussed in the literature related to blended or hybrid learning (for example, Graham, 2006; Jump, 2011; Torrisi-Steele, 2011). According to Torrisi-Steele (2011), “the aim of blended learning design is to integrate face to face approaches with technological approaches, so as to optimise learning opportunities and thus precipitate substantially better learning outcomes” (p. 535). The three online learning activities that have been discussed previously were blended with the normal class activities so that each student had more opportunities to interact outside class hours and to learn from others through peer-to-peer support. To understand how online and in-class activities were blended together, I asked the lecturer participants how they engaged with this blended learning approach.

One of the lecturer participants in the study gave an example of how he integrated online activities with his existing in-class activities and created a connection between the online and physical learning environments.

What I’ve done so far is post the discussion questions in advance [on the online platform], and [students] have to answer those questions from the readings … When they come to class, I put [them] into [a] group first to discuss the answer to those questions, and then I made clarification. So, it seems like there is a connection between reading, posting the answers online, and discussing with friends and lecturer [in class]. [Lecturer A, I2-05/08/13]

This combination of online and in-class activities links to what Graham (2006) refers to as “course-level blending” and was commented favourably by students in the discussion forum (Section 7.3.1). In this instance, the lecturer took advantage of the space and time
flexibility of the online learning environment by reserving the online space for individual or asynchronous learning activities, while class time was allocated for group or synchronous discussions.

As indicated in the interview, Lecturer A believed that students should be encouraged before they come to class so that they can contribute to class discussions.

Based on my teaching experience here, lecturers complain that students don’t read and wait for the lecturers to explain. Now I think they should get the students to do something online so that they can read and when they come to class we can just discuss the content and reflection. And if we don’t have the online [platform], how can we make sure that the students read? You know, maybe, by giving them quiz, I don’t think that’s effective. We want them to be motivated to read. [Lecturer A, I2-05/08/13]

His response suggests that the introduction of online activities in this context was not only to complement in-class activities, but also to challenge the existing practice of giving students in-class quizzes to ensure that they had read the assigned materials. He hoped that the new practice of having students complete online activities before class would be an improvement on the existing practice of giving in-class quizzes.

When asked about the learning implications of the online learning environment for their learning, some students reported that having this online space helped motivate them to study more.

[Before having this platform], I gain knowledge through reading books, but now I gain knowledge from the [online posts]. Sometimes I read books, and I get bored. But when I read [the online posts], I feel [more motivated] so I continue reading. [Student 2.3, FG2-02/05/13]

It reduces my laziness. It motivates me to learn more and introduce a different way of constructing knowledge. [Student 2.2, FG2-02/05/13]

Although this blended learning practice could potentially save class time and motivate students to read, some lecturers were concerned about what other activities they could, or should, introduce in their classes when some activities were moved from classes to the online space. As one lecturer queried, “sometimes I was concerned that if I had the discussion questions on the platform already, then what should I do in the classroom?”
This concern added to the challenges of finding a balance between online and in-class activities (Torrisi-Steele, 2011) while managing simultaneously the two learning environments. According to Lecturer A, with his teaching load he did not have enough time to read or comment on students’ online posts.

The challenge is I don’t have time to give comments to students. I have to go one by one if I have to give feedback to their response or give feedback to the forum. I want to, [but] I don’t have time to respond to every comment that the students posted. [Lecturer A, I2-05/08/13]

It was not uncommon for full-time lecturers in this institution to teach five or more classes per semester, so if there was a virtual space assigned for each class, workload and time management could well be an issue for these lecturers. The implementation of blending learning practices or engaging with a hybrid type of learning in this context needs to consider not only the lecturer’s capability to integrate online and in-class activities but also the practicality of this new practice to meet an individual lecturer’s needs and circumstances.

### 7.4.2 Active in Class and/or Active Online

Class participation is perceived as an important constituent of student learning and assessment in both classroom (Fassinger, 1995) and online learning environments (Caspi et al., 2008; Collison et al., 2000; Kleinman, 2005). A review of different course syllabuses in the MA in TESOL program showed that class participation was usually part of students’ assessment and typically accounted for approximately 10 per cent of the students’ total marks. Class participation in the physical classroom is usually measured in relation to the “comments or questions that students offered or raised in class” (Fassinger, 1995, p. 27) while in online classes it is usually measured quantitatively based on the number of times a student participated in the learning activities and the number of expressions posted online (Caspi et al., 2008). In the previous chapter, the frequency of students’ logins were used to measure the level of participation by individual students in the online classes. While online participation was part of the overall class participation assessment in two of the classes, the lecturers reported that the marks given to students for their online participation were intended to encourage them to participate, rather than to assess or compare student learning
performance. They also agreed that the practice of grading in-class and online participation was generally subjective and was based on the individual student’s number of contributions to the learning activities.

Through his observation of students in both the classroom and the online learning environment, Lecturer A noted that in terms of their participation students were more active in class than online:

Generally, most students are not very active online. They just post comments for the purpose of the task. [However], many students are active in class. [E-12/06/13]

According to Caspi, Chajut, Saporta, and Beyth-Marom (2006), class participation depends on extrinsic factors such as the learning environment as well as intrinsic factors such as individual preferences and personality. Findings reported in the previous chapter suggest that students had different preferences for the modes of communication which could be associated with their personality traits. Some students thought that the typical asynchronous, text-based nature of online communication made it hard to interact with their lecturers and peers, while others seemed to prefer online communication since it provided them the opportunity to express themselves more openly. As a lecturer in the study observed,

In class [some students] just sat and listened to my lecture and shared their ideas in class [quietly], and they seemed to be shy. But online they expressed how they felt more often and shared more ideas; they also responded [more] to others' questions. [E-12/06/13]

The same lecturer also provided some examples of his students who behaved and participated differently in the classroom than they did in the online learning environment.

[There were] a few students who were not very active in class but were very active online. One student, his name is [Student A]. He usually posted a very long reflection. He’s the oldest in class and he seems to be a bit self-conscious because he’s the oldest and a bit shy as well. He seems to feel that he’s much older than the other students, and he’s doing the MA with these young students, so he didn’t want to express himself much in class, but he
wrote a lot in the discussion forum. And I have two very good students, [Student B and Student C]. [They] talked a lot in class and [they] got good score most of the time, but [they] didn’t post comments in the open discussion reflection. [They] just went through other people’s comments and then posted just a few sentences. [Lecturer A, I2-05/08/13]

This response suggests that the students who were active online were not necessarily the same students who were active in class. This affirms and complements findings from other studies (Caspi et al., 2006; Hew & Cheung, 2012) on how students’ class participation can vary according to different learning environments and the influences that students’ personality traits might have on their participation in an online learning environment.

7.4.3 Learning Communities and Student-Centred Learning: Rhetoric versus Reality

While the lecturers in the study had different ways of implementing and integrating the online learning environment into their existing teaching practices, they shared a similar goal in regard to developing a good learning community for their classes. This is highlighted by the following statement from one lecturer.

My goal was to encourage everybody to talk to each other. I want the class to be what we call a “good learning community”. [Lecturer A, I2-05/08/13]

Although the lecturer did not elaborate on what constitutes a good learning community, many studies on learning communities (for example, Collison et al., 2000; Freese & Strong, 2008; Lave & Wenger, 1991; Tu, 2004; Wenger, 1998) define a ‘good learning community’ as a community which encourages and involves active participation, openness, collaboration, and support. Whilst it might be a teacher’s intention to develop a good learning community, doing so is reported as challenging (Brown, 2001; Freese & Strong, 2008; Hopkins et al., 2004; Kling & Courtright, 2004; Roberts & Lund, 2007), a finding consistent with the current study. The challenge of establishing a good learning community in this study was not only in understanding what constitutes a good learning community, but also in addressing the tension between what the participants wanted to achieve and their situational and cultural contexts.
The findings from the three online activities discussed in this chapter suggest that the lecturers wanted the students to actively participate and engage in the learning activities as much as possible. This expectation aligns with their stated desire for student-centred learning approaches discussed earlier in the chapter. They hoped that the convenience of the technology would impact students’ engagement with their learning. Nevertheless, the lecturers’ espoused pedagogies were not always reflected in their practice. One example is the use of the online discussion forum in Class B, which aimed to promote social knowledge construction but lacked the dialogic space and appropriate guidance from the lecturer to turn it into a higher-order knowledge construction. The mismatch between espoused and enacted pedagogies in this case aligns with the conclusion of Judson’s (2006) study that “teachers’ beliefs about instruction do not necessarily resonate in their classroom practices when integrating technology” (p. 592). This might be due to the fact that although student-centred or social constructivist learning approaches were deemed to be best practice, they might be interpreted and enacted differently according to the individual lecturer. The inclusion of online discussions as part of the learning activities did not mean the lecturer practised a social constructivist pedagogy unless the lecturer provided guidance and support for students to take the discussions to a higher level.

The findings from the three online activities also show that the students’ online participation was not always consistent and could vary according to an individual’s attributes, the learning tasks, and the learning environment. As noted in previous studies (for example, Hew & Cheung, 2012; Kleinman, 2005; Wells et al., 2008), limited student participation is a common issue in online discussion, and this is also the case in the current study. However, an issue for the current study was the cultural learning context where a high value was placed on grades and how students performed when compared with their peers. Consequently students had mixed feelings as to whether they should collaborate or compete with their peers. As one student commented, students were motivated by the bonus marks [Student 3.2, FG3-25/05/13]. The traditional perceptions of learning to pass the exams and learning through knowledge transfer from teachers to students still existed in the online learning environment. Richards (2004) refers to this dilemma as the “culture clash between old methods and new imperatives of learning” (p. 340). On one hand, the students embraced the rhetoric of a learning
community and collaborative learning while on the other hand they were unsure of their place and role in this ‘new’ type of learning.

In a culture where challenging other people’s ideas, especially those with higher status, is considered as inappropriate, active and open participation in a learning community did not always work in practice. The findings from the students’ online posts that have been presented in this chapter show that while there were a few students who were open and critical towards other people’s comments, the majority of students chose to agree rather than to challenge or contest them. Ardichvili et al. (2006) opine that

in Asian cultures, such values as modesty and the desire to save face would constitute a significant barrier to active participation in online knowledge sharing communities … Community members are likely to avoid being too active in online and other open-forum discussions, out of fear of appearing too immodest and boastful. (p. 99)

However, the use of online teaching techniques such as online reflection indicated how lecturers could potentially utilize the benefits of the online space to encourage participation in a less confronting way. The small social groups which students formed through their miscellaneous comments and discussions demonstrated how their capacity to situate themselves in the larger learning community, and these small groups were equally, if not more, important than the larger, well-structured groups such as the MA group and the class groups.

A definitive conclusion cannot be drawn as to whether or not the implementation of the online platform in the program led to a major transformation of the participants’ teaching and learning practices, given the short time span in which the intervention was operationalized. The online practices of some participants merely mirrored their conventional practices, and any changes in practices were very subtle. However, through the implementation of this intervention, the participants developed some new understandings and perspectives of teaching and learning within an online learning environment, which they did not possess or demonstrate at either the pre-implementation stage, or when they first adopted the platform.
7.5 Chapter Summary

This chapter has examined the class-based enactments of the online learning environment through looking at examples of the teaching and learning practices in the three classes participating in this study. The three online activities analysed and discussed in this chapter showed different ways in which the lecturers applied and adapted their teaching practices within the online context. They also suggested how students’ participation could vary according to the nature of learning activities, individual factors such as personality traits, and the environment in which the learning was situated.

The challenges lecturers and students faced in implementing the online learning environment were not only about how to adopt the ‘new’ practices but also how to integrate them into the existing practices and the situational and cultural contexts. By looking at the existing practices of the participants and their applications in the online context, it is evident that the implementation of the online learning environment in this context was not culturally neutral. The tension between what was perceived as the ‘ideal practices’ and the practicality of their practices was the issue that participants constantly grappled with throughout the implementation process. As the design-based research came to an end, the participants gained new experience of online teaching and learning, and their actual implementation of the online learning environment subsequently became part of their broader teaching and learning practices. As Gladwell (2008) mentions, “practice isn't the thing you do once you're good. It's the thing you do that makes you good” (p. 42).
Chapter 8: Conclusion

8.1 Introduction

It is the educational and cultural context that can make ICT integration in education a complex process and a challenging endeavour. This awareness, coupled with my interests, background, and experience were the catalysts for this research study which examined the introduction and implementation processes of an online learning environment in the Cambodian higher education context. The study aimed to investigate how an online learning environment can be used to support out-of-classroom teaching and learning and identify what enables and constrains the introduction and implementation processes. In doing so, it sought to view ICT introduction and implementation beyond simply providing resources, applying ICT integration models, or following the ICT policy guidelines.

To understand the dynamics of ICT introduction and implementation, I engaged in a participatory research approach with local academics and students in a Cambodian university. The adoption of a design-based research methodology framework allowed the lecturer and student participants to be actively involved in the formulation, design, and development of the online learning environment from the early pre-implementation stage and to provide continual feedback from their hands-on experience during the implementation stage. Insights that were drawn from their implementation experiences and reflections will hopefully contribute to the limited literature on ICT introduction and implementation in the Cambodian educational context and broaden the understanding of how ICT can be used to enhance teaching and learning.

In this concluding chapter, I revisit the research questions and summarize the key findings of the study. I then discuss the study’s implications for the Cambodian educational technology policies, higher education institutions, and teaching and learning with ICT. Further research to extend the study’s findings are then addressed prior to the concluding remarks, in which I reflect on my design-based research experience.

8.2 Revisiting the Research Questions

Two research questions framed the study:
1. How does the integration of an online learning environment into a Cambodian academic program impact the teaching and learning approaches of its lecturers and students?

2. What are the factors that enable and constrain the online learning environment’s introduction and implementation processes?

In response to these questions, I refer to the key findings from Chapter 5, 6, and 7, which uncovered both the ‘impacts’ of the online learning environment and the ‘processes’ behind its introduction and implementation. The conclusions drawn from the analyses and discussion of the data in these chapters are now presented.

### 8.2.1 Impacts of the Online Learning Environment on Teaching and Learning

At the commencement of the design-based research described in Chapter 5, the design of the online learning environment in the study was intended to support out-of-classroom teaching and learning, targeting three key areas:

- file storage and management;
- networking and communication; and
- extending and supporting class activities.

The key findings in Chapters 6 and 7 revealed that the implementation of the online learning environment did not always progress as intended, reflecting the complexity of ICT integration and contesting that the pathway towards ICT integration is not always fixed or linear as suggested in some literature (for example, Mills & Tincher, 2003; Moersch, 1995). Furthermore, although the participants expressed a willingness to embrace the online learning environment to support out-of-classroom teaching and learning, the impact of the online environment on teaching and learning was very subtle. As discussed in Chapters 6 and 7, the introduction of the online learning environment certainly did not lead to major transformation of teaching practices, and this affirms Judson’s (2006) argument that “technology integration is not necessarily a pillar of reformed instruction” (p. 592). In the following sections, the extent to which the online learning environment impacted the lecturers’ teaching practices and the students’ learning is elaborated.
Impacts on the lecturers’ teaching practices

While the lecturer participants expressed interests in adopting the online platform in the pre-implementation stage of the study, their appropriation of the online environment during the implementation stage varied according to their needs, expectations, background, and experience. In Chapter 6, the SAMR model (Puentedura, 2014) was referred to when discussing the different ways the lecturers integrated the technologies into their classes. The findings showed that their level of uptake was commensurate with their background and prior experience of technology-enhanced learning. Lecturers who had some teaching and learning experience within online environments were more willing to integrate different online activities into their teaching whereas those with limited experience used the online platform mainly for administrative and management tasks.

In Chapter 7 I discussed how the lecturers integrated online and in-class learning activities as part of their blended learning practices. Lecturer A applied an online reflection technique in his class to help improve the practices of giving in-class quizzes whereas Lecturers B and C used the online platform to support online discussions and resource sharing. While the lecturers acknowledged the potential of the online environment to support their teaching practices, the pedagogical aspect of the technology was not taken into as much consideration as the efficiency of the technology. The online environment was not adopted with the key intent of facilitating students’ learning, but rather for its capacity to reduce time spent on addressing administrative and management tasks.

Tensions between the lecturers’ espoused and enacted pedagogies also emerged during the online learning environment’s implementation stage. A noticeable finding of the study is that whilst the lecturers claimed to value student-centred pedagogy, their practices did not necessarily reflect student-centred approaches. For instance, the implementation of the online discussion question activity in Class B indicated a one-way participation and lacked the dialogic space which is associated with student-centred learning. As the data indicated, there is still a wide gap between what is perceived to be ideal practices and the reality of their enactment.
**Impacts on the students’ learning**

Overall, the student participants expressed their appreciation of the benefits of the online platform for their learning, which included the ability to access digital learning resources, communicate with their lecturers and classmates, and participate in class activities online. Some students also noted the time flexibility of the online platform and that engaging in the online community helped motivate them to read and research more efficiently (see Section 7.4.1).

The comparison between students’ online and in-class participation in Chapter 7 revealed that some students were more active online than they were in their face-to-face classes. Nevertheless, online student participation was still very limited in some classes, and students needed considerable guidance from their lecturers to participate actively in the learning community. Classes where lecturers assisted and scaffolded students’ practices of online dialogue and discussion had a better sense of being in a community of learners than classes with limited involvement of the lecturers (see Section 7.3).

The students’ reluctance to share information and to interact with one another were the lecturers’ key concerns. It reflected the complexity of cultural influences on teaching and learning in the Cambodian context in which lecturers more commonly play the roles of knowledge distributors (Ahrens & McNamara, 2013; Howes & Ford, 2011; Ngo, 2013; Pellini, 2005). As the findings confirmed, students usually relied on their lecturers to be the source of knowledge, and changing this perception was very challenging and beyond the scope of this research project. The processes whereby students actively engaged in knowledge sharing with their peers were reported to be valuable but were also challenging in terms of its enacted practices.

In addition, the academic tradition of challenging, contesting and critiquing ideas was not widely practiced, and online discussion activities generally resulted in students individually answering their lecturer’s discussion questions but not engaging in the dialogic space with their classmates. Yet, the analysis of students’ online interactions in Chapter 7 indicates that students can initiate and sustain a dialogue that assists them in constructing knowledge through clarifying with one another content covered in their classes (see Section 7.3.1). The findings concur with Wegerif’s (2007) argument that “[t]ools, including language and computer environments, can be used for opening up and maintaining dialogic spaces and for deepening and broadening dialogic spaces” (p.
These dialogic spaces cannot be established without support of the lecturers and the awareness of both lecturers and students as to what constitutes a community of practice and what it means to be an active member of that community.

### 8.2.2 Enabling Factors and Constraints of the Online Learning Environment Implementation

Different factors emerged which can be attributed to influencing the introduction and implementation processes of the online learning environment in the study. Figure 8.1 provides a representation of these key factors that are discussed in Chapter 5, 6, and 7, and are categorized into four groups: the lecturers, the learners, the institution, and the cultural context.

![Diagram of online learning environment factors](image)

**Figure 8.1 The introduction and implementation of an online learning environment**

In response to the second research question, “What are the factors that enable and constrain the online learning environment’s introduction and implementation processes?”, the factors shown in Figure 8.1 are now synthesized and discussed in terms of “enabling factors” and “constraints”.
Enabling Factors

Prior experience and expectations

While most student participants were regular internet users and had intermediate computer/internet skills, their experience in using web technologies varied according to their purpose for using the technologies and with whom they communicated. According to the survey data collected and analysed, the majority of the students used the internet for online communication, information searching, and leisure purposes; only a few students reported experience in using Learning Management Systems or social networking sites for learning purposes. Despite their limited experience with learning online, the students’ computer/internet skills, self-learning experience via the internet, and online social practices were all relevant in preparing them for using and adapting to learning within the online learning environment.

The lecturers’ experience and skills in using the internet for academic purposes were similar to those of the students, as was indicated by their prior uses of Google Doc and social networking sites with their classes. However, while the students’ expectations of the online platform focused on the storage of reading materials and communication with their classmates, the lecturers’ expectations focused on administrative and management tasks such as posting assignments, uploading documents, and students’ grades. What was interesting about the reports from both lecturer and student participants was that their expectations were largely informed by their prior experience of using other web-based tools for academic purposes, and they expected the online platform to be similar to the tools with which they were familiar. Therefore, prior experience played an important role in enabling prospective implementation of an online learning environment as it helped prospective users form positive expectations which generally led to later adoption. This finding adds to the understanding of the Technology Acceptance Model (Davis, 1989) that attitude and the intention of use of a technology are not only informed by “perceived usefulness” and “perceived ease of use” but also by users’ expectations which are interrelated to their prior experience in using other types of technology.

Perceptions of usefulness and online social practices

Students who decided to adopt the online platform noted that usefulness was an important factor which informed their decision in addition to other factors such as
novelty and the availability of communication channels. Their perceived usefulness of the online platform, as reported in the implementation stage, was linked to the students’ hands-on experience of an online platform, and how they thought it might benefit their learning. This finding is not atypical, and it is also noted in the Diffusion of Innovations theory (Rogers, 2003) that people are more likely to adopt an innovation if they perceive the innovation as beneficial or useful for them. Nevertheless, the finding also revealed that the participants’ perceptions are not only related to their prior experience and expectations, but also to their regular engagement with online social networking such as Facebook. The participants’ familiarity with Facebook allowed them to compare and contrast their experience in social learning through Facebook with that of the online learning environment. Their perceptions of the usefulness of the online learning environment were also drawn largely from their perceptions of the usefulness of Facebook. These findings infer that the usefulness of technological tools and social networking tools are not mutually exclusive and that familiarity with Facebook was an enabling factor for adoption, and the understanding of its usefulness highlights an overlap between the academic and the social practices of technology.

**Lecturer and peer support**

The enactment of the learning activities in the three classes of the study stressed the importance of support from lecturers and peers as an enabling factor for not only continued adoption but also meaningful enactment of the online learning environment, which had implications for enhancing teaching and learning practices. It reaffirms Dillenbourg et al.’s (2002) argument that an online learning environment is a social space consisting of different types of interactions and activities. The participation and engagement of lecturers and students in each class affected the performance of others in the same class. Lecturers played an important role in supporting students’ learning and encouraging them to actively participate in the online learning environment. For example, in Class A students’ online reflections in the first week only addressed their lecturer, and there were limited interactions between students, but after the lecturer encouraged them to respond to each other’s reflections, the number of interactions started to increase and the ripple effects of online reflections emerged.

Likewise, peer support enabled students to engage more actively in their online learning environment. This was exemplified by the miscellaneous questions and comments
activities in which students posted and answered each other’s questions online. This low-risk, informal activity helped encourage peer-to-peer support between students, and had the potential to develop into a strong learning community for students. These findings support previous literature related to the importance of social interactions in online learning environments (Dillenbourg et al., 2002; Jaques & Salmon, 2007; Riel & Polin, 2004; Wegerif, 2007). Despite the different sociocultural contexts and the reliance on lecturers as the knowledge distributors (see discussions in Sections 7.2 and 7.4.3), the participants in the current study shared similar values with regard to the importance of social interactions and peer support to enhance their learning practices.

**Emerging understanding through engagement in the implementation process**

The act of implementation itself can be an enabling factor for the continued adoption and implementation of the online learning environment. As elaborated in Chapter 6, through implementing the online platform the participants gained a better understanding of what it was like to teach and learn within an online learning environment. The participants also reported that they struggled with the technical and design aspects of the online platform at the outset of the implementation, but with familiarisation these aspects became less daunting.

Perceptions of the online learning platform/environment also changed as the implementation stage progressed. Students in the early stages of the implementation tended to focus on the design elements of the online platform while in the later stages their focus was on the performance elements or the human aspects. These shifts in perceptions might derive from the fact that participating in the online platform meant participating in the community embedded within it, and the more students became involved the better they were able to understand how an online community functioned. This aligns with the conceptual framework of situated cognition (Hung & Chen, 2001; Irwin & Berge, 2006) and communities of practices (Brown & Duguid, 1991; Lave & Wenger, 1991; Wenger, 1998) and affirms the connection between technology and learning which can be made more obvious when placed in a specific learning context. ICT implementation is a collective and long-term effort that requires different stakeholders to be involved in the implementation and decision-making processes.
Constraints

Socioeconomic issues

Socioeconomic issues were presented by members of staff as a factor which might have hindered students’ adoption and participation in the online learning environment. Although most of the student participants reported in the survey that they had regular access to the internet, internet access was an issue when the implementation stage commenced. This was due to the fact that only about half of the student participants had internet access at home, and others accessed the internet through their mobile phone, workplace, or internet cafes. According to the program coordinator, despite some increased affordability of internet access, some students were still unable to afford broadband internet at home, so they used the internet at their workplace or through mobile phone and internet cafes, which were the cheaper options. The use of mobile phones and reliance on public spaces such as work and internet cafes potentially reduced the capacity of students to fully engage with learning activities in the same way that they could by working privately in their own homes. This subsequently influenced their online participation and ongoing adoption of the online platform. While this study did not collect data about the number of hours spent online or specific data plans, it is reasonable to suggest that the cost of data, poor download speeds, and student access to the internet might limit the number of hours they can spend online and the upload or download of large files.

Socioeconomic issues not only affected students’ access to the internet but also their learning time. According to the program coordinator, many students held full-time or part-time jobs and did not have much time to focus on changing learning practices, but rather were focused on the practicality of attending classes and completing their assignments. Lecturers had heavy teaching loads, and some frequently held other part-time jobs to supplement their teaching income. Consequently, they had limited time to devote to the design of their class instructions. Despite it being in the lecturers’ best interests to enhance their teaching practices, taking the next step to actually implement the online learning environment in their class could be risky and time consuming for them.

These were the practical issues students and lecturers in this academic context faced, which reflected the situational and cultural complexity of the Cambodian higher
education identified in Chapter 2. Socioeconomic hardship experienced by some participants impacted the implementation of the online learning environment, and it presents as one the most challenging issues for tertiary institutions to address. A possible solution such as providing free internet access for students on campus would make it more convenient for them to access the online learning environment on campus, but there is no guarantee that students will participate or engage more in the learning environment as a result of this accessibility.

Cultural Tensions

Chapter 2 provided an overview of the Cambodian cultural context and how different aspects of the Cambodian culture influence its education system. A key finding in the study, as noted in both Chapter 6 and Chapter 7, is that technology integration is not culturally neutral. Rather, the cultural tensions were a powerful force impacting on the introduction and implementation of the online learning environment in the current study.

The concept of sharing emerged from focus group interviews when discussing the reasons as to why the practice of sharing was limited on the online platform. Students referred to “the culture of sharing” as a constraint for the sharing practices within the MA in TESOL group. Sharing practices did not mean simply coming equipped with the collaborative tools, but the practice of sharing ideas to co-construct knowledge needed to be nurtured. Understanding the dynamics of this concept required looking at both the influence of the Cambodian culture and the teacher-student relationships within this learning context. Both lecturers and students in the study reported that they valued the practice of sharing, but they also raised the concern that this practice was usually one-way, from lecturers to students. This constraint highlights the challenges students faced in applying the sharing practices involved in the social networking context, with which they were familiar, to the practice of sharing in the educational context. Some participants thought that sharing was integral to the Cambodian cultural values, but felt confused about sharing practice in an educational context.

In addition, competition among students in the same classes was another barrier to their practices of knowledge sharing and collaboration. The findings of the study suggest a conflict between values and practices of knowledge sharing when collaboration and student competition collided, and this added another layer of complexity to the
application of sharing practices within the classroom context. Nevertheless, the implementation of different online learning activities such as online reflections and online miscellaneous questions and comments show that there were some scenarios where sharing was successfully practised. In Class A students posted their reflections online and shared them with the whole class, and in miscellaneous questions and comments activities they asked each other questions related to the learning content. The mutual act of sharing and reciprocity played a crucial role in promoting sharing practices, and as noted by students in the focus group interviews, sharing and participation need to be perceived as two-way processes.

These more subtle aspects of culture were embedded in the participants’ perceptions and engagement with the implementation of the online learning environment. The impact of the cultural context on ICT implementation can only be speculated on as people are not always aware of why they behave or think the way they do. It was not the intent of the study to examine the cultural impact, but it is important that cultural factors considered not only to help explain the ICT adoption, appropriation, and adaptation phenomenon, but also to understand the complex relationship between individuals and their culture.

Change and adaptation

In Chapter 6, I discussed change and adaptation as parts of the constraints embedded within the implementation of the online learning environment. Introducing new changes was challenging not only because the participants were unsure if the new practices would be to their advantage, but also because of the risks associated with the change implementation. From the introduction of the online learning environment, the participants were internally assessing the risks arising from the project. Some participants were hesitant about becoming involved in the project, and others opted not to adopt the platform because of the associated risks.

The findings of the study also suggest that lecturers were usually perceived to be the key actors in initiating and leading the change processes. The findings indicate that this is related to the socio-cultural perception in which students rely on their teachers or lecturers as the source of knowledge and advice (Ahrens & McNamara, 2013; Howes & Ford, 2011). As noted in Chapter 6, this put pressure on the lecturers to lead the implementation and to address the many challenges that arose such as coping with
heavy teaching loads and also the adaptation process with which they needed to familiarise themselves.

These enabling factors and constraints provide a snapshot of the introduction and implementation of an online learning environment within a Cambodian tertiary context. As the research progressed new factors emerged, with some gaining more significance while others became less important. These factors provided meaningful insights into the rhetoric and reality of using technology in a developing country to support and enhance teaching and learning.

8.3 Implications and Recommendations

8.3.1 The Cambodian ICT in Education Policies

The Cambodian ICT in education policies (MoEYS, 2004; MoEYS, 2010) highlight two key constraints of the ICT integration in the Cambodian context: the lack of ICT infrastructure in universities and schools; and the limitation of human resources. In the current study internet access was limited on campus, and due to their socioeconomic circumstances some students did not have sufficient internet access for participating in the online platform. However, there were also instances in the study when students were provided with tools and space for sharing and participating in the online learning environment, and they were unable to use those resources to their full potential. The implementation of the MA in TESOL group (Section 6.4.1) is an example of this. Students were hesitant to share their learning resources among the group because of the competitiveness of the students, which made sharing in this educational context challenging. These findings demonstrate that the complexity of ICT implementation spans beyond infrastructure and accessibility. The provision of ICT infrastructure and technical training may have been important in the early stage of the implementation, but as the implementation progressed new challenges emerged in relation to the adoption, appropriation, and adaption of the technology.

The findings of the current study highlight an untapped gap in the Cambodian ICT in education policies in addressing the interrelationship between the academic uses of ICT within education settings and the emerging online social practices outside of education settings, which to date are perceived as mutually exclusive. It should be noted that while Cambodian academics and students might have limited experience in using ICT for
academic purposes, this is not always be the case with their use of ICT for social purposes. Therefore, policy makers need to take into consideration the background and experience of local academics and students and how they use ICT in their social lives as well as their academic lives. This will help with the development of future policies and professional training programs that align with the background, experiences, needs, and expectations of academics and students.

8.3.2 Higher Education Institutions

As the findings of the study reveal, the implementation of ICT is not necessarily a linear process but a complex process that requires higher education institutions to consider not only what types of resources are needed to successfully implement ICT but also the practicality and contextual constraints of ICT implementation. In the case of the current study, heavy teaching loads are a constraint for the lecturer participants, leaving them with limited time for their own professional learning or time to focus on how to enhance their teaching with the use of ICT. Therefore, higher education institutions need to explore different strategies to reduce the teaching loads or consider recruiting additional staff to support the academics in their ICT implementation. Moreover, to keep their staff abreast of new developments in pedagogical practices, regular skill and professional development workshops should be organized so that staff can acquire new skills, share their experiences and discuss issues concerning their teaching practices.

The study has revealed that human-related factors such as perceived usefulness and willingness to engage in the change process play crucial roles in sustaining the online learning environment implementation in the long term. It also notes the important role of the lecturers in scaffolding the participation in the discussion forums and in driving the adoption and implementation of the online platform. Students tended to adopt the online platform and participate more when their lecturers participated with them, and they also looked up to their lecturers to guide them in the new online learning environment. These human-related factors should be carefully considered, in addition to technology-related factors, in order to ensure that the designed online learning environment matches with the needs and expectations of the stakeholders. By including different stakeholders such as the program coordinator, academics, and students in the decision-making and in the design and development processes, higher education
institutions will be better positioned to develop an online learning environment which is both robust and sustainable.

8.3.3 Teaching and Learning with ICT

To integrate ICT into teaching and learning, academics need to view ICT beyond being simply a tool of convenience, and most importantly consider the pedagogical aspect of the technology such as the types of learning activities, as well as considering both the technology itself and the content to be learned. They need to understand the meaning of a student-centred approach in both theoretical and practical terms, and how they can embed the new pedagogical and learning approaches into the online learning environment. Literature related to teaching and learning approaches in the Cambodian context (for example, Ahrens & McNamara, 2013; Howes & Ford, 2011; Ngo, 2013; Pellini, 2005) has addressed the predominance of teacher-centred approaches in the education system and has suggested a need to introduce some emphasis on a student-centred approach into the system. As identified in this study, pedagogical and learning approaches have a close relationship with educational traditions and the sociocultural aspects of the education system. It follows then that the introduction of a student-centred approach must take into consideration the traditional pedagogies and learning approaches and their cultural context.

To enhance their learning with new technologies, students need to understand the importance of online sharing practices and to actively participate in the process from sharing within small class groups to sharing within the larger academic program. This can be achieved through having students reflect on their online activities (both inside and outside classroom), how they participate in them, and how they benefit from the sharing of practice. Open discussions among academics and students with regards to the cultural challenges of teaching and learning with ICT are essential to ensure that hidden cultural constraints can be uncovered and discussed. Both academics and students need to understand what it means to be a participant in a community of learners and to engage dialogically in developing a learning community that expands and deepens their thinking and engagement with learning.
8.4 Contribution to Knowledge

The study has made three key contributions to the understanding of ICT introduction and implementation in the Cambodian higher education context. First, the study makes a contribution to the current small body of empirical studies on ICT integration in the Cambodian education system. This is timely given there has been a proliferation of mobile technologies and applications in Cambodia in recent years, and increasingly young Cambodians are immersed in these technologies. The study has highlighted the need to take into consideration practitioners’ and students’ background and experience in using ICT not only for academic purposes but also for social and communication purposes, and the potential influence on their adoption and appropriation of ICT in an academic context. Moreover, the study has identified that the adoption of online learning environments in the higher education context must consider the expectations of the students and the lecturers’ pedagogical practices which are reflective of Cambodia’s educational and socio-cultural context.

Second, the study has pinpointed some key constraints of ICT introduction and implementation in addition to the infrastructure and human resource limitations. These constraints include the complexity of change implementation and knowledge sharing practices in a cultural context where there is a strong social hierarchy and a conflict between ‘espoused’ and ‘enacted’ pedagogies and learning approaches. To successfully introduce ICT to practitioners and students in this context requires not only the knowledge of ICT integration and implementation models but also an understanding of the cultural and pedagogical tensions since technology implementation is not culturally neutral.

Third, the current study also makes a methodological contribution to design-based research, which is known for its optimism of linking research with practice. Although the design-based literature (for example, Randolph, 2008; Reeves, 2006; Walker, 2011) suggests the distinctiveness and insularity of this research approach from other methodologies, it appears that design-based research might be isolated in theoretical term but not in practical term. Many of the challenges of conducting design-based research, such as the collaboration between researchers and research participants and the unclear boundary between formal and informal data, resonated with the challenges identified with ethnography and participatory action research. These challenges require
further investigation and the development of guidelines to support researchers and to enhance the design-based research methodology. The study has drawn attention to the complexity of design-based research, the interrelationship between educational design, research, and change, and the need to narrow the gap between research and practice.

8.5 Further Research

As noted in the methodology chapter, all research studies have limitations. As a design-based research with a qualitative orientation, this study was confined to only one academic program within a major tertiary institution. To generate more insights into the introduction and implementation of online learning environments in the Cambodian higher education context, research needs to be extended to include a range of institutions from different parts of the country and the inclusion of a range of academic programs.

Further research might consider employing more than one macro cycle and reiterating the implementation stage of the online learning environment to refine and improve the robustness, drawing on the recommendations that emerged from the design-based research findings. Subsequent iterations could focus on establishing a blended learning environment. This reiteration would potentially provide more in-depth insights into an assessment of the impacts of the online learning environment over a longer period of time.

To build on this study’s finding of the relationship between the social uses of technology outside the classroom context and academic uses of the online learning environment, a further investigation could explore how social uses of technology might be exploited for academic purposes.

The current study has identified a tension between the national culture and individual perceptions of their culture in relation to sharing. Further research is needed to understand the practices of online sharing in the different learning groups such as assignment groups, class groups, and institution/organization groups. This would provide further insights into how students participate and share resources in different groups and the cultural implications of teaching and learning practices in complex online learning environments.
A limitation of the data collection for the online platform adoption in the current study is that no data were collected from lecturers and students who chose not to adopt the online platform. Therefore, the findings cannot provide a complete picture of the different adoption trajectories proposed by Rogers (2003). It would therefore be useful for future research to investigate possible reasons for lecturers and students rejecting or discontinuing their adoption of online learning platforms. This would potentially contribute to gaining insights into how best to encourage participation and to sustain engagement with an online learning environment.

8.6 Reflecting on the Research Experience

This research experience has shaped both my understanding of the design-based research approach and ICT integration in the Cambodian higher education context. Design-based research is based on real world practices, but some design-based research literature (for example, Barab, 2005; Reeves et al., 2005; Squire, 2005) de-emphasise the practical challenges and issues that inevitably arise when a project is implemented. The literature also creates the expectation for novice design-based researchers to be ambitious and to aim for novel discovery without alerting the novice to the high level attention and time component for collaborative decision-making and designing the intervention. There were indeed countless decisions and adjustments that I needed to make along the way that necessitated interpretation of the existing guidelines for conducting design-based research. My experience so far has taught me that design-based research requires not only the participants’ genuine interest in the project and commitment to participate, but also some time and experience in working in similar participatory or action-based projects. The research development process has to progress through specific stages, and the intervention project needs time to develop and mature while the participants also need time to adjust and reflect on their practices.

Design-based research not only contributes to the literature on the findings or outcomes it produces, but the act of simply engaging in design-based research is a step towards narrowing the research-practice gap and producing research findings which are relevant to local contexts. The introduction of the online learning environment in the study might be a small step to enhance teaching and learning practices of the participants, but I hope that their participation with the online learning environment, as part of the research intervention, has helped them rethink their teaching and learning practices and how to
use new technology to support and enhance those practices. I also hope that the findings of the study will open more discussions among policy makers, researchers, and practitioners regarding the potential for ICT to address the educational gap in the Cambodian higher education.
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Appendix A – Plain Language Statement and Consent Form
for the Head of the English Department

Melbourne Graduate School of Education

PLAIN LANGUAGE STATEMENT FOR PARTICIPANTS
(Head of Department)

Project Title: Web-based Technology Integration in Cambodian Tertiary Institution

Dear Mr. Tith Mab,

Your department is invited to take part in this research project, which is being conducted by Ms. Sidonie Fors (Student Researcher), Dr. Nicholas Reynolds (Principal Investigator) and Dr. Sally Godinho (Co-Researcher) from the Melbourne Graduate School of Education at The University of Melbourne. This project forms the basis of a Doctor of Philosophy (PhD) degree. The research has been approved by the University’s Human Research Ethics Committee.

The aim of this research is to investigate the use of web-based technology to support teaching and learning practices in an academic program at a Cambodian tertiary institution. This letter will explain about the research project and invite your department’s participation.

What is required of your department?
The project will specifically study the technology integration processes in the Master of Arts in Teaching English to Speakers of Other Languages (MA in TESOL) program of your department. Hence, we would like to ask for your permission for the program coordinator, lecturers, and students in the program to participate in this study. The project will start in October 2012 and will continue until August 2013. During that period, the student researcher will work collaboratively with the MA program coordinator and lecturers to develop an online platform that is intended to support teaching and learning practices within the program. The project will start with needs analysis meetings with the program coordinator and lecturers to discuss existing issues and needs of the MA program. Students will also be invited to complete a 10-minute needs analysis survey. After the online platform has been launched, all students will be invited to participate in online activities designed by the student researcher and the MA program lecturers. Students will also be invited to participate in focus group interviews running for approximately 60 minutes and in an online survey which will take approximately 20 minutes to complete. The design team, which comprises of the MA program coordinator and lecturers who volunteer to work with the student researcher in developing the online platform, will meet fortnightly about an hour to evaluate and review the development progress, and at the end of the study they will be invited for individual interviews lasting about 30 minutes.

Participation and confidentiality
Involvement in this project is voluntary. Participants are free to withdraw consent at any time and to withdraw any unprocessed data collected. It is important to emphasise that the aim of the online platform is not a tool to assess students’ performance nor lecturer’s teaching practice, it is to support informed teaching and learning practice outside conventional classrooms.

The raw data collected from focus group interviews, individual interviews, online survey, and online activities will only be viewed by the researchers. The data will be kept safely at the Melbourne Graduate School of Education for five years after the thesis is completed. After this it will be destroyed following the University’s regulations.
Once the study is complete, a brief summary of the findings will be available to you, and it is also possible that the results will be presented at academic conferences or in journal articles.

What if you have some questions?
This project has been approved by the University of Melbourne Human Research Ethics committee. If you would like more information or have any questions or concerns, you can contact any of the researchers listed below. Or you can contact the Executive Officer, Human Research Ethics, The University of Melbourne, on phone: +61 3 8344 2073, or fax: +61 3 9347 6739.

How do you agree to participate?
If you are happy for your department to be a part this project, please make sure you have read the information in this letter and sign the consent form attached.

Thank you for your interest in this project.

Yours sincerely,

Sidonie Pors
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Consent Form
(Head of the English Department)

Project Title: Web-based Technology Integration in Cambodian Tertiary Institution

Investigators: Dr. Nicholas Reynolds, Dr. Sally Godinho, and Ms. Sidonie Pors
Head of the English Department: Mr. Tith Mab

1. I consent for the research as described in the Plain Language Statement to be conducted in my department. A written copy of the information has been given to me to keep.

2. I consent for the Master of Arts in Teaching English to Speakers of Other Languages (MA in TESOL) program coordinator, lecturers, and students to be invited to participate in the project named above, the particulars of which - including data collection from needs analysis meetings, the needs analysis survey, design team meetings, focus group interviews, online evaluation survey, and individual interviews - have been explained to me. A written copy of the information has been given to me to keep.

3. I acknowledge that:
   
   (a) I have been informed of the commitment required of the MA in TESOL program coordinator, lecturers, and students;

   (b) the project is for the purpose of research;

   (c) I have been informed that my staff and students are free to withdraw from the project at any time without explanation or prejudice and to withdraw any unprocessed data previously supplied;

   (d) I have been informed that the confidentiality of the information my staff and students provide will be safeguarded subject to any legal requirements;

   (e) the online platform, developed by the student researcher with the program coordinator and lecturers, will not be used to assess student performance nor lecturer teaching practice, hence, participation or non-participation in the research will have no affect on student grades or lecturer evaluation;

   (f) once returned, this consent form will be retained by the researchers.

Signature: [Signature]
Date: 15.08.2017
(Head of the English Department)
Appendix B – Plain Language Statement and Consent Form for the Program Coordinator and Lecturers

Melbourne Graduate School of Education

PLAIN LANGUAGE STATEMENT FOR PARTICIPANTS
(Program Coordinator and Lecturers)

Project Title: Web-based Technology Integration in Cambodian Tertiary Institution

Dear Participant,

You are invited to take part in this research project, which is being conducted by Ms. Sidonie Pors (Student Researcher), Dr. Nicholas Reynolds (Principal Investigator) and Dr. Sally Godinho (Co-Researcher) from the Melbourne Graduate School of Education at The University of Melbourne. This project forms the basis of a Doctor of Philosophy (PhD) degree. The research has been approved by the University’s Human Research Ethics Committee.

The aim of this research is to investigate the use of web-based technology to support teaching and learning practices in an academic program at a Cambodian tertiary institution. This letter will explain about the research project and invite your participation.

What is required of you?
The project will specifically study technology integration process in the Master of Arts in Teaching English to Speakers of Other Languages (MA in TESOL) program, starting from January to August 2013. The goal is to develop an online platform that serves as a communication tool between lecturers and students within the MA program and provides learning support to students outside of their conventional classrooms. It should be noted that the online platform will not be used as a tool to assess students’ performance or lecturers’ teaching practice. To participate in this study, you do not need to have prior experience with technology practice or development since the student researcher will be responsible for the technical aspect of the online platform development and will be willing to provide technical training to you should you need such. The student researcher will work collaboratively with you and other lecturers in the MA program to develop an online platform that addresses the learning needs of the program. You will be invited to participate in the following activities:

- **Needs analysis meetings:** these meetings come at the beginning of the study to introduce you to the research procedure and time frame and to discuss current needs, problems, solutions, and expectations for the study. The frequency and length of these meetings is to be determined in consultation with participating lecturers.

- **Design team meetings:** the team will meet for approximately an hour every fortnight to evaluate and review the progress of the online platform once it has been launched.

- **Online participation:** you are free to participate in online activities any time you want as often as you want it. Specific online activities will be determined after the need analysis discussion, but, in general, you are expected to provide support to the students and guide them in their learning by using the online platform.

- **Semi-structured interviews (30 minutes):** at the end of the study, you may be invited to participate in a semi-structured interview to share your experience of the technology integration in your program. With your permission, the interview will be audio-recorded to ensure an accurate record of what is said. When the tape has been transcribed, you would be provided with a copy of the transcript to verify that the information is correct and/or request deletions.
Participation and confidentiality
Your participation in this study is completely voluntary. Should you wish to withdraw at any stage, or to withdraw any unprocessed data you have supplied, you are free to do so without prejudice.

Once the study is complete, a brief summary of the findings will be available to you, and it is also possible that the results will be presented at academic conferences or in journal articles. We intend to protect your anonymity and confidentiality of your responses to the fullest possible extent, within the limits of the law. Any references to personal information that might allow someone to guess your identity will be removed; however, you should note that the number of participants is very small, and it is possible that someone may still be able to identify you.

The raw data collected from the activities will only be viewed by the researchers. The data will be kept safely at the Melbourne Graduate School of Education for five years after the thesis is completed. After this it will be destroyed following the University’s regulations.

What if you have some questions?
This project has been approved by the University of Melbourne Human Research Ethics committee. If you would like more information or have any questions or concerns, you can contact any of the researchers listed below. Or you can contact the Executive Officer, Human Research Ethics, The University of Melbourne, on phone: +61 3 8344 2073, or fax: +61 3 9347 6739.

How do you agree to participate?
If you are happy to be a part this project, please make sure you have read the information in this letter and sign the consent form attached.

Thank you for your interest in this project.

Yours sincerely,

Sidonie Pors

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Email: nreyn@unimelb.edu.au

Co-Researcher:
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Email: spors@student.unimelb.edu.au
Melbourne Graduate School of Education

Consent Form
(Program Coordinator and Lecturers)

Project Title: Web-based Technology Integration in Cambodian Tertiary Institution

Investigators: Dr. Nicholas Reynolds, Dr. Sally Godinho, and Ms. Sidonie Pors

Name of participant:

1. I consent to participate in the project named above, the particulars of which - including data collection from needs analysis meetings, design team meetings, online participation, and semi-structured interviews - have been explained to me. A written copy of the information has been given to me to keep.

2. I authorise the researcher or assistant to use, for this purpose, the discussion from needs analysis and design team meetings, online activities, and semi-structured interviews referred to under (1) above.

3. I acknowledge that:

   (a) the possible effects of the discussion in needs analysis and design team meetings, online activities, and semi-structured interviews have been explained to me to my satisfaction;

   (b) I have been informed that I am free to withdraw from the project at any time without explanation or prejudice and to withdraw any unprocessed data previously supplied;

   (c) the project is for the purpose of research;

   (d) I have been informed that the confidentiality of the information I provide will be safeguarded subject to any legal requirements;

   (e) the online platform will not be used to assess student performance nor lecturer teaching practice; hence, participation or non-participation in the research will have no effect on student grades or lecturer evaluation;

   (f) interviews can be audio-recorded only when I give my permission and copies of transcripts will be returned to me for verification;

   (g) in the final report, I’ll be referred to by a pseudonym, and any references to my personal information will be removed;

   (h) once returned, this consent form will be retained by the researchers.

Signature of participant __________________________ Date __________________________

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HREC No.: 1237940.1; Date: 22/06/2012; Version: 2.0
Appendix C – Plain Language Statement and Consent Form for Students

Melbourne Graduate School of Education

PLAIN LANGUAGE STATEMENT FOR PARTICIPANTS
(Students)

Project Title: Web-based Technology Integration in Cambodian Tertiary Institution

Dear Participant,

You are invited to take part in this research project, which is being conducted by Ms. Sidorie Pors (Student Researcher), Dr. Nicholas Reynolds (Principal Investigator) and Dr. Sally Godinho (Co-Researcher) from the Melbourne Graduate School of Education at The University of Melbourne. This project forms the basis of a Doctor of Philosophy (PhD) degree. The research has been approved by the University’s Human Research Ethics Committee.

The aim of this research is to investigate the use of web-based technology to support teaching and learning practices in an academic program at a Cambodian tertiary institution. This letter will explain some of the details about the research project and invite your participation.

What will you be asked to do?
The student researcher is working with your program coordinator and lecturers of the Master of Arts in Teaching English to Speakers of Other Languages (MA in TESOL) program to develop an online platform that can provide learning support to students outside of their conventional classrooms. The online platform will allow you to build your learning network, share learning resources, and discuss learning issues with lecturers and students in your program. It should be noted that the online platform is not intended to be used as a tool to assess your learning performance, and your participation will not affect your class grades. The project will start in January 2013 and continue until August 2013. You will be invited to participate in the following activities:

- **Needs analysis survey** (approximately 10 minutes): this survey aims to collect data related to your experience with technology and expectations from using technology to support learning. The information you provide will help us in developing an online platform that meets with your needs. The survey will be given to you at the beginning of the study.
- **Information/training session**: if you are interested in the study and would like to learn more about how to use the online platform, you are welcome to participate in this session.
- **Online participation**: once the online platform is launched, we will send you an email with detailed instructions on how to register and access it (please provide your email address in the consent form). You are free to participate in the online activities any time you want and as often as you want.
- **Focus group interviews** (60 minutes): during the study, you may be invited to participate in a focus group interview to share your experience of using the online platform and to offer suggestions for improving it. With your permission, the interview will be audio-recorded to ensure an accurate record of what is said. When the tape has been transcribed, you will be provided with a copy of the transcript to verify that the information is correct and/or request deletions.
- **Online evaluation survey** (approximately 20 minutes): at the end of the study, you will be invited to complete an online survey to share your perspectives on learning with technology.
Participation and confidentiality
Your participation in this study is completely voluntary. Should you wish to withdraw at any stage, or to withdraw any unprocessed data you have supplied, you are free to do so without prejudice.

Any references to personal information that might allow someone to guess your identity will be removed; however, you should note that the number of participants is very small, and it is possible that someone may still be able to identify you. It is possible that the results of the study will be presented at academic conferences or in journal articles.

The raw data collected from the activities will only be viewed by the researchers. The data will be kept safely at the Melbourne Graduate School of Education for five years after the thesis is completed. After this it will be destroyed following the University’s regulations.

What if you have some questions?
This project has been approved by the University of Melbourne Human Research Ethics committee. If you would like more information or have any questions or concerns, you can contact any of the researchers listed below. Or you can contact the Executive Officer, Human Research Ethics, The University of Melbourne, on phone: +61 3 8344 2073, or fax: +61 3 9347 6739.

How do you agree to participate?
If you are happy to be a part this project, please make sure you have read the information in this letter and sign the consent form attached.

Thank you for your interest in this project.

Yours sincerely,

Sidonie Pors

Principle Investigator:
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Appendix D – Needs Analysis Survey for Students

Stage 1: Pre-implementation

Needs Analysis Survey for Students

The aim of this survey is to learn about your experiences in using web-based technologies, your learning habits, and your expectations from technology integration within your academic program. Data collected from this survey will be used to assist the researcher and practitioners in developing an online platform that meets your needs.

Technology:

1. How often do you use the Internet?
   a. Rarely  b. Once or twice a week  c. Everyday

2. Where do you usually access to the Internet from?
   □ Work place  □ Home  □ Internet Café  □ Mobile phone
   □ Others: ........................................

3. What do you normally use the Internet for? (Tick all that apply)
   □ E-mail  □ Search engine (Google, Yahoo, etc.)  □ Online Chat
   □ Online discussion  □ Online videos  □ Blog  □ Wiki
   □ Social networking (Facebook, Ning, Hi5, etc.)  □ Others: ........................................

4. How would you rate your computer and internet skill?
   a. Basic  b. Intermediate  C. Advanced

Learning:

1. How many hours per week do you usually spend for self-learning outside normal classes?
   a. Less than 2 hours  b. 2 to 4 hours  c. More than 4 hours

2. What types of self-learning activities do you engage in?

   ____________________________________________
   ____________________________________________
   ____________________________________________

3. How do you usually communicate with your lecturers and other students outside normal classes?

   ____________________________________________
   ____________________________________________
   ____________________________________________

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Online platform:

1. Have you ever used any types of online platform (including online discussion, blogs, wikis, and social networking sites) for learning purpose?
   □ Yes: what types of online platform have your used? For what learning activities?
   ________________________________________________________________
   ________________________________________________________________
   □ No

2. If there is an online platform designed specifically for students and lecturers in this academic program to use, what do you want it to be like?
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

3. How do you think an online platform could support your learning?
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

Thank you for your participation in this needs analysis survey.
Appendix E – Guiding Questions for Needs Analysis Meetings

Stage 1: Pre-implementation

Guiding Questions for Needs Analysis Meetings

Context:
1. Could you briefly give me an overview of the program?
2. How many lecturers and students are there in the program?
3. Does the program employ any types of technology to support teaching and learning practices?
4. What experience, if any, do you have with web-based technologies?

Problems and Needs:
1. What do you think are the key challenges in teaching and learning practices within your program?
2. How do you think web-based technologies could help addressing those challenges?
3. If there is an online platform which supports teaching and learning practices outside conventional classrooms, what do you expect it to be like?

Thank you for your participation in this needs analysis meeting.
Appendix F – Guiding Questions for Student Focus Group Interviews

Stage 2: Implementation

Focus Group Interview Questions for Students

1. Is this your first time in using an online platform for learning purpose? If no, what other online platforms have you used before?
2. How often do you use this online platform? What do you use it for?
3. What do you like about the online platform?
4. What don’t you like about it?
5. How can the online platform be improved?
6. Does the online platform have any impacts on you learning? If yes, how? If no, why not?

Thank you for your participation in this focus group.
Appendix G – Guiding Questions for Interviews with the Program Coordinator and Lecturers

Stage 3: Post-implementation

Semi-structured Interview Questions for the Program Coordinator and Lecturers

1. What is your general impression of this web-based technology integration in your program?

2. What are the benefits you can get from this web-based technology integration?

3. What do you think are the challenges in integrating web-based technology in your academic program?

4. What would you recommend to other institutions that might be interested in integrating technology in their academic programs?

Thank you for your participation in this interview.
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Author/s:
Pors, Sidonie

Title:
Introducing and implementing an online learning environment in a Cambodian academic program: Impacts, enabling factors and constraints

Date:
2016

Persistent Link:
http://hdl.handle.net/11343/92341

File Description:
Introducing and implementing an online learning environment in a Cambodian academic program: Impacts, enabling factors and constraints