ICT IN ELT: A MIXED METHODS STUDY OF LEBANESE NATIONAL POLICIES, UNIVERSITY COURSES AND ENGLISH TEACHERS

by Youmen Chaaban

Bachelor of Education in Mathematics and Science

Bachelor of Arts in English Language and Literature

Master of Education in TESOL

Master of Arts in Education

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Foreword

The study presented in this dissertation was conducted in the Lebanese context. Several factors operating within the wider cultural, economic and most importantly the political contexts created a challenging environment during particular instances throughout this three-year study. Culturally speaking, many participants may have declined to be involved in the study because they are either unaccustomed to being involved in research studies, or they may have been afraid of disclosing their practice in a dissertation thesis. Economically, teachers across the country staged open-ended strikes over salary increases, which led to schools closing and teachers protesting on the streets. On the political front, Lebanon underwent extreme political conflicts which led to countless civil rivalries and violence in the exact context where most of this study took place, that is, Tripoli. This situation led to the further closure of schools in Tripoli, and consequently, potential participants were difficult to contact. Adding to this situation, teachers returned to school after dreadful circumstances and were obliged to compensate for lost learning opportunities. Considering these circumstances, the participant base in this study did not reach the desired number as first expected. Consequently, the use of the quantitative questionnaire was mostly limited to descriptive data instead of performing inferential statistical analysis as planned during the initial research proposal. Nevertheless, the thesis represents an in depth investigation of the Lebanese context with a diverse participant base taking part in the study.

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Glossary

ICT: Information Communication Technology

IT: Information Technology

ELT: English Language Teaching

CERD: Centre for Educational Research and Development

MEHE: Ministry of Education and Higher Education

PB: Pedagogical Beliefs

SEB: Self-efficacy Beliefs

VB: Value Beliefs

TK: Technological Knowledge

TCK: Technological Content knowledge

TPK: Technological Pedagogical Knowledge

TPCK: Technological Pedagogical Content Knowledge

TPACK: Technological Pedagogical and Content Knowledge

TBTUS: Teachers' Beliefs regarding Technology Use Survey

Abstract

The integration of technology into an educational context has long been identified as a long process consisting of multi-level changes. This change process dictates the presence of enabling factors which promote the integration of technology at three levels of the educational system: the national, university and school levels. When such enablers are absent or insufficient, the integration of technology faces barriers which hinder its further progress. While the examination of technology integration has received considerable attention in developed countries, too little attention has been paid to the process in developing countries, such as Lebanon.

Therefore, this paper presents data from a mixed methods study that explored the integration of technology into the Lebanese educational system through an analysis of national policy, university preparation, and classroom practice. Participants at each level provided useful insights into the factors that either impeded or supported the progress of technology integration. The study derived its theoretical framework from Rogers' (2003) Diffusion of Innovations Theory. Using this framework, the current and future status of technology integration was made possible.

Study 1 reports on research which examined national policy plans, funding schemes, curriculum development documents, and support for technology adoption provided at the government level. The study identified the role of government in assisting English teachers to adopt technology. Data was collected through interviews with three leading government officials and an analysis of primary sources of data obtained from the Department of Education.

Study 2 reports on research which investigated the role of Lebanese universities in preparing pre-service teachers for the integration of technology into their professional practice. Through interview data, seven teacher educators provided comprehensive descriptions of their courses. Successively, questionnaire data obtained from pre-service teachers corroborated the findings

from the interviews by examining pre-service teachers' perceptions of the environmental factors and individual characteristics operating at the university level.
Study 3 reports on research which explored teacher readiness to adopt educational technology in their classrooms. Questionnaire data followed by selective interview data investigated the levels of technology use of English teachers working in Tripoli, the second largest city in Lebanon. The study was also designed to achieve an understanding of in-service teachers' perceptions of the environmental factors and individual characteristics operating at the school level.

These combined findings revealed the barriers and enablers operating at each level of the educational system. The study can serve as a vehicle for educational change and development in the Lebanese educational context as it identified the issues that need to be addressed and others that need to be consolidated, in order for English teachers to effectively integrate technology and enhance their teaching and student learning with technology. A model has been designed to help stakeholders grapple with the different factors that should be taken into consideration at each level investigated, as well as from the interrelationships among the levels. A possible "blueprint" for future development in the field of ICT in the English classroom across Lebanon was developed in the form of recommendations for the different stakeholders.

Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma by the university or any other institution, except by way of background information and which has been duly acknowledged in this thesis.

To the best of my knowledge and belief, it contains no material previously published or written by another person except where due acknowledgement has been made.

The approval of Macquarie Ethics was obtained in April 2012. The reference number is: 5201100939

This is to certify that I, Youmen Chaaban being a candidate for the degree of Doctor of Philosophy, am aware of the policy of the University relating to the retention and use of higher degree theses as contained in the University's Higher Degree Research Thesis Preparation, Submission and Examination Policy.

In the light of this policy, I agree to allow a copy of my thesis to be deposited in the University Library for consultation, loan and photocopying forthwith.

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CHAPTER 1 Introduction and the Research Problem

1.1 Introduction

This study is located in the context within which I work and strive to improve both personally and professionally. The context is the Lebanese school and more specifically the Lebanese English classroom in Tripoli. Working in Lebanon, I have noticed individual teacher efforts aimed at integrating Information Communication Technologies (ICTs) in English language teaching (ELT). My educational background, though, does not provide me with solid evidence regarding the status of ICT in ELT. I received a Bachelor of Education from the Lebanese University in 2004. All the courses in this 4-year degree were compulsory. However, none of the courses targeted the use of technology for instruction as representative of contemporary pedagogy. It was not until I began a second Master's degree that I undertook a course of ICT in ELT. This is when my interest in this field began and I conducted an investigation about using a Computer Assisted Language Learning methodology to teach a group of grade 10 students specific reading and writing strategies. After completing this thesis, I wondered why I had not received any formal preparation or training in ICT at the Bachelor level and why the school where I worked at that time did not include ICT in its policies, plans or curriculum.

I was then recruited at another private school. At this school, ICT occupied an integral part of the school's policy plan. Up-to-date computer labs, Promethean interactive whiteboards, Internet connection, two computers in each classroom, professional development programs and a professional IT team were all on site waiting to be used. This was when I became an adopter of ICT in my English classroom. Gradually, my confidence in implementing lessons that integrated ICT became stronger. My students were a further motivating factor as they displayed engagement, motivation and most importantly, enjoyment towards these lessons. However, not all the teachers were making use of this technology, with frequency of use varying from teacher to teacher and from subject to subject. This sparked my curiosity to investigate the hierarchy of this implementation. It was both a personal endeavor and coincidence that I was able to complete an elective ICT in ELT course at a private university and then use what I had learned at a technologically equipped school. Other teachers may not have received such an opportunity.

Education in Lebanon cannot rely, however, on the personal endeavors of individual English teachers to ensure quality and up-to-date English teaching. It seems that the Lebanese situation has similar characteristics to the American situation back in 1994, when Marcinkiewicz (1993/1994) found that the majority of teachers were not using technological devices even though they were available and the teachers had positive perceptions about their potential benefits on student learning. Half of the elementary teachers surveyed by Marcinkiewicz did not even use any form of technology. Could this be the situation in Lebanese schools more than twenty years later? And what might be the elements of a possible “blueprint” for the future of ICT integration in English education for Lebanon?

This chapter first introduces the status of ICT locally and globally. Then five background issues are addressed as they represent the major concepts guiding the research study. These five issues consist of providing a definition for educational technology integration, defining barriers/enablers and their two different types, presenting ICT research in Lebanon, displaying the connection between ICT and ELT and discussing the conditions for effective ICT integration at three different contexts. Next, the theoretical framework, which gives structure to the research findings, is explained in some depth. Then, a general overview of education in Lebanon is presented. Following, the purpose of the study is introduced and a statement of the problem is explained. The significance of the study is further elaborated leading to the research contentions, aims and questions. The information presented in this chapter is necessary to capture the comprehensiveness of the three levels investigated in this study representing the government, university and school levels.

1.2 The status of ICT locally and globally

All around the globe, technology occupies a stable position in all aspects of life. ICT[1] is no longer something new or unknown as it was many years ago and technological devices, such as computers, tablets and laptops, are now standard equipment in businesses (D. M. Watson, 2001), universities (Selwyn, 2007), schools and homes (Selwyn, Potter, & Cranmer, 2009; Somekh, 2004) in many developed countries (Pelgrum, 2001) and some developing countries (Albirini, 2008). ICT devices began to emerge in the classrooms of developed countries in the 80s (Cuban, Kirkpatrick, & Peck, 2001; Younie, 2006). Not until the late 90s did they surface in some Lebanese classrooms (Yaghi, 1997). For the past 15 to 20 years, technology in worldwide education has become common place in the classroom (Fluck, 2001) and it will continue to occupy a high profile (Hughes, 2005) due to the advancement in technology, the support received from Departments of Education and the growing body of research studies that assert educational benefits (Lei, 2010).

This rapid and widespread dissemination of ICTs at home and in schools (Somekh, 2004) has presented teachers with opportunities to transform their teaching practices (Deaney, Ruthven, & Hennessy, 2006) and accordingly contribute to innovative learning across subject matter areas (Hughes, 2005). Worldwide research supports the importance of using technology in the classroom and advocates its adoption (Almekhlafi, 2006; Kozma, 2003; Lei, 2010; Liao, Chang, & Chen, 2007; Topkaya, 2010; Young & Bush, 2004).

The English classroom is no exception. Chapelle (2001) has written, “As we enter the 21st century, everyday language use is so tied to technology that learning language through technology has become a fact of life” (p. 1). English teachers have a wide range of devices at their disposal to enhance their teaching practices (Shoffner, 2009). Some of the most commonly used tools are CD-ROMs, videodiscs, computers, laptops, iPads, notebooks, digital cameras, interactive radios, interactive whiteboards, the Internet and Web 2.0 tools like blogs and wikis. Hutchinson (2012) notes a special role for ICT literacy indicating that “digital technologies open

[1] The terms “technology” and “ICT” have been used interchangeably throughout this thesis

up new and unique aspects of literacy that differ from conventional forms" (p. 38). Therefore, literacy teachers carry a further responsibility of developing literacy for both print and digital texts (Hutchinson, 2012).

However, researchers tend to generally agree that teachers are not taking full advantage of these opportunities (Bauer & Kenton, 2005; Cuban et al., 2001; Ertmer, 2005; Fluck & Dowdent, 2013; Hutchinson, 2012; Somekh, 2004; Tondeur, van Braak, & Valcke, 2007). Both teachers and students are using these technological tools more frequently outside school than during class (Means, 2010) and limit technology use in the classroom to whatever software is mostly available (Young & Bush, 2004). Despite increases in the number of technological devices accessible in schools and the increased amount of technology training opportunities for teachers, introducing new technologies into the classroom does not automatically lead to new forms of teaching and learning (Underwood & Dillon, 2011). Therefore, technology is not being used to support the kinds of instruction (e.g. student-centered) believed to be most powerful for facilitating student learning (Ertmer & Ottenbreit-Leftwich, 2010; Hayes, 2007).

Technology has also become an important feature in the curriculum of the 21st century (Partnership for 21st Century Skills, 2002). A recently released US national technology plan stated, "Whether the domain is English language arts, mathematics, sciences, social studies, history, art, or music, 21st century competencies and expertise such as critical thinking, complex problem solving, collaboration, and multimedia communication should be woven into all content areas" (US Department of Education, 2010, p. 4). Further, learners need to be equipped and prepared for jobs that require a different set of skills than in the past (Partnership for 21st Century Skills, 2010). Individuals are required to perform non-routine and creative tasks for career, personal and civil success (Partnership for 21st Century Skills, 2010). These skills, however, will become outdated every three to five years (Partnership for 21st Century Skills, 2002). Hence, learners need to be trained to learn how to learn, unlearn, and relearn on their own using the technological devices available both inside and outside the classroom (Gibson, 2009).

1.3 Background issues to the study

In this section, background issues are briefly discussed. First, ICT integration is defined followed by a definition of barriers/enablers to ICT integration. Further, a contextual description of the status of ICTs in Lebanon and English Language Teaching (ELT) is provided. Also discussed are the conditions necessary for successful and effective integration of technology in any educational setting. The concepts presented in this section shape the conceptualization of the literature review and enhance the understanding of the thesis and its results.

1.3.1 Definition of ICT integration

Technology integration has been defined in several ways by different researchers. Some researchers define technology integration in terms of quantity of use. They focus on how technology can be used to carry out familiar activities more reliably and effectively (Hennessy, Ruthven, & Brindley, 2005). Other researchers tend to define technology integration according to quality. These researchers differentiate between low level uses of technology in schools and high level uses of technology (Bebell, Russell, & O'Dwyer, 2004). These researchers explicate different types of technology use to determine the extent of technology integration into an educational system. For example, teachers have been reported to use technology for the following practices:

- Teachers' use of technology for class preparation (Preparation)
- Teachers' professional e-mail use (Professional E-mail)
- Teachers' use of technology for delivering instruction (Delivering Instruction)
- Teachers' use of technology for accommodation (Accommodation)
- Teacher-directed student use of technology during class time (Student Use)
- Teacher-directed student use of technology to create products (Student Products)
- Teachers' use of technology for grading (Grading)

By developing separate measures of teachers’ technology use, a more nuanced understanding of how teachers are actually using technology is revealed (Bebell et al., 2004).

The tension between quality and quantity is resolved in this study by defining technology integration as the sufficient and effective use of hardware (desktop and portable computers, projection technology, calculators, data-logging, and digital-recording equipment), software applications (generic software, multimedia resources), and information systems (Intranet, Internet) available in schools for the purpose of enhancing instruction (Hennessy et al., 2005; Hew & Brush, 2007; Okojie, Olinzock, & Okojie-Boulder, 2006). Further, as defined by Belland (2009), technology integration is understood to be "the sustainable and persistent change in the social system of K-12 schools caused by the adoption of technology to help students construct knowledge (e.g., research and analyze information to solve problems)" (p. 354). In this study, too, technology integration is believed to cause changes to the social contexts in which it is adopted, particularly the transformation of a traditional, teacher-centered pedagogy to a constructivist, learner-centered one. Technology integration is not only about technology access or simply technology use (Hixon & Buckenmeyer, 2009). Teachers are considered technologically literate when they know "what the technology is capable of, they are able to use the technology proficiently, and they make intelligent decisions about which technology to use and when to use it" (Davies, 2011, p. 47).

1.3.2 Factors impacting technology integration: Extrinsic and intrinsic

A number of research studies have investigated the process of technology integration (Chandra & Lloyd, 2008; Osta, 2005; Tearle, 2004) and have proposed reasons why teachers are reluctant to integrate ICTs (Mcgarr, 2009; Vannatta & Fordham, 2004). What these studies have in common is the realization that technology integration is a complex process of change (Ertmer, 2005; Somekh, 2004; Tearle, 2004; Younie, 2006) involving several interacting factors and requiring extensive time and effort (Underwood & Dillon, 2011). More specifically, some of these factors may enhance the integration process, while others may hinder it. Accordingly, the factors which support technology integration are commonly known as enablers while the difficulties facing the integration of technology are commonly known as barriers (Ertmer, 2005; Schoepp, 2005). The literature thus reveals a wide array of factors which differ from one context to another. These factors need to be taken into careful consideration during the integration process in order to identify whether they are enablers or barriers.

Researchers in the field of educational technology have paid more attention to the barriers as they represent challenges which need to be overcome before technology integration may proceed. Bromme, Hesse, and Spada (2005) explained that a barrier "comes from psychological research on problem solving and creativity. There it refers to the gap between an initial and end state. In other words, barriers are challenges which have to be overcome in order to attain a goal" (p.1). Goktas, Yildirim, and Yildirim (2009) further explained the definition of a barrier in terms of the difficulties associated with ICT integration. They emphasized the importance of establishing individual and social routines in using them. In addition, they claimed "the use of ICTs is complicated because it involves not only the use of alternative tools for dealing with old, conventional problems but also expectations that these technologies will help in meeting new challenges" (p. 194).

A number of classifications are used to describe these barriers by different researchers (Ertmer, Addison, Lane, Ross, & Woods, 1999; Graves & Kelly, 2002; Hew & Brush, 2007; Zhou & Xu, 2007). Within the context of this study, barriers are classified according to Ertmer et al.'s (1999) classification into extrinsic and intrinsic barriers. However, the word 'barrier' is substituted with the word 'factor' as some of the factors investigated in this study may be enablers rather than barriers. With this new expression, first order factors are those which are extrinsic to teachers and second order factors are those which are intrinsic to teachers. Using this classification, the factors identified within the different contexts under study become readily organized. Those found at the national, university and school level are extrinsic factors, while those located at the teacher level are intrinsic factors.

1.3.3 ICT research in Lebanon

Only two research studies of direct relevance to the current investigation have been located. Both studies were limited in scope as they addressed school-based technology use and collected quantitative data only. These research studies are discussed because of their significance in understanding the Lebanese ICT context and in becoming aware of the fact that there exists only a limited amount of research into this new and evolving field.

The first study conducted by Yaghi (1997) contended that computers began to emerge in a number of Lebanese schools in the 1990s. However, using ICT applications in the Lebanese context was very limited. According to this study, the use of ICT in Lebanese schools was both restricted and unsatisfactory. Only 23% of schools nationwide were found to be using computers in education. This meant that more than three-quarters of Lebanese students did not have access to computers. Of the 23%, 31% were using computers simply in drill and practice exercises in different subject matter areas. The schools participating in the study were all private schools since at the time of the study the researcher claimed that public schools were well known for their lack of computers and hence excluded from the study right from the very beginning. The ratio of student per computer was found to be 95:1 at the national level. Another important finding was that computer education was controlled and managed by computer technicians who lacked any formal educational training. A low 10% of teachers were found capable of using computers in their subject matter area. Furthermore, at the time of the study, none of the Lebanese universities offered courses in training pre-service teachers in using computers and other technologies. The researcher concluded that computer education in Lebanon was lacking qualified personnel, a unified computer education program and more time allotted per week. The researcher highlighted the importance of training pre- and in-service teachers in using computers in all subject matter areas.

A decade or so later, Nasser (2008) conducted another study in the Lebanese context during the academic year 2005/2006. This time, both public and private schools were included in the investigation. The researcher collected data from the CERD, a division of the Ministry of Education. The study attempted to measure the quantity of ICT tools and resources available in schools and their effectiveness as measured by the students' success in the Lebanese baccalaureate exams. The results of the study indicated a significant difference between private and public schools on the average number of ICT tools per school. While public schools had a mean score of 9.85 computers per school, private schools had 17.23 computers per school. Further, 66% of public schools owned computers compared to 91% of private schools. According to the researcher, these numbers translated into 19.2 students per computer for public schools and 16.67 students per computer in private schools. However, the researcher did not mention how these computers were used in schools. The researcher also concluded that an insignificant difference existed in the number of students per computer in Lebanese private schools compared to public schools. In terms of Internet access, only 5.7% of public schools had Internet access, compared to 52.7% among private schools. Finally, the results of the study indicated no difference between private and public schools in the success rate of students in the national exams. The researcher concluded that ICT was not a main influencing factor in student success in school and might only lead to increased competence in using these technologies, as well as enhanced communication and interaction with the global community.

The results presented above raised many more questions than those actually answered. A few of these questions will be the focus of the current investigation. The results revealed a need for research that combines data from more than one level of the educational system. Further revealed was a need for both quantitative and qualitative research methods in order to get a complete picture of the status of educational technology in Lebanon. Using the information obtained from these two studies, in addition to international data, the issue of the integration of educational technology into the Lebanese context will be further advanced and understood.

1.3.4 ICT in English language teaching

Understanding and using technology in the teaching of English language arts is a complex endeavor (Young & Bush, 2004). However, when English teachers actively integrate technology in their teaching, they are presented with opportunities to enhance learners' engagement in the learning process (Shoffner, 2007) and revolutionize the way they teach (Young & Bush, 2004). However many English teachers are only beginning to accommodate the pedagogical complexities inherent in integrating technology into the English curriculum. This problem arises when the technology is placed at the center of a teacher's planning, though ideally pedagogy must be placed in the forefront as it drives the technology. In such a case, the technology itself becomes the focus rather than the English content (Young & Bush, 2004). When technology is used in this way, integration is said to be technological rather than curricular (Hutchinson & Reinking, 2011).

According to a framework developed by Mishra and Koehler (2006), technology integration is considered both techno-centric and ineffective without an amalgam of technology, pedagogy and content knowledge within a particular context. According to this framework, there are many differences in the way educational technologies are best applied to enhance student learning of content goals. Therefore, it is necessary to carefully consider both content area goals and the technologies that can be used to achieve them (Harris & Hofer, 2011). Furthermore, research has long supported the importance of the notion of context in the teaching of English language arts and more recently in technology use. Without a clear understanding of the context within which technology is integrated, teachers risk using technology ineffectively and inappropriately (Young & Bush, 2004).

The study, therefore, examined educational technology integration in the teaching of English as a second main language within the Lebanese context, rather than in a range of subject matter areas. Four reasons justify the choice of the ELT context. First, the TPACK framework dictates the focus upon a particular content area (Harris & Hofer, 2011). Second, many technological resources and Internet websites are in English and many of them target the teaching of the English language or can be adapted to do so. Third, as an English teacher and coordinator within this context, the status of technology diffusion within the English curriculum in Lebanon is of particular concern professionally. Finally, for maximum benefit and accuracy, identifying the factors operating within a specific content area creates a more precise description of the enablers and barriers impacting technology integration. By building on the enablers and overcoming the barriers, the integration of technology within the English curriculum can become well established, as what may work in a certain content area may not work for another.

1.3.5 Conditions for effective ICT integration

Several conditions need to be in place for technological change in schools to occur. Beginning at the governmental level, many national policies around the world have been issued addressing the need to integrate ICT in education and across all subject matter areas, including English language arts (DfES, 2005; MCEETYA, 2006; US Department of Education, 2000, 2004, 2010). Some national organizations have advocated the need for 21st century skills and cited these skills as defining features that categorize students into those who are prepared for a complex life and work environment and those who are not (Partnership for 21st Century Skills, 2010). Other international teacher-based organizations have proposed separate standards for administrators, teachers and students that provide guidelines for effective and meaningful technology use in K-12 classrooms (ISTE, 2008). Using such blueprints, policy makers and researchers alike are capable of assessing not only whether technology is being used, but more importantly how this technology is being used to support student learning of subject matter content (Niederhauser, Lindstrom, & Strobel, 2007; OECD, 2001). At this upper end of the hierarchy, it seems that national policies and ICT evaluation reports represent the first conditions for successful ICT integration (Younie, 2006).

Further conditions need to be in place at the individual teacher level. Whether pre-service or in-service, teachers have been considered the “key determinant of implementation”, as they possess a good deal of autonomy when it comes to deciding how and when technology is used (Judson, 2006, p. 583). The inconsistency between desired teacher actions regarding the use of ICTs and their actual actions has prompted researchers to search for practical solutions (Tondeur et al., 2007). Some researchers focus on what university courses can do to prepare pre-service English teachers (Egbert, Paulus, & Nakamichi, 2002; Hu & McGrath, 2011; Partnership for 21st Century Skills, 2010; Y. M. Wang, 2002). Other studies place emphasis on school level support and professional development programs that prepare in-service teachers (Duncan-Howell, 2010; Guskey, 2002; Yates, 2007; Young & Bush, 2004). Therefore, several frameworks have been proposed which dictate the necessary conditions for effective technology preparation through university courses and professional development programs

(Mouza, 2006; UNESCO, 2002). Also using these blueprints, researchers and teachers are capable of assessing effective educational technology preparation. At this lower end of the hierarchy, it seems that universities and schools are responsible for fulfilling the conditions for effective ICT integration. Also at this level, teachers are held responsible for integrating technology in ways “which enable students to construct deep and connected knowledge, which can be applied to real situations” (Ertmer & Ottenbreit-Leftwich, 2010, p. 257)

In sum, this thesis acknowledges the importance of software and hardware provision at the disposal of the English teacher, but also proposes that the support teachers receive in terms of policies, funding, curriculum design, educational technology preparation courses and professional development programs play a crucial role in determining teachers’ ICT use. Hence, this study is a multi-level investigation that places equal emphasis on English teacher’s individual characteristics represented in their beliefs, knowledge and skills in using ICT, and on the national policy, university and school contexts which are believed to shape teachers’ classroom practices. In this way, the study results will lead to a broader and deeper level of understanding of the status of educational technology in the Lebanese educational system and point to a possible “blueprint” for future development in the field.

1.4 Theoretical framework: The Diffusion of Innovations Theory

A theoretical framework deepens understanding and connects development in Lebanon with many other contexts around the world. It is also needed to understand the complexity of technology integration in an educational system (Zhao & Frank, 2003). Diffusion of Innovation Theory proposed by Rogers (1995, 2003) is one such framework that explains the process through which any new artifact is introduced into a sociocultural context and consequently integrated into it. This understanding of innovation diffusion has been applied and accepted as the basis for different types of innovations, including the diffusion of ICT in education (Fluck, 2001). This study acknowledges that there has been theoretical development since Rogers’ Diffusion of Innovations Theory (e.g. Lim, 2002; Tearle, 2004; Webb & Cox, 2004) and it has critically considered alternative models. However, the critical choice of this study was that adopting the Diffusion of Innovation Theory suited this three level study and provided important insights into the ICT integration process in Lebanese schools. First, it provided a thorough consideration for several interrelating factors investigated in this study. Second, it encompassed four elements in such a way that the perspectives of participants towards these elements became feasible. Third, it considered the history and developmental phases of integration in a comparable way to other models developed specifically for ICT integration. Finally, it provided a theoretical basis for understanding the results of the three different, yet interrelating studies.

Rogers' theory of diffusion of innovations is discussed in some detail as it represents the theoretical framework used to understand the results of the study. The theory makes it possible to discuss the present and future of technology integration in Lebanese schools. Therefore, the theory is applied to understand the intricacies of technology diffusion according to the results obtained from this multi-level study. By providing a common language to talk about the diffusion of educational technologies in Lebanese schools, change agents involved in the decision making process can develop structured intervention plans that are informed by the factors identified in this study, though preferably on a nationwide scale.

According to Rogers (2003), an innovation is any new idea, practice or object which is introduced into a sociocultural context. Diffusion is the process by which this new idea, practice or object is communicated through certain channels over time and consequently adopted or rejected by members of the social system. Rogers (1995) explained diffusion as "a type of social change, defined as the process by which alteration occurs in the structure and function of a social system" (p. 6). Rogers argued that innovations do not become embedded into a context by coincidence. Rather they are diffused systematically and in a somewhat predictable manner. The process Rogers describes has distinct stages whereby individuals go through a range of cognitive and affective decision making until the innovation becomes fully integrated and thus ceases to be considered an innovation.

The theory of diffusion of innovation encompasses an array of theoretical explanations based upon several elements that are identifiable in diffusion situations. Each element focuses on a different aspect of the diffusion process, thus presenting an interrelated theory of innovation and diffusion. The four elements are: (1) the inherent characteristics of the innovation, (2) the channels through which it is communicated, (3) time, and (4) the social structure of the system. These elements are explained below.

1.4.1 Characteristics of the innovation

The first element in the diffusion process pertains to the nature of the innovation. Potential adopters formulate perceptions about its attributes and make judgments about it according to its characteristics. The way individuals perceive the characteristics of an innovation helps explain its rate of adoption. They base their judgments upon five characteristics that affect its uptake. They are explained as follows:

Relative advantage: Individuals vary in the degree of relative advantage they assign to an innovation in comparison with the practice that it displaces. The innovation is viewed in terms of time, cost, effectiveness, convenience, quality, results, and social prestige. When the innovation is compared to old practices, these characteristics play a role in accelerating its adoption or vice versa. Quite common in policy plans is a description of the relative advantages of technology typically presented at the very beginning of the document (DfES, 2005; MCEETYA, 2006; US Department of Education, 2010). Additionally, universities may be considered among the pioneers of technology diffusion as they operate independently from governmental influences. When an educational technology course is developed, it may be logical to conclude that the relative advantages of technology are well known to the ICT teacher educator developing the course. Teachers, by contrast, have been found to disregard the relative advantages of technology, resist the changes brought about by the introduction of technology in their school contexts and prefer practices that have worked in the past over new and risky practices (Cuban, 2001; Groff & Mouza, 2008; Smeets, 2005; Smeets & Mooij, 2001). It has been argued that teachers need to be exposed to exemplary models of technology integration before they can assess the relative advantage of this new way of teaching (Mueller, Wood, Willoughby, Ross, & Specht, 2008; Tondeur et al., 2012; Yates, 2007).

Compatibility: Individuals also vary in the degree to which an innovation is believed to be in alignment with existing values, practices, needs, past experiences and social norms. The adoption of an incompatible innovation is a slow process requiring first the adoption of a new value system. At the national level, policy makers tend to advocate the necessity of integrating technology in schools in order to keep up with learners' values, practices, needs and social norms outside the school context (US Department of Education, 2010). Further, the compatibility characteristic of technology aligns with research on teacher beliefs towards technology use. Teachers who possess constructivist beliefs and have high self-efficacy and value beliefs regarding technology tend to use it more frequently (Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010; Overbay, Patterson, Vasu, & Grable, 2012; Paraskeva, Bouta, & Papagianni, 2008; M. Russell, Bebell, O'Dwyer, & O'Connor, 2003).

Complexity: Individuals vary in the degree to which they believe an innovation is difficult to understand, learn and use. Innovations perceived as being complicated will be adopted more slowly than those readily understood by most members of the social system. Among the several barriers impeding technology integration is teachers' lack of knowledge and skills (Hew & Brush, 2007). Research indicates that when teachers receive organizational support in the form of a shared vision and technology integration plan, as well as the provision of resources, training, and encouragement, they acquire the necessary knowledge and skills and hence become more willing to integrate technology (Hew & Brush, 2007).

Trialability: Individuals adopt an innovation when it is possible for them to trial, experiment and reduce their uncertainty about its effects and when it is possible for them to learn by doing prior to adopting. This notion is supported by research on technology integration. Teachers incorporate technology use into their practices through a mechanism of trailing and then reflecting upon the success of their practice. This trialing process enhances teachers' confidence, skill and enthusiasm for using ICTs (Brush et al., 2003; Deaney & Hennessy, 2007).

Observability: Individuals are also believed to adopt an innovation more readily when they see the results of the innovation directly. Observability refers to the visibility of the results of adoption which stimulates discussion, interest and uptake among peers. Through teacher preparation courses and professional development programs, teachers are presented with opportunities for active learning experiences (Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010; Garet, Porter, Desimone, Birman, & Yoon, 2001) where they can observe expert teachers using technology in action (Deaney & Hennessy, 2007; Lim & Khine, 2006) and become actively engaged in meaningful discussion, planning, and practice (Garet et al., 2001). These vicarious experiences encourage teachers to eliminate uncertainty and develop their ICT and pedagogical skills (Lim & Khine, 2006).

The presence of all such characteristics – greater relative advantage, compatibility, trialability, observability, and less complexity – in an innovation accelerates the rate of adoption of that innovation.

1.4.2 Communication channels

Second, the social nature of the diffusion process creates communication channels among members of the social system about the new idea. Individuals sometimes rely on the subjective judgments of similar peers who have previously adopted an innovation instead of basing their decision to adopt or reject an innovation upon their own experiences. Communication is said to be more effective among individuals with similar attributes such as social backgrounds, beliefs, interests, and education. However the very nature of an innovation dictates communication among individuals with very different attributes. Such differences in attributes between the change agent and potential adopters lead to ineffective communication. For example, different stakeholders at the national policy level have been found to hold different perceptions of how, where and why technology should be used (D. M. Watson, 2001). Such conflicting views require robust communication channels among stakeholders to resolve these issues. Furthermore, the translation of a national policy into practice has also been found to be problematic (Younie, 2006). Further, for teacher training purposes, researchers have advocated the importance of mentoring, coaching and collegial support (Dexter & Riedel, 2003; Kopcha, 2012; Li & Ngan, 2009; Wentworth, Graham, & Tripp, 2008). These opportunities encourage teachers to share ideas, learn from each other's experiences, and provide encouragement. At the school context, communication channels are necessary through university-school partnerships (Strudler, Archambault, Bendixen, Anderson, & Weiss, 2003) as well as among teachers through communities of practice (Whighting, 2006).

1.4.3 The time factor

The third element in the diffusion process is time. The time dimension may be measured in three different ways as discussed below.

The time it takes an individual to adopt an innovation based on individual innovativeness: The relative earliness or lateness with which an innovation is adopted depends on the degree of innovativeness. As such, some individuals adopt new ideas relatively earlier than other members of the social system. On the basis of innovativeness, adopters may be classified into 5 categories: innovators, early adopters, early majority, late majority, and laggards. This classification depends on the time it takes them to adopt an innovation in relation to other members of the social system.

The speed within which members of the system adopt an innovation in a certain period of time: This time dimension is termed rate of adoption and suggests that any innovation needs time before it is fully adopted. The process begins slowly with only a few individuals adopting the innovation. Soon enough, the rate of adoption is accelerated with more individuals joining the innovators. Fewer individuals adopt the innovation after this period until the diffusion process is completed. Innovations are said to differ in their rate of adoption according to the five characteristics of innovations described above.

The time it takes an individual to pass from first knowledge of an innovation through its adoption or rejection: This process is termed the innovation-decision process. The innovation decision process suggests that diffusion is not a one-shot action but happens over a period of time. The diffusion process moves through five stages including (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. Within this process, communication is critical for knowledge about an innovation. Through communication, adopters become aware of the innovation, understand how it functions, and learn how adoption happens in a given context. Favorable or unfavorable attitudes towards the innovation are formed in the persuasion stage which in turn leads to a decision to either adopt or reject the innovation. When the decision is made to adopt, the individual puts the innovation into use, possibly reinventing it at this stage. Teachers are believed to progress through the first three stages during their pre-service preparation courses, while the last two stages occur when teachers implement and apply their learned knowledge in the real classroom. Consequently, teachers either confirm or reject their decision to adopt technology after graduation (Lambert & Gong, 2010). This progression process places pressure on pre-service teacher preparation programs to help teachers in their integration efforts. Later, professional development programs forward the progression of teachers through the stages towards full integration.

1.4.4 Structure of the social system

The social system is the fourth element in the diffusion process. Rogers defined a social system as “a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal” (p.23). For example, teachers working in the same school may be considered a social system as can all the teachers in a district, city or even country be considered to belong to the same social system. The pursuit of the common goal brings the members of the social system together. One aspect of the social system influencing the diffusion of an innovation is the type of decision-making process functioning within its realm.

There are three types of innovation decisions: *Optional innovation-decisions* spare complete adoption to individuals independent of other members of the social system. Factors such as the norms of the system and interpersonal networks may influence an individual's choices. *Collective innovation-decisions* are decisions made by agreement among members of the social system. All individuals conform to the decision once it is made. Though the decision is made collectively, individuals can decide to adopt or not. Finally, *authority innovation-decisions* are the decisions made by relatively few members of the system, but these individuals possess the power, status or technical expertise which makes their decisions indisputable. Other members simply follow orders and adopt the innovation. Collective and authority decisions are much more common in social organizations such as schools.

Examining the extrinsic and intrinsic factors within the framework of Rogers' diffusion theory provides structure and coherence to the findings. As the diffusion of technology is influenced by the social system within which it is integrated, this social system has been identified in this study as consisting three interrelated and overlapping contexts, the government, university and school. These contexts are further discussed in this chapter. The more general context is the wider educational system in Lebanon discussed next.

1.5 Education in Lebanon

A quick overview of the Lebanese education system is presented as it represents the wider educational context where the diffusion of technology is hypothesized to take place. The research sought to gain an appreciation of the ICT diffusion status across a spectrum of national policies, universities and schools (both public and private). The study did not seek to narrow the participant base to a particular context. Therefore, it becomes necessary to describe the Lebanese educational system played out at the national, university and school levels.

Lebanon is a small country situated in the Middle East, on the eastern shore of the Mediterranean Sea. Its total area is 10,400 square kilometers. The capital city is Beirut. Other major cities include Tripoli in the north and Sidon in the south. Lebanese people speak Arabic, which is the official language in Lebanon. A large percentage of the Lebanese population, however, speaks English and/or French. Lebanon's population is one of the most highly educated in the region with the adult literacy rate being around 90%.

The educational system in Lebanon is divided into 4 cycles. Preschool consists of 3 years as students enter school at the age of three. Next, all students must complete primary education which consists of 2 cycles. Cycle 1 consists of grades 1, 2 and 3, whereas cycle 2 consists of grades 4, 5, and 6. Students then continue their education in cycle 3, which consists of grades 7, 8, and 9. At the end of grade 9, all students must undergo their first official examination or the Brevet. Mandatory education ends at cycle 3 after which students can choose between a vocational or secondary education track. Progression to cycle 4, which consists of grades 10, 11, and 12, depends upon passing the Brevet examination, which is a high-stakes examination administered by the government. In grade 11, students are divided into two general tracks. In grade 12, students are further divided among 4 main tracks. All students must undertake another official high-stakes examination or the Baccalaureate at the end of grade 12 to become eligible to apply for a university degree. This focus on high-stakes examinations makes it obligatory for schools to place high value on teaching exam content and imparting test-taking strategies. This exam-oriented culture may also lead to the exclusion of higher-order thinking skills, especially those related to 21^{st} century skills. Because teachers are held responsible for student results, they may entirely teach for the test especially during these two grade levels.

Schools are divided into three main types, private, private non-paying, and public schools. Public schools are governed by the Lebanese Ministry of Education. Both private and private non-paying schools are self-governed. The difference between these two types of private schools is that the former are financed by student fees whereas the latter receive subsidies from the government and other private organizations. Private non-paying schools are few in number. In general, private education is mostly prevalent in the country with most students attending these schools. Students at the lower end of the socio-economic status attend public schools or private non-paying schools. The difference between public and private schools is vast. Many parents in Lebanon prefer sending their children to private schools although public education is offered free of charge. The quality of education provided at these two types of schools also differs greatly.

At the national level, the Ministry of Education regulates the educational system in the public and private sectors. Though the Ministry has absolute control over the public sector, it still manages to have reasonable control over private schools by mandating a prescribed curriculum and through licensing private schools. Once private schools obtain licensure from the government, they become relatively free in choosing their subjects, teachers, and even students. Whereas public schools have a similar structure, private schools differ amongst each other in almost all aspects of their educational systems. In addition to foreign curricula, the Lebanese curriculum is applied in all private schools to ensure that students pass the Lebanese Brevet and Baccalaureate.

Arabic and English or French are the main languages of instruction. Besides the teaching of the Arabic language and literature, most subjects are taught in either English or French, with only history, geography and civic education taught in Arabic. English is the language used for learning academic subjects such as science and mathematics beginning at the pre-school level in many schools. English or French are considered second main languages rather than foreign languages. English is taught on a daily basis until students graduate from school and even then it is possible that English will become the only language of education.

Furthermore, Lebanese learners are not isolated from the English-speaking world. In fact, they have many resources outside the classroom context readily available. Such contexts include the Internet, native speakers (relatives, teachers, and tourists), books, and television programs. English also occupies an important position in the Lebanese society to the extent that one seldom communicates with an educated person without using some sort of mixed language (Arabic, English and/or French). Therefore, learners have many opportunities to use English both in and out of class, however, unsuccessful learning of the English language will have consequences on their overall achievement.

After graduation, learners can further choose between a vocational track or university track. Lebanon has one public university; the Lebanese University, which consists of several majors and branches all over Lebanon. Arabic, English, and/or French are the languages of instruction at the Lebanese University. Private universities abound with universities teaching all majors in French, English and/or Arabic.

Considering this educational context and the research findings on the effects of technology in enhancing learning, the integration of ICTs into the English curriculum becomes more of a necessity if learners are to become proficient in English, prepared for the information society, and capable of life-long learning.

1.6 Purpose of the study

A personal and professional desire to deeply understand the status of educational technology in the Lebanese educational system motivated the study. The broader desired contribution of the study was the enhancement of equitable student access to improved English education in Lebanon. To accomplish this goal, the study thus aimed to provide a possible “blueprint” for the future development of ICTs in the wider context of English classrooms across Lebanon.

The purpose of the study, therefore, was to learn about the use of educational technologies by English teachers in Lebanon and the factors influencing such use. A mixed methods design was used to describe the factors that influenced teachers’ use of educational technology at the national, university and school levels. In this study, qualitative interviews with national policy-makers, ICT lecturers and in-service English teachers explored the barriers/enablers of ICT integration in English classrooms. Concurrent with this data, quantitative surveys were used to collect information about pre-service and in-service teachers’ perceptions of the environmental and individualistic characteristics operating within their contexts. The reason for collecting both qualitative and quantitative data was to bring together the strengths of both forms of research and to allow for the comparison and validation of the results.

1.7 Statement of the problem

A need existed for research on the integration of educational technology in Lebanese English classrooms because the progress has not been recorded nor measured formally in governmental documents (Osta, 2005). Even though computers have appeared in some schools, the introduction of computers in Lebanese schools is a recent phenomenon that dates to the 1990s (Yaghi, 1997). Within the Lebanese context, previous research has focused on providing nationwide quantitative results on computer access in schools (Nasser, 2008; Yaghi, 1997). These studies do not incorporate qualitative data that gives voice to the participants nor do they include data from the policy and university levels. One issue that arises, then, is that the quantitative results alone are inadequate to describe and explain English teachers' experiences with the use of ICTs in their teaching and the factors that may influence such use. In addition, Lebanese regions may differ in the quantity of ICT access and quality of ICT use. Therefore, this research has chosen to focus on English teachers working in Tripoli, Lebanon's second largest city and the capital of the Northern district. Researchers have argued for research to be conducted in both developed and developing countries (Chapman, Garrett, & Mahlck, 2004). In a similar vein, Osta (2005) argued for research that is unique to the Lebanese educational system. Despite a multitude of research studies on educational technology in schools in developed and developing countries, there is but a limited body of research that addresses technology integration in the Lebanese context, and no published research that addresses this issue in Tripoli. Consequently, not much is known about the use of technology in Lebanese universities or in Tripoli classrooms where English is taught as a second main language.

More specifically, the issue and impact of ICT integration must be addressed at three different levels. The interrelationships between these levels must also be investigated. Such delineation served the purpose of the study in identifying whether there was a problem with ICT integration in Lebanon and consequently where this problem was located; at the national policy, university or school level. Since so many schools were not using ICTs in teaching and learning (Nasser, 2008), it seemed likely that one reason could be because the national endeavor attempting to promote and fund the process of ICT integration was insufficient. Another reason could be linked to a potential deficiency in university courses which did not prepare pre-service English teachers comfortably enough to consider ICT an integral part of teaching and learning (Egbert et al., 2002; Selwyn, 2007; Strudler, McKinney, Jones, & Quinn, 1999; Wentworth et al., 2008). Finally, another reason seemed to be related to in-service English teachers' individual characteristics represented in a lack of knowledge, skills, and positive beliefs, as well as to environmental factors represented in a dearth of resources, access and support (Ertmer et al., 1999).

Generally, teachers may be under pressure to incorporate ICTs into their classroom practices from policy makers (DfES, 2003; Gray, Pilkington, Hagger-Vaughan, & Tomkins, 2007; Llyod & Yelland, 2003) and school administrators (Haddad, 2005; Yee, 2000). They may also have a professional desire to keep updated in their workplaces in line with their personal beliefs about the benefits of adopting technology on student performance (Sugar, Crawley, & Fine, 2004). Other teachers, though, have not responded to this pressure and have not integrated any use of ICTs into their classrooms (Cuban et al., 2001). It remains to be known where English teachers in Lebanon stand in terms of using ICTs in teaching English subject matter and the factors influencing this use.

1.8 Significance of the study

This research study aimed to create a comprehensive picture of the ICT context in which English subject matter is taught in Lebanese classrooms. It was therefore differentiated from previous research in seven important ways enumerated below.

First, the study contexts have not been extensively researched and therefore there was a necessity for their investigation (Osta, 2005). Only few studies of relevance to the investigation undertaken in this study were found (Burns, 2012; Nasser, 2008; Osta, 2005; Saleh, 2007; Yaghi, 1997). However, ICT integration has been closely adhered to the sociocultural context in which it is integrated (Hew & Brush, 2007). The specificity of certain sites makes it difficult for researchers to generalize research findings into new and different contexts (Chandra & Lloyd, 2008). Therefore, investigating the socio-cultural context in an eastern cultural environment having characteristics that differ from the western culture may yield different results regarding the process of ICT integration and the factors influencing its adoption. In their identification of contextual differences, Robertson, Webb, and Fluck (2007) went as far as claiming that “each situation is unique and there are no ready-made answers that can be applied universally,” in addition “what is valid in one situation may be irrelevant in another” (p. 9). In a similar vein, Osta (2005) described two kinds of barriers in her discussion of factors influencing the Arab world. Certain barriers are of a general nature and are therefore faced by all countries, whether developed or developing. Other barriers are specific to Arab countries and are dependent upon the characteristics that make these countries different from other countries in the world. Therefore, the study aimed to document the status of technology integration in Lebanon, thus, addressing an area of research that has not been studied comprehensively.

Second, the study aimed to build upon and add to the body of knowledge already existing in terms of the interrelating factors affecting ICT integration starting at the policy level and moving down the hierarchal paradigm to the university sector and finally to the school context. In this way, the study attempted to create a theoretical foundation based on an extensive literature review and consisting of the interrelating factors from the contexts mentioned above. From this theoretical foundation, the findings of the research could be better understood and discussed.

Third, the research had a practical dimension in terms of finding solutions for the problems facing ICT integration in Lebanese schools and devising a possible “blueprint” for the future development of ICTs in the field in the form of recommendations. As a result of this research, teachers and school administrators, who are directly responsible for the integration of technological innovations in the education system may obtain the necessary information to successfully integrate technology. As Chapman et al. (2004) noted, “Only as education leaders understand the issues associated with the effective use of technology in instruction can they effectively guide the process” (p. 20).

Fourth, even though research into policies, university courses, and teacher characteristics is extensive, there is little research that combines the impact of these three different contexts in one study. Thus, there seems to be a gap in the literature on the use of ICTs targeting the Lebanese context. This gap calls for a much needed investigation that creates a complete picture of the extrinsic and intrinsic factors operating within this context. O'Dwyer, Russell, and Bebell (2004) contended that to fully understand technology integration, a preliminary first step is to understand how technology is being used and the contexts that affect this use. These researchers asserted the importance of examining the “potential technology-related policy levers that exist at the school and district level…since technology-related decisions that can impact practices within the classroom are typically made *outside* of the classroom” (p. 2). The importance of research into the availability of resources and implemented actions towards ICT integration has been highlighted in the literature (Osta, 2005). It is proposed that the results of the study will lead to a better understanding among stakeholders about educational technology integration and as a result possibly advance the integration process. By contrast, the absence of research in the field makes it difficult for all those involved to reach the goals beset by the demands and complexity of integrating ICT in any educational system (Osta, 2005).

Fifth, English teachers have a greater responsibility for using ICTs in their classrooms since many teaching resources are in English and specifically target the development of the English language whether as a native language or as a second or foreign language. English teachers, therefore, have a greater opportunity to integrate ICTs than teachers of other languages and subjects. Few research studies target the investigation of English teachers’ perceptions of new technologies as reported by teachers themselves (Mcgrail, 2005). Incorporating the three different contexts in one study may present English teachers with a complete picture of ICT uses and integration levels.

Sixth, transforming individual teacher practices and behavior is a complex and problematic process. Many teachers have a history of resisting change and any new addition to their classrooms that may interrupt the order they have imposed (Prensky, 2001). Somekh (2004) declared that, “schools are notoriously sites of control in which students are required to conform to a regime of practice which places the teacher in the role of an authoritative individual and students in the role of members of an ignorant and potentially oppositional group” (p. 174). However, there has to be a starting point from where the change process is initiated. Thus, the current study contributes to a comprehensive understanding of the roles of national policies, university courses, school contexts and teacher characteristics in the integration process and examines the importance of each role in the transformation of education.

Finally, in terms of research design, the study adopted a pragmatic, mixed methods approach. Both qualitative and quantitative methods of data gathering were used. Rocco, Bliss, Gallagher, and Perez-Prado (2003) called for the incorporation of mixed methods research in the field of education. Further, Hew and Brush (2007) recommended the use of mixed methods specifically in research studies on technology integration. This approach helped in providing rich and contextualized insights into the three interrelated contexts which underwent extensive investigation during the research study.

1.9 Research contentions, aims and questions

A sequence of contentions was formulated to assist in the generation of the precise aims of this investigation. From the aims of the study, the research questions were generated and consequently the research design.

1.9.1 Contentions

- ICT has already begun to be an integral part of teaching and learning around the world but has not become a basic tool in the Lebanese educational system (Yaghi, 1997). A high 19.2 students per computer ratio in public schools and 16.67 students per computer ratio in private schools indicated a low integration level (Nasser, 2008).
- The Lebanese government needs to establish ICT as an integral part of the Lebanese educational system and English curriculum for successful student learning, in a similar

fashion to worldwide policy plans (DfES, 2003; MCEETYA, 2006; US Department of Education, 2004).

- Lebanese universities are, by far, held responsible for preparing pre-service teachers to integrate ICT comfortably into their classrooms. Research acknowledges the importance of pre-service teacher courses in preparing tomorrow's teachers (Brush et al., 2003).
- Not all Lebanese English teachers have the individual characteristics necessary to integrate ICT into their classrooms (Yaghi, 1997), despite extensive research studies on the central role of teachers as change agents (Bitner & Bitner, 2002; Lim, 2007; UNESCO, 2008).
- Lebanese English teachers need to be taught practical ways to integrate ICT conducive to student learning in the form of continuing professional development, as recommended by research conducted in the field of educational technology (Palak & Walls, 2009; UNESCO, 2008).

1.9.2 Aims

From these contentions, the following five aims of the investigation were derived:

- To provide a comprehensive knowledge base of the ICT in ELT status in Lebanon
- To identify some of the reasons why technology infusion in Lebanese schools has not occurred at a similar rate to that in other countries
- To determine the enhancing enablers and limiting barriers to ICT integration at the policy, university and school levels
- To provide a possible "blueprint" for future development in the field in the form of recommendations for policy makers, ICT lectures, school leaders and professional development providers.
- To make recommendations for further research on ICT use in the Lebanese educational context

These research aims then led to the generation of the major issue under investigation and was formulated as the main research question guiding the study.

1.9.3 Research questions

To achieve the aims of this investigation, the following research question was generated. This question provided the coherence feature which grouped all three studies under one major investigation:

RQ: What factors enhance or inhibit the integration of ICT in the Lebanese English classroom?

To address this broad question, several other questions were derived and formulated. These questions were developed to direct the progress of the study from the data collection to the data organization, analysis, and finally discussion stages. The questions are:

RQ1: What are the national policies that support, fund and monitor the implementation of ICT in ELT and what barriers/enablers can be identified in the implementation of the policies?

RQ2a: How do Lebanese universities prepare pre-service teachers to integrate ICT into the English classroom and what barriers/enablers can be identified in the shaping of the pre-service teachers' preparation?

RQ2b: What are the environmental and individual characteristics influencing pre-service teachers' future integration of technology inside their classrooms?

RQ3a: What are the levels of ICT integration already reached by English teachers in Tripoli?

RQ3b: What are the environmental and individual characteristics influencing in-service teachers' integration of technology inside their classrooms?

RQ4: What inferences can be made for the future uptake of ICT in the Lebanese English classroom?

1.10 Thesis organization

This chapter introduced the doctoral research study which was undertaken for a period of three years. The chapter first identified the research topic and background to the study. Next, a concise description of the theoretical framework guiding the study was presented. Further, the Lebanese educational system was portrayed. The purpose of the study was discussed next, leading to the identification of the research problem at three levels of the Lebanese educational system. The chapter also highlighted the significance of the study within the context of the current research agenda in ICT nationally and internationally. The chapter ended with a description of a series of contentions and aims which led to the construction of the research questions.

The thesis consists of seven chapters. The first chapter presented the background to the study along with the theoretical framework which was used to interpret the results of the three studies. Chapter 2 provides an extensive and intensive literature review for the various concepts and contexts which were deemed necessary to situate the study within extant research in the field of educational technology. Chapter 3 provides an overview of the research methodology. A mixed methods design was adopted which included the collection of both qualitative and quantitative data. Chapter 4 presents a detailed description and analysis of the data collected as well as key themes and findings which emerged from the study of national policies. Chapter 5 presents a description and analysis of the seven educational technology courses investigated as well as the environmental factors and individual characteristics of pre-service teachers who had undertaken these courses. Chapter 6 provides a detailed description of the levels of ICT use reached by in-service English teachers as well as the environmental factors and individual characteristics affecting their use of technology. Chapter 7 discusses the conclusions which could be derived from the synthesized research results at all three levels as well as the implications of the results on the educational technology milieu in Lebanon. The Diffusion of Innovation Theory is applied to the research results in order to provide for a common language that connects the three studies. Further, a number of suggestions were put forward for the future investigation of ICT in the Lebanese context.

Having established the foundational background of the study, the next chapter now reviews the literature which informed the investigation.

CHAPTER 2 Literature Review

2.1 Introduction

In the previous chapter, a consideration of several issues led to the establishment of the foundational background of the study. This chapter now presents the literature review that informed the investigation into the field of educational technology in Lebanon. Its purpose was to create a context in which the research could be embedded into the existing body of international and national knowledge. It also provided structure for the section on research methodology that follows. Key themes which have certain bearings on the research design, data collection and data analysis are identified and discussed in the literature review. Presented here is a succinct overview of the key themes discussed.

The literature review used the research questions as a framework to focus first on current studies that involve investigations into national policies, second on university preparation courses and pre-service teacher characteristics, and third professional development programs and in-service teacher attributes. However, there are limited research studies that fit these criteria nationally, therefore insights were drawn from the wider field of international studies conducted in both developed and developing countries.

The chapter, therefore, presents the general benefits of Information Communication Technologies (ICTs) in education. Further, the review discusses the levels at which ICTs are diffused within the educational system. The three levels mentioned pertain to the contexts of the three research studies undertaken in this investigation. Next, the factors, which were investigated throughout the study, are broadly discussed. These contextual factors have been found to influence teachers' uses of ICT in teaching subject matter area such as English language arts. The presence of these factors transforms them into enablers of technology integration, however, when these factors are absent or insufficiently available, they become barriers to technology integration. Furthermore, intrinsic factors include teachers' beliefs and knowledge about ICT and pedagogy. Extrinsic factors include the availability of resources, access and support, national policies, university preparation courses, and professional development programs. Governments, universities and schools create interacting external forces that may enhance or confine teachers' practices as they attempt to overcome internal forces to technology integration. Before discussing these extrinsic and intrinsic factors, it is useful to briefly consider the true benefits of educational technology and why some governments have generously invested in them.

2.2 Investing in the benefits of ICTs

The promises of technology in enhancing student learning, preparing learners for the future and revolutionizing education are some of the reasons behind ample investments in educational technology (Albirini, 2006). Lei (2010) reported the extent of worldwide governmental investments in digitizing schools. For example, the US has invested over $66 billion on school technology in 2004. In Ireland, 107.92 million pounds were proposed in the country's national educational technology plan in 2001 and China had spent 100 billion Yuan by 2004. A further $1.1 billion was allocated in the Australian budget for the Digital Education Revolution in 2008 and 2009. These are but a few examples of a worldwide wave targeting educational technology with ample investments.

Most governments worldwide have been convinced that technology has several benefits on student learning (Lei, 2010). The benefits of technology, however, are not necessarily equivalent to improved student achievement scores (Lai & Pratt, 2007). In his book, Selwyn (2011) raises several compelling questions: Does technology improve learning? How exactly can technology support learning? What types of learning result from technology use? Why can technology support learning that would not otherwise take place? However, to answer any one of these questions is empirically difficult since there can never be a discernible cause-and-effect relationship between technology and learning (Selwyn, 2011). Whether technology enhances learning or not is a debatable issue. However, simply considering the reality of its pervasiveness in society and school settings brings to the foreground a question about its wider benefits.

In various studies, positive outcomes of using technology, in any of its various forms, have been recorded on student motivation (Mathew, 1997; Sheehy et al., 2005), creative thinking (Wheeler, Waite, & Bromfield, 2002), problem solving and higher-order thinking skills (Tondeur et al., 2007), communication skills (Twining et al., 2006) flexible learning opportunities (Tondeur et al., 2007), constructivist learning experiences (Jonassen, Peck, & Wilson, 1999; Shoffner, 2007) , students' attitudes towards learning and self-esteem (Christensen, 2002), school efficiency (Chapman et al., 2004), the promotion of independence and collaboration among learners (Petko, 2012), teacher productivity (Deaney et al., 2006), teacher-student and teacher-teacher communication (Lai & Pratt, 2007), education equity, quality, and access (Chapman et al., 2004), as well as the creation of a school community (Whighting, 2006) and more globally an international learning community (Gibson, 2009). Central to all these benefits is of course the development of technology skills which constitute essential skills for survival in the 21st century (Partnership for 21st Century Skills, 2002).

These benefits have been found to support the creation of an entirely new learning environment, where students are motivated and actively engaged in the learning process and minimal behavioral problems are exhibited (Deaney et al., 2006). Technology may change the subject, methodology, objectives and assessment (Lim, 2002; Osta, 2005) as well as how learners learn and how teachers teach (Underwood & Dillon, 2011).

Because this study is concerned with the integration of ICT in the English classroom of Lebanese schools, literacy becomes an issue since this is the place where formal English literacy education begins for the majority of students in Lebanon. Research suggests that digital technologies are being used in many creative and productive ways in the English language arts classroom to engage learners and improve their literacy skills (Sweeder, 2011). Pennington (2004) summarized the benefits of ICT as offering language learners expanded resources for learning in the changed nature of the quantity, access, diversity, sources, quality, novelty, and interaction with input. Furthermore, a number of positive outcomes have been associated with effective technology integration. In general, these outcomes include: increased student achievement, promotion of higher level/critical thinking skills, increased media literacy, the reduction of geographical/logistical constraints, increased student collaboration, and improved student attitude, interest, and motivation (Singleton & Heaton, 2007).

More specifically, technology has the capability of enhancing the acquisition, retention and usage of English language arts skills (Simpson & Park, 2013). These skills include listening, speaking, reading, writing, viewing and visually representing ideas and knowledge. Language learners have access to virtually unlimited resources, multimedia, software, applications and devices that target each of these skills (Simpson & Park, 2013). For example, both listening and speaking skills are enhanced through real time communication software which allow learners to develop and exchange ideas and learning outcomes. Further, both reading and writing skills are acquired when learners work collaboratively using cloud computing. Viewing and visually representing ideas and knowledge may be more effectively achieved through the use of common computer software and Internet tools such Microsoft PowerPoint, Apple's iMovie, YouTube, Glogster, Inspiration and Prezi to name just a few. To merge all six skills in one place, English teachers may use online discussion boards and social learning networks such as Blackboard, Edmodo, wiki, and blogs where learners can upload and download podcasts, readings, short video clips, and writing products posted by teachers and students alike.

As a result, learners acquire both English literacy skills and digital literacy skills (Beach, 2012), which are equally important for life and work in the 21st century (Partnership for 21st Century Skills, 2010). In fact, the digital literacy skills of informational/accessibility, collaborative knowledge construction, multimodal communication, gaming literacy, and reflection on learning (Beach, 2012) are considered essential English literacy skills with or without the integration of technology. First, having the ability to readily access and acquire knowledge from print based texts may be further enhanced with online digital texts. Through online digital texts, learners are engaged in processing, accessing, subscribing to, and tagging online material (Beach, 2012) as well as identifying important questions which lead to locating, synthesizing, critically evaluating, and communicating information (Coiro & Dobler, 2007; Leu et al., 2011). Second, a constructivist approach to acquiring English language arts standards involves learners constructing knowledge collaboratively. Through online discussion forums, social networking/ bookmarking sites, note-taking and annotation tools, learners share and construct knowledge collaboratively. Third, acquiring the digital literacy skill of multimodal communication engages leaners in essential English literacy skills. The productive skills of writing, speaking, and visually representing ideas and knowledge may be more efficaciously acquired when learners engage in the creation of digital artifacts such as digital storytelling, videos, podcasts and images intertwined with captions, scripts and voice recordings. Fourth, while developing gaming literacy, English language arts learners become more engaged and motivated as they address various issues and topics through play (Barab, Pettyjohn, Gresalfi, Volk, & Solomou, 2012). Learners may also create their own games using online software tools that employ a range of print and digital literacies (Beach, 2012). Lastly, another important literacy skill is the ability to reflect upon one's learning. By creating e-portfolios, learners collect, annotate, observe patterns, and critically reflect on their work (Meyer, Abrami, Wade, Asian, & Deault, 2010). Numerous websites and cloud computing, in addition to the more commonly cited blogs and wikis, provide learners with opportunities to extend their work over long periods of time and obtain a wider audience for commenting on and evaluating their work. Thus, learners simultaneously acquire integrated English literacy skills and digital literacy skills.

However, careful attention needs to be taken when considering the integration of technology into the curriculum. Technology as an add-on to classroom practices does not lead to desirable results (Ertmer & Ottenbreit-Leftwich, 2010). Technology needs to be well-knit into the curriculum and made an integral part of a lesson (Underwood & Dillon, 2011; Yang, 2001). Therefore, teachers need to shift their mindsets away from the idea that technology is simply a supplemental tool for traditional teaching practices (Hayes, 2007), and start using technology as an essential tool for successful student outcomes (Ertmer & Ottenbreit-Leftwich, 2010).

Integrating technology into the teaching and learning of the English language is still a long process of change on multiple levels of the educational system. The levels within which an innovation is integrated into an educational institution are the topics discussed in the next section.

2.3 Levels of ICT diffusion

Throughout the diffusion process, different educational levels seem to play fundamental roles in promoting the process or obstructing its course (Mooij & Smeets, 2001). Each level has different characteristics which create a unique environment where technology integration is made possible. The nature of these levels and their unique characteristics are discussed in more detail next.

2.3.1 ICT integration at the national policy level

In measuring the impact of ICT in education, researchers seem to disagree on whether students' use of ICT has positive, negative or neutral effects on their achievement levels. Despite these mixed results (Andrews et al., 2007; O'Dwyer, Russell, Bebell, & Tucker-Seeley, 2005; Torgerson & Zhu, 2003) and in other cases negative results (Cuban, 2001; Kirkpatrick & Cuban, 1998; OECD, 2005; Oppenheimer, 1997), educational technology has not provided a "fragile basis" for making policy or allocating resources (Kirkpatrick & Cuban, 1998). In fact, governments have not been discouraged by these outcomes and continue to invest in technology (Banyard, Underwood, & Twiner, 2006; Gray et al., 2007) and include ICTs in recent policy plans (DfES, 2003, 2005; MCEETYA, 2006; US Department of Education, 2004, 2010).

Therefore, policy planning is considered an essential aspect of any national effort which aims at the widespread integration of technology into the curriculum. The design and content of educational ICT policies very much depend on the dominant rationale driving curriculum development (Tondeur et al., 2007). Policy makers employ such rationales to promote the use of ICT and to justify expenditure on infrastructure. These rationales may imply different approaches to the way ICT is introduced and implemented in schools according to the nature and definition of ICT adopted (OECD, 2001). In terms of their diverse nature and definition, ICTs have been viewed from three different angles. ICT may be viewed as a key skill, a resource/tool, or a discipline in its own right (Tanner, 2003). As a key skill, much like literacy and numeracy, ICT supports learning in a range of subject areas. As a tool or resource, ICT supports and extends teaching and learning across the curriculum. Lastly, as a discipline, ICT has a separate set of knowledge, skills and understandings. Policy plans allude to these diverse definitions of ICT in the form of rationales.

For example, in the Australian national policy document, several distinct reasons were stated for promoting ICT use in classrooms as follows (DETYA, 2002):

- Type A: encouraging the acquisition of ICT skills as an end in themselves
- Type B: using ICTs to enhance students' abilities within the existing curriculum
- Type C: introducing ICTs as an integral component of broader curricular reforms that are changing not only how learning occurs but also what is learned
- Type D: introducing ICTs as an integral component of the reforms that alter the organization and structure of schooling itself.

Another classification of rationales that has driven ICT policies in education was discerned by Hawkridge (1990). Though devised more than 20 years ago, it is of particular relevance to this study, especially since it represents the same time frame as the emergence of the latest Lebanese curriculum document in 1994. Hawkridge differentiated between four different rationales as follows:

- An economic/vocational rationale: since learners are prepared for future jobs and careers at school, the development of ICT skills becomes necessary to meet the need for a skilled work force.
- A social rationale: all learners should become familiar with technology since schools prepare children for life. Such familiarity with technology helps learners become responsible and well-informed citizens.
- An educational/pedagogic rationale: ICT is a supportive tool that improves teaching and learning of other subjects. It is based on the belief that technology is a teaching/learning tool.

- A catalytic rationale: ICT has the potential to make desired improvements in teaching and learning. Learners become autonomous, cooperative and problem-solvers.

Among the rationales driving policy planning and implementation as discussed by Hawkridge (1990), the economic and social rationales remain to take precedence over the educational and catalytic rationales (Fluck, 2001; Tondeur et al., 2007). This focus of national policies on the socioeconomic rationale has led governments to introduce ICT as a separate subject with the aim of teaching students a number of isolated technical skills (Tondeur et al., 2007). However, when policies stress the educational rationale, ICT literacy becomes a secondary effect for content-related ICT use. Therefore, researchers generally advocate the educational rationale where ICT skills are embedded within subject area competencies (Tondeur et al., 2007; UNESCO, 2008). Without neglecting the importance of distinguishing between these rationales for policy making, the OECD (2001) reported that there is growing convergence among these rationales since the technological skills acquired from educational uses of ICT reflect positively onto the workplace and social skills required in the information and knowledge society.

There are several ways in which countries integrate ICT competencies into the national curriculum. Some countries include ICT competencies as a list of recommendations or guidelines for schools, while others specify, manage and oversee the integration of ICT across the national curriculum (Tondeur et al., 2007). In the first case, schools have more freedom in directing their educational innovation processes. They are held responsible for translating the policy document into a working school ICT plan. However, such absence of a formal and established ICT curriculum is believed to lead to an ambiguous situation and no guarantees to the attainment of the proposed ICT competencies (Tondeur et al., 2007). Integrating ICT across the curriculum by mandated government legislation has been most popular among developed countries; in recognition that technology is already pervasive in the outer economic and social contexts and its benefit in improving the quality of education are transparent (OECD, 2001).

To date, there is no Lebanese national policy regarding the integration of ICTs across the curriculum existing in Lebanon (Nasser, 2008). Only recently, a national strategic plan was published by the Ministry of Education and Higher Education (MEHE) recommending the integration of technology across the curriculum and consequently advising that technology be used as a tool or resource (MEHE, 2012). Since this document was not mandated by the MEHE and had not been approved by the Council of Ministers, the strategic plan could not be regarded as an officially implemented policy plan. Therefore, an investigation of other national documents regarding technology integration was deemed necessary. Such an investigation revealed technology as a discipline in its own right. The implemented national curriculum document available at the time of the study pertained to the inclusion of Information Technology (IT) as a separate subject taught once a week for 50 minutes (Constantine, 2005). This most recent national curriculum dates back to 1994 when the Center for Educational Research and Development (CERD), a division of the Ministry of Education responsible for curriculum design and development, devised a new plan for educational reform using a New Framework for education. The New Framework included IT as an essential requisite for Lebanese students to remain updated in this age of technology. The New Framework dictated that the IT course be taught in the classes of the third and fourth cycles. The following general goals were specified for the new curricula (Constantine, 2005):

(1) Dealing positively with computers and developing the motivation to benefit from modern technologies in order to reinforce self-confidence and personality

(2) Appreciating the role of computers in inter-human communication and the social and educational importance of computers in the labor and production market

(3) Openness to other cultures and civilizations through software, various communication networkers such as the Intranet and the Internet

(4) Reinforcing inventiveness, logic, comprehension, problem-solving, making comparisons, measurements and other endeavors through programming

(5) Understand the specificity of the computer as a machine that performs specific tasks based on programming instructions

(6) Acquiring the basic computing concepts and applications in society

(7) Dealing with stored information by reviewing, transmitting, receiving, storing and retrieving

(8) Learning the rules of databases and how to handle them

(9) Effective utilization of computers and peripherals

(10) Acquiring the basic skills that are in demand with the labor market

Analysis of these goals reveals the curriculum's restriction to the purpose mentioned in Type A in the DETYA (2002) document mentioned above. However, researchers and policy makers alike have criticized the practice in education that limits the teaching of ICT as a separate course and consider this practice inadequate in itself (DETYA, 2002; Okojie et al., 2006). That is, "if today's children are restricted to acquiring only the knowledge and skills that served us well in the 20th century, they will not be well prepared for the 21st century" (DETYA, 2002). Moreover, ICT must be coupled with national policies that promote ICT integration across the curriculum within subject oriented competencies (Tondeur et al., 2007). Furthermore, aligning the Lebanese IT curriculum to the rationales discussed by Hawkridge (1990) indicates that the curriculum serves well the economic and social rationales. In light of this rationale, Lebanon, like other countries in the world, has introduced IT as a separate school subject to teach students technical skills (US Department of Education, 2004). Until the national strategic plan (MEHE, 2012) becomes a mandated policy plan, Lebanese schools were still teaching IT skills as a separate subject once a week at the time of the study.

Furthermore, several conditions are considered essential for the successful development of a national policy. The OECD (2001) report discussed eight conditions which must be met by governments when they plan to include educational technology as an integral part of their national curriculums. Consideration of these conditions at the national policy level informs the analysis of data from Study 1 in Chapter 4. These conditions are listed below:

1- Radical curriculum change is needed in the Internet age.

2- Student assessment must be compatible with ICT-enriched learning.

3- Digital literacy is a now fundamental learning objective for all.

4- Schools must be fully equipped and supported for using ICT.

5- Schools need plentiful educational software of quality and easily accessed information.

6- ICT in schools requires an extended professional role for teachers.

7- School leadership and management must be fully committed to adopting ICT.

8- School, home, and community have new opportunities for partnership.

The OECD (2001) also reported on how several countries have been successful in stepping up and achieving some of these conditions. Since there was no mention of Lebanon in the report, it awaits to be seen how many of these conditions have been met by the Lebanese Ministry of Education. Therefore, the study aimed to make explicit the government's role in terms of policymaking, funding schemes, provision of professional development, and assessment of successful integration within the English curriculum. Hence, the importance of the current study lied in the development of an overall understanding related to the status of ICT integration at the national policy level, which in turn has the potential to create awareness among education leaders in the country towards successful technology integration.

2.3.2 ICT integration at the university level

With the introduction of technology into educational settings came a need for an urgent re-conceptualization of the technological competencies required of pre-service teachers enrolled in education courses (Gomez, Sherin, Griesdorn, & Finn, 2008; Lambert & Gong, 2010; G. Russell & Finger, 2007). The role of universities in preparing future teachers became both evident and necessary. Many universities worldwide responded to this necessity by introducing technology preparation into their settings (Hsu, 2012). Through the development of university courses which prepare pre-service teachers, universities play a crucial role in providing the necessary human infrastructure for schools.

The focus of university faculty on teacher preparation courses in ICT has shifted over the last decade (Hsu, 2012; Wentworth et al., 2008). The beginning of technology infusion initiatives started as universities competed to establish computer labs to ensure pre-service teachers had enough exposure to learn the technical skills necessary to use technology in their classrooms

(Lambert & Gong, 2010). ICT courses comprised of an introduction to computer software and hardware isolated from curriculum and teaching practices (Wentworth et al., 2008). Soon enough, researchers became dissatisfied with the level of technology use displayed by pre-service teachers upon their graduation (Kay, 2006; Lambert & Gong, 2010). Therefore, the preparation of pre-service teachers in technology integration then developed into the standalone computer course which responded to the increasing demands from schools for teachers with adequate technological proficiency and skills (Y. M. Wang, 2006). Researchers realized that both the mere presence of technology on university campuses (Lambert & Gong, 2010) and the sole technical course (Y. M. Wang, 2006) would not suffice as technological skills did not automatically translate into classroom practices and teachers continued to face difficulties in using technology in authentic contexts. Without connecting technology to classroom practices and student learning in meaningful ways, pre-service teachers may regard their university preparation as abstract and impractical (Shoffner, 2007).

Some universities responded to the urgent calls of researchers and began to consider full integration strategies across all education courses, especially methods courses (Lambert & Gong; Y. M. Wang, 2006). Hopes were thus upon the potential of modeling strategies in specific content areas to better prepare pre-service teachers and consequently motivate them to use technology (Doering, Beach, & O'Brien, 2007; Hsu, 2012). However, the full integration model backfired when incoming pre-service teachers did not possess the technology literacy skills deemed necessary for the integrated model (Y. M. Wang, 2006). Adding to this problem, many teacher educators did not widely adopt the use of technology or have time for training and, “as a result, the standalone educational technology course still serves as the primary means of pre-service teacher preparation in technology” (Lambert & Gong, 2010, p. 55).

Today, pre-service teachers are considered digital natives and have grown up in a digital world making them comfortable with technology, hence, the declining emphasis on technical skills. But being comfortable using technology does not automatically transfer into classroom practices (Wentworth et al., 2008), and it remains crucial for pre-service teacher programs to include instruction and training on effective technology integration (Dutt-Doner, Allen, & Corcoran, 2006). Together the standalone computer course and the integrated method help pre-service teachers become proficient in using technology. Pre-service teachers learn the technical skills in the standalone course and then apply and develop these skills in the integrated methods courses (Hsu, 2012; Y. M. Wang, 2006).

Given these new requirements, the role of teacher educators in preparing pre-service teachers for technology integration is directly affected. Teacher educators, therefore, must take on further responsibilities in order to fulfill their new roles. First, teacher educators must practice what they preach since their actions will necessarily reflect on their students (Stanford & Reeves, 2007; Y. M. Wang, 2002). They must access the technology that is available in their contexts, consider their own curriculums and teach with technology. Through this process, pre-service teachers will observe models of how it is like to teach with technology and acquire insights into their future teaching practices (Stanford & Reeves, 2007). Second, teacher educators must structure their courses in ways that exemplify student-centered constructivist pedagogy (Pope & Golub, 2000) and practically model ideal teacher practices (Brush et al., 2003). Since it is easier to use technology for teacher productivity and teacher-centered presentations (Wentworth et al., 2008) rather than in student-centered and innovative ways, there is a need for pre-service teachers to become comfortable with acquiring the skills which will enable them to use technology in such ways. Third, teacher educators must also help pre-service teachers acquire a clear vision of their roles in technology-equipped classrooms which directly reflect on their practices. These courses have the potential to act as catalysts for changing teacher's roles and their perceptions about their roles (Y. M. Wang, 2002). Only when teacher educators begin to use technology both personally and professionally throughout their pre-service teacher preparation courses, will they be able to prepare the teachers of future generations (Belland, 2009; Stanford & Reeves, 2007). One way to help teacher educators realize their new roles is to offer system wide and ongoing professional development (Howland & Wedman, 2004; Tondeur et al., 2012).

Several strategies based on elaborate, theory-driven research on how to best prepare the future teaching cadre for an already complex profession have been documented (Kay, 2006; Ottenbreit-Leftwich, Glazewski, & Newby, 2010). Though criticized for a lack of extensive, systematic evaluations of their effectiveness (Kay, 2006), these strategies provide universities with options from which to develop courses that best fit their particular contexts. These strategies take ten different forms: (1) single technology courses, (2) mini-workshops, (3) full integration, (4) modeling, (5) using multimedia, (6) collaboration, (7) field-based, (8) focus on education faculty, (9) focus on mentor teachers, and (10) focus on access to software, hardware, and/or support. Whatever the strategy may be, the ultimate goal is for pre-service teachers to acquire and then transfer knowledge and skills into their teaching practices (Brush et al., 2003). Therefore, the combination of several strategies has been proven to be more effective than the adoption of a single strategy (Brown & Warschauer, 2006; Mims, Polly, Shepherd, & Inan, 2006).

According to the study conducted by Kay (2006), the primary strategy adopted by 44% of the programs was the integrated strategy. The main advantage of this strategy included a focus on meaningful and authentic problem-solving tasks where pre-service teachers learn with computers, not about them. Further, pre-service teachers gradually acquire an increasingly complex skill repertoire as they progress through the program (Collier, Weinburgh, & Rivera, 2004). By contrast, Kay identified delivering a single technology course adopted by 29% of the programs and targeting basic computer skills. The primary advantages of this strategy were improving self-efficacy, providing an overview of using technology in teaching, and developing a strong foundation of technology skills. Further advantages include enhanced value beliefs in the benefits of technology for instruction (Lambert, Gong, & Cuper, 2008). The major disadvantages of this strategy were learning technology skills in isolation, the limited extension of these skills in the field, and the heavy workload placed upon pre-service teachers' schedules (Brown & Warschauer, 2006; Choy, Wong, & Gao, 2009). Further drawbacks include a mismatch between the technology requirements of the courses and incoming student teachers' skills, a disconnection between technology skills and teaching methods, and an indecision of when the course should be taken; at the beginning of teacher candidature or towards the end of the program (Y. M. Wang, 2006). Kay has suggested that a single technology course strategy might be effective for a one-year program, but not for a multi-year program, however, “the jury is still out on which strategies work best” (p. 395).

The model developed by Kay (2006) provides an important departure point for evaluating the comprehensiveness of the technology integration strategy adopted within any pre-service teacher preparation program. According to Figure 2.1, having good access to software, hardware, and support is the necessary first requisite in both the university classroom and in the field placement. Without adequate access, other strategies will not find a fertile context. Next, whether the strategy adopted is the single course, workshop, integration, or multimedia strategy, the program must be accompanied with every effort to model and construct authentic teaching activities. Finally, collaboration among pre-service teachers, faculty members and mentor teachers is deemed necessary if gains in attitude and ability are to translate into meaningful uses of technology. Considering the diversity within which universities help prepare pre-service teachers integrate technology reinforces the notion that ‘a one size fits all’ course is neither possible nor necessary.

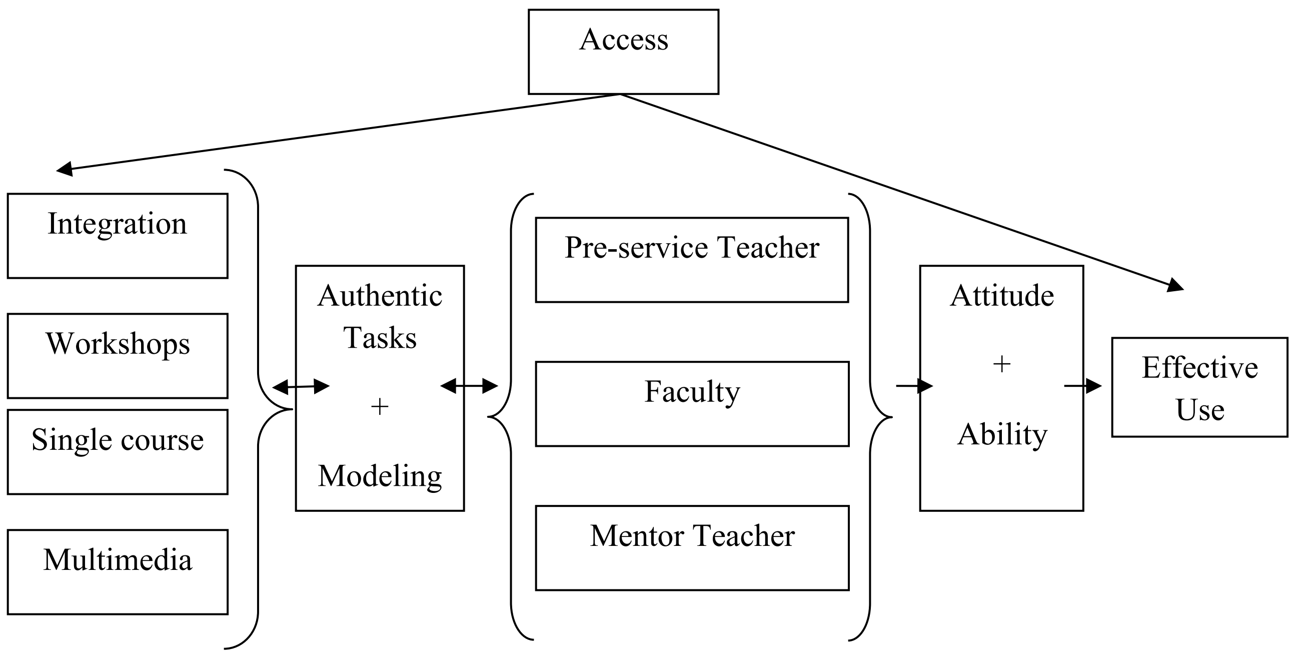

Figure 2.1: Guiding model for incorporating technology into pre-service education from Kay (2006)

On an individual course level, Ottenbreit-Leftwich, Glazewski, and Newby (2010) identified six approaches used in preparing teachers to integrate technology whatever the strategy adopted. They are: (1) information delivery of technology integration content, (2) hands-on technology skill building activities, (3) practice with technology integration in the field, (4) technology integration observation or modeling sessions, (5) authentic technology integration experiences, and (6) technology integration reflections. The authors describe the process used to design technology experiences for pre-service teachers and consequently provide faculty with various experiences to select from according to the intended goals of the pre-service teacher education program. The activities identified from the thorough analysis of numerous programs are separated into three main constructs: the specific methods used to conduct the activities (approaches), the substance or curriculum covered in the activities (technology content goals), and how the activities are situated in the overall teacher education curriculum (broader context).

Adopting certain strategies and approaches, several university courses have been reported to provide positive results on pre-service teachers' technology preparation (Ertmer, 2003) and hence deserve to be considered as exemplar programs worthy of examination by other universities attempting to design or re-design their educational technology courses (Kay, 2006). A succinct summary of several studies investigating university programs is provided below:

- Preparation of real materials involving higher-order thinking and problem solving skills which can be directly transferred to future teaching contexts (Lambert & Gong, 2010).
- A combination of course work, effective faculty modeling of instructional technology, and technology-enriched field experiences (Duran, Fossum, & Luera, 2006).
- Learning activities embedded in both coursework and field experiences. Pre-service teachers develop and create technology-rich learning activities and then implement these activities in their placement schools. Post-lesson reflections and evaluations are required at the end of the field experience (Brush et al., 2003).
- Collaborative communities of learners are formed. Course participants draw on the expertise of other group members, share resources, and provide encouragement. This model includes cycles of collaboration, enhancement, enactment, and reflection (Seels, Campbell, & Talsma, 2003).
- A standalone educational technology course is coupled with technology integration in subject area methods courses and student field experiences (Strudler et al., 2003).
- A combination of mentoring programs, multifaceted professional development strategies, and sharing resources and expertise embedded in a community of reflective learners (Thompson, Schmidt, & Davis, 2003).
- Elimination of the standalone technology course and complete integration of technology throughout the teacher preparation program including a specification of the types of technology experiences and standard expectations for each course. Pre-service teachers further participate in technology seminars progressing from basic to more challenging levels of technology use (Collier et al., 2004).

- Other researchers advocate a teacher work sample methodology (McConney, Schalock, & Schalock, 1998), a learning technology though design approach (Mishra & Koehler, 2003) or technology supported portfolios (Rosaen & Bird, 2003).

In the context of the current study, several Lebanese universities are known to offer courses in technology integration (Sabieh, 2001; Saleh, 2007). However, little is known about what these courses constitute or how they are structured. Moreover, there is limited evidence supporting their effectiveness in preparing pre-service teachers to integrate technology in their future teaching careers (Saleh, 2007). The current study, therefore, investigated university courses and the pre-service English teachers undertaking them at both the public university and other private universities in Lebanon to provide a description of their structure and content as well as identify the extrinsic enablers and barriers operating at this level. Enabling factors can help reinforce and consolidate existing actions while locating barriers can create a solid understanding from which to plan, design and implement recommended approaches to overcome them (Saleh, 2007).

2.3.3 ICT integration at the school level

The last level discussed here is the school. Schools also make their own policy plans about what to include in the curriculum and how much to spend on tools. These decisions affect the quantity and quality of ICT integration (Crawford, 2001). At school, the role of the ICT coordinator is crucial in leading in-service teachers towards the effective use of technology according to the subject areas they teach (Sugar & Holloman, 2009). However, researchers also assert the leadership role of the school principal whose authority is over and above that of the ICT coordinator (R. E. Anderson & Dexter, 2005; Hayes, 2007; Kim, Kim, Lee, Spector, & DeMeester, 2013).

These researchers emphasize the importance of technology leadership over technology infrastructure for the effective use of technology in schools (R. E. Anderson & Dexter, 2005). In fact, teachers will not be capable of integrating technology without the leadership of their school principal (Schrum, Galizio, & Ledesma, 2011). When school leaders acknowledge the benefits of technology, they play the role of a consultant and provide their teachers with more training and support (Dawson & Rakes, 2003; Kim et al., 2013). They also become capable of leading teachers' implementation of newer beliefs and scaffolding teachers in resolving their weaknesses and consolidating their strengths (Kim et al., 2013). Therefore, Williams (2008) recommended that to close the "cultural gap between their digital immigrant teachers and digital native students, then the decisions taken by school leaders must be not only well informed, but enterprising" (p. 223). However, many administrators have been found to be uninformed and uninvolved in the role technology plays at their schools (Dawson & Rakes, 2003). All of this points to the need for school leadership that possesses technology knowledge and skills beyond simply operating technical tools (Schrum et al., 2011).

Other researchers emphasize the role of in-service teachers in the integration process. Teachers are under pressure to change their classroom practices and stay updated with developing knowledge and technologies mandated by the introduction of ICTs into schools (Duncan-Howell, 2010; Yates, 2007). However, many in-service teachers have been found to lack the necessary knowledge and beliefs that are required for the adoption of technology. Therefore, governments and schools in many developed and developing countries have tried to compensate for this deficiency in a skilled workforce by providing professional development opportunities (Lawless & Pellegrino, 2007; Mueller et al., 2008; Yates, 2007) which are considered essential pillars for successful integration and sustainability of ICT in education (Culp, Honey, & Mandinach, 2005). Professional development programs have also been considered the “single most important means” by which teachers gain opportunities to enhance the quality of their teaching and consequently the quality of their students' learning (Yates, 2007, p. 218). Through professional development, teachers learn new pedagogies of teaching with technology, how content can be taught using these new technologies, and how to help learners acquire specific content standards using technology (Harris, Mishra, & Koehler, 2009). Professional development also enhances teachers' knowledge and consequently increases their confidence and reduces their fear associated with using technology (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012).

These professional development efforts take on many forms such as one-shot workshops (Lawless & Pellegrino, 2007), online communities for teachers (Duncan-Howell, 2010; Kopcha, 2012), classroom-based action research (Gilmore, 1995), undertaking a graduate masters course at university (Carneiro, 2006), an organic approach, a computer based training approach (Davis, Preston, & Sahin, 2009b), a learner-centered professional development approach (Polly & Hannafin, 2010), a design-based approach, a mentoring or coaching model, train the trainers model (Lawless & Pellegrino, 2007), a learning-technology-by-design approach (Koehler & Mishra, 2005) and a TPACK activity types approach (Harris et al., 2009).

Researchers generally agree that one-shot workshops or 'one size fits all' workshops are not as effective as once believed because teachers fail to perceive their relevance and practical applicability into their contexts. What works in professional development is context specific and depends on the particular teachers involved, in a particular setting (Guskey, 2002). Teachers at the different developmental stages are said to benefit from different professional development strategies (Hixon & Buckenmeyer, 2009). Teachers at the investigation stage need incentives to give technology a try. Teachers at the application stage require hands-on training sessions which introduce specific technology and curricular applications. Teachers at the advanced levels of technology integration benefit from peer-coaching, reflective practice, action research, and participation in discussions related to technology's role in the curriculum (see Hixon & Buckenmeyer, 2009). Additionally, professional development needs to be on-going and include observing experts using technology in action (Deaney & Hennessy, 2007; Lim & Khine, 2006). With varying levels of strengths and weaknesses, each approach focuses on certain types of content, uses dissimilar methods, and varies in terms of length and thus leads to different outcomes (Lawless & Pellegrino, 2007).

Therefore, researchers have attempted to create lists of conditions for effective professional development targeted at helping teachers with the integration of technology in their classrooms. The following six research-based conditions for effective professional development programs have been discussed in several research studies. These principles are summarized as: (1) the content must be relevant to the teachers and address their concerns, beliefs, subject discipline and pedagogy; (2) the mode of delivery must suit teachers' busy schedules and be sympathetic to their needs as learners; (3) the form of delivery must be collaborative, interactional and involving knowledge sharing as to avoid feelings of alienation and isolation; (4) the time frame must be long enough for teachers to develop their professionalism through active learning experiences, practice what they have learned with concrete tasks, reflect on their learning and receive feedback; (5) the objectives of the professional development must be compatible with policy and standards; and (6) organizational support and change must accompany the teacher training (Davis et al., 2009b; Duncan-Howell, 2010; Martin et al., 2010; Mouza, 2006; Yates, 2007). Consideration of these conditions at the school level informs the analysis of data from Study 3 in Chapter 6.

To effectively evaluate the effectiveness of professional development, Guskey (2002) recommended gathering evaluation information from 5 different levels: (1) participants' reactions, (2) participants' learning, (3) organization support and change, (4) participants' use of new knowledge and skills, and (5) student learning outcomes. The information gathered at each of these five levels is important for improving professional development initiatives and consequently enhancing their levels of success (Davis et al., 2009b). One way teacher change has been examined is through their progression towards higher levels of technology use. Professional development is considered ineffective when it fails to support teachers in their progression from low-level uses towards higher-level uses (Hixon & Buckenmeyer, 2009).

This progress from low-level uses towards higher-level uses of technology may be manifested at the in-service teacher level through the stages of ICT development discussed below.

2.4 Stages of ICT development in schools

Similar to Rogers' stages of Diffusion of Innovations, Newhouse, Clarkson, and Trinidad (2005) proposed another framework to capture the stages of teacher development in their readiness to adopt educational technology. Teachers progress along five stages from (1) inaction, (2) investigation, (3) application, (4) integration, to (5) transformation. At each stage, teachers' uses of technology becomes more sophisticated and embedded within classroom activities. The stages are described as follows:

- Inaction: the teacher displays a general lack of interest and/or action. The teacher may have little or no knowledge of educational technology and how it can be integrated into the classroom.
- Investigation: the teacher develops interest in ICT and begins to act on this interest by acquiring information about how to use technology in the classroom.
- Application: the teacher regularly uses ICT with students and does so competently and confidently. The teacher uses technology to present lesson content and to provide learners with extra practice.
- Integration: ICT becomes critical to the learning environment and students are provided with opportunities to achieve through the learning experience. The teacher focuses on cooperative, project-based and interdisciplinary work incorporating the technology as needed.
- Transformation: the teacher takes on leadership roles in the use of ICT and is knowledgably reflective on performance. The teacher can apply knowledge of educational technology in new and innovative ways.

Finger and Jamieson-Proctor (2010) used Mishra and Koehler's (2006) framework of teachers' Technological Pedagogical and Content Knowledge (TPACK) to identify the stages of technology integration in relation to Newhouse, Clarkson, and Trinidad's (2005) classification. The way this comparison was made helps to identify the types of teacher knowledge in action at each stage of ICT integration. Teachers' knowledge of content, pedagogy, and technology becomes increasingly interrelated as they progress from inaction to transformation. At first, teachers' knowledge is devoid of technological knowledge. At the investigation stage, teachers acquire knowledge of basic technologies, however pedagogical content knowledge remains independent from technological knowledge. At the next stage, teachers begin to explore with digital technologies but their knowledge remains restricted within existing curriculum frameworks. Crossing the critical use border, and at the integration stage, teachers' TPACK is developed and applied in regular classroom practices. Finally, at the transformation stage, teachers' TPACK is fully developed and teachers use technology innovatively.

The study acknowledged alternative models such as Sandholtz, Ringstaff and Dwyer's (1997) stages of ICT integration. Teachers are also believed to progress through a series of stages to instigate real change in their teaching practices and consequently reach full integration of ICT in their classrooms. These stages are (1) entry, (2) adoption, (3) adaption, (4) appropriation, and (5) invention. The model is described in terms of the progression from "text-based curriculum delivered in a lecture-recitation-seat work mode…strengthened through the use of technology" to "far more dynamic learning experiences for students" (p. 37).

Another study conducted by Zhao (2003) focused on teachers' knowledge and compared the levels of teacher knowledge to Sandholtz et al.'s (1997) stages of ICT integration. Zhao's conceptualization of the depth of teacher knowledge provides a useful representation of the way teachers' knowledge starts at the mechanical level, then proceeds to the meaningful level and then finally reaches the generative level. The depth or level of teacher knowledge has the potential to predict the stage of ICT integration achieved by teachers. The deeper the teachers' knowledge level, the further they are in terms of the stages of ICT integration.

Table 2.1 compares Newhouse, Clarkson, and Trinidad (2005), Sandholtz, Ringstaff and Dwyer (1997), Rogers (2003), Finger and Jamieson-Proctor (2010) and Zhao's (2003) conceptualization of models of the stages of ICT integration.

Table 2.1: Stages of ICT integration

Newhouse et al.'s stages of teacher development	**Finger and Jamieson-Proctor's TPACK features**	**Rogers's diffusion of innovation theory**	**Sandholtz et al.'s stages of development**	**Zhao's depth of knowledge**
Inaction	Focus on pedagogy and content	Knowledge *(Laggards)*	Entry	---
Investigation	Focus on pedagogy and content-some exploration of digital technologies to enhance learning and teaching	Knowledge Persuasion *(Late majority)*	Adoption	Mechanical level
Application	Focus on technology applications, pedagogy and content largely within existing curriculum frameworks	Decision Implementation *(Early majority)*	Adaptation	Mechanical level
Critical use border				
Integration	Focus on technology, pedagogy, and content	Confirmation *(Early adopters)*	Appropriation	Meaningful level
Transformation	TPACK is fully embraced-sophisticated understandings of the intersection of technology, pedagogy, and content and context.	Confirmation *(Innovators)*	Invention	Generative level

Adapted from Newhouse, Clarkson, and Trinidad 2005, Finger and Jamieson-Proctor 2010, Rogers 2003, Sandholtz, Ringstaff and Dwyer, 1997, and Zhao 2003)

When teachers' progression through the stages is supported, then the factors operating within their contexts are enablers. However, when their progression is obstructed, a logical explanation is that they are facing barriers of either the intrinsic or extrinsic type. These types of factors are discussed next.

2.5 Classifying factors associated with ICT integration

Several researchers have identified the conditions within which successful technology integration can be achieved. When such conditions are in place, teachers' integration efforts are supported by enabling factors. Other researchers have reported the difficulties faced by teachers as they attempt to integrate technology. These difficulties have been organized into two sets: first-order barriers to technology integration are extrinsic to teachers while second-order barriers are intrinsic to teachers (Ertmer, 1999). Although many extrinsic barriers are more readily resolved, intrinsic barriers are believed to be more persistent as they include defying belief systems and confronting established classroom practices. Therefore, it is important to examine the levels of technology use and the factors operating both outside and inside the classroom context which are associated with higher levels of technology integration (Ertmer, 2005; Mueller et al., 2008; Petko, 2012; Wozney, Venkatesh, & Abrami, 2006).

Obviously, solving extrinsic barriers will not lead to technology integration (Ertmer et al., 2012) and simply placing technological devices in teachers' hands will not lead to changes in classroom practices (Cuban et al., 2001; Ertmer, 1999). Intrinsic barriers have the potential to reduce or increase the effects of extrinsic barriers (Ertmer et al., 2012). By contrast, without overcoming extrinsic barriers, teachers would not be capable of moving beyond non-use to higher-level uses at the integration and then transformation stages (Hixon & Buckenmeyer, 2009). Although the number, type or order in which teachers encounter such barriers is unpredictable, the fact remains that they will experience a wide range of barriers (Ertmer, 1999). However, being aware of these barriers is the first step towards overcoming them and transforming them into enablers (Goktas et al., 2009).

A large number of factors have been found to influence technology integration. For example, Hew and Brush (2007) found 123 barriers in an analysis of 48 empirical studies. Among the three most frequently cited barriers impacting integration, Hew & Brush cited (1) resources, (2) teachers' knowledge and skills and (3) teachers' attitudes and beliefs accounting for 40%, 23%, and 13% of studies respectively. Whereas, Petko (2012) explained 60% of the variance in the frequency of classroom ICT using the "will, skill and tool" theoretical framework. He identified five enablers that account for teacher use of Internet and computer applications in the classroom as follows (1) teachers consider themselves to be more competent in using ICT for teaching, (2) more computers are readily available, (3) the teacher is a homeroom teacher and is responsible for the class, (4) the teacher is more convinced that computers improve student learning, and (5) the teacher more often employs constructivist forms of teaching and learning. These studies focused on the factors existing at the school level. Several of these factors at the school level, in addition to other factors operating at the national and university levels were examined in this study and are summarized in Table 2.2.

Table 2.2: Intrinsic and extrinsic factors investigated during the study

Factors associated with technology integration		
Intrinsic factors	Teachers' knowledge and skills	Technological Pedagogical Content Knowledge
	Teachers' beliefs	Pedagogical – Self-Efficacy - and Value Beliefs
Extrinsic factors	National policies	Curriculum documents-funding schemes and professional development
	University courses	Course types: addition or integration

2.6 Intrinsic factors associated with ICT integration

Research reveals the presence of a gap between national policies, curricular development, investments in technology and teacher use of technology in the classroom (Hermans, Tondeur, van Braak, & Valcke, 2008). This gap has inspired researchers to seek answers on the individual teacher level in order to decipher the factors associated with technology use or non-use by subject area teachers (Bauer & Kenton, 2005; Mcgrail, 2005). This type of research may provide answers as to why some teachers adopt technological innovations and why others do not (Zhao & Cziko, 2001). Technology-related teacher characteristics which may act as intrinsic barriers include teachers' beliefs about technology and their level of knowledge and skills (Abbitt, 2011a; Graham, Culatta, Pratt, & West, 2004). Researchers emphasize the importance of eliminating these barriers claiming that barriers are known to exist even among exemplary users. Furthermore, intrinsic barriers are "the true gatekeepers" to technology integration and "little will be gained if second-order barriers are not addressed" (Ertmer et al., 2012, p. 433). These individual teacher characteristics are the topic of discussion in the next section.

2.6.1 Teacher beliefs and technology integration

2.6.1.1 Defining beliefs

Defining teacher beliefs has been mingled with some confusion and consensus among researchers is lacking. Pajares (1992) labeled teacher beliefs as a "messy construct" and attributed this confusion to "definitional problems, poor conceptualizations, and differing understandings of beliefs and belief structures" (p. 307). The "daunting undertaking" of determining if and how teacher beliefs differ from teacher knowledge creates even more confusion (Pajares, 1992). However, as outlined by Nespor (1987), teacher belief systems have six characteristics which differentiate them from knowledge. A summary of these characteristics is presented in Table 2.3 to provide a succinct overview of the nature of beliefs.

Table 2.3: Characteristics of belief systems

Characteristic	**Explanation**
1- Existential presumption	Teachers' beliefs about their subject matter, students and methodology transform into entrenched classroom practices.
2- Alternativity	Teachers' conceptualization of ideal classroom practices differs from reality. Classroom practices are based on these ideal beliefs

	without knowing their advantages on student learning.
3- Affective and Evaluative Loading	Belief systems rely on feelings, subjective evaluations, and personal preferences, which influence how teachers approach their subject matter areas and the energy they exert into certain activities.
4- Episodic Storage	Belief systems rely on episodic memory derived from personal experience or cultural sources which influence teachers' understanding of future events. Teachers are thought to learn a lot about teaching from their experiences as learners.
5- Non-consensual	Beliefs systems are static in nature and inaccessible to outside evaluation or examination.
6- Unbound	Belief systems extend in radical and unpredictable ways from the contexts in which they were formed to other non-related contexts.

Beyond a connection between beliefs and knowledge, teacher beliefs have been broadly defined as tacit, often unconsciously held assumptions about students, learning, classrooms, and the academic material to be taught (Kagan, 1992). They are "a set of conceptual representations which signify to its holder a reality or given state of affairs of sufficient validity, truth or trustworthiness to warrant reliance upon it as a guide to personal thought and action" (Harvey, 1986 cited in Fang, 1996, p. 49). According to Kagan, teachers' beliefs are influenced by many factors. Among these factors are the particular class of students a teacher encounters, the nature of the subject to be taught, and teachers' prior experiences. Even new classroom practices, such as technology use, tend to be based on preexisting beliefs (Ertmer, 2005; Kim et al., 2013).

2.6.1.2 Teacher beliefs and change

The importance of investigating teacher beliefs lies in the assumption that beliefs are unlikely to change or be replaced, unless they are challenged and proven to be unsatisfactory. Even in such circumstances, belief change is the last option. This does not mean that "beliefs do not change under any circumstance but that they generally do not change even when it is logical or necessary for them to do so” (Pajares, 1992, p. 317). Niederhauser, Salem, and Fields (1999) believe that “if teachers are to adopt instructional reform in ways that truly change their practices, they will need to engage in conceptual change regarding their beliefs about the nature of learning, the role of the student, and their role as teacher” (p. 157). Similarly, Windschitl and Sahl (2002) suggested that there “can be no institutional ‘vision of technology use’ that exists separately from beliefs about learners, beliefs about what characterizes meaningful learning, and beliefs about the role of the teachers within the vision” (p. 202).

Other researchers suggested increasing teachers’ uses of technology by changing their beliefs about the importance of technology during pre-service teacher preparation courses and professional development programs (Kim et al., 2013; M. Russell et al., 2003). Providing teachers with the opportunity to work with technologies before using them in their classrooms may have the potential to shift their beliefs about using technology in meaningful ways. Additionally, teacher networking is a recommended strategy where teachers can observe, practice, and reflect on technology use. Teachers may then share information, discuss difficult situations and become encouraged to implement newer beliefs (Kim et al., 2013).

2.6.1.3 Types of beliefs

To operationalize teacher beliefs about technology, Park and Ertmer (2007/2008) use three components of teacher beliefs adapted from Miller et al. (2003): pedagogical beliefs about teaching and learning, self-efficacy beliefs about technology use, and beliefs about perceived value of technology for student learning. These three belief constructs were examined in this study. A description of each type follows.

Pedagogical beliefs: Several researchers differentiate between traditional or teacher-centered pedagogical beliefs and constructivist or learner centered pedagogical beliefs (Albion & Ertmer, 2002; Ertmer, 2005; Hermans et al., 2008; Ravitz, Becker, & Wong, 2000; Y. M. Wang, 2002). Traditional or teacher-centered beliefs are based on knowledge transmission from expert teacher to novice student. Teachers direct instruction through presentations and demonstrations. They use an externally prescribed curriculum consisting of discrete skills and factual knowledge. Students learn facts, concepts, and understandings by listening to teachers' explanations or reading and answering questions, typically done alone. Drill and practice are dominant methods for skill acquisition in a systematic and prescribed way (Ravitz et al., 2000). Students are frequently given written assignments aimed at their remembering factual knowledge and performing skills. Finally, learners' mastery of skills and knowledge is evaluated through written tests that prompt them to recognize factual statements and apply skills to give correct answers (Becker, 2000).

Conversely, constructivist or learner-centered beliefs emphasize knowledge production or construction, cooperative learning and prolonged engagement in activities that lead learners to link new knowledge to prior knowledge (Ravitz et al., 2000). Learners are believed to actively construct meaningful learning based on their current knowledge and by interacting with peers. They present detailed explanations of their reasoning and communicate their understandings to others. Finally, they develop deep understandings of a topic and acquire knowledge that is transferred to other contexts (Becker, 2000). Jonassen et al. (1999) summarize the attributes of meaningful learning as active, cooperative, constructive, authentic and intentional.

Some researchers contend that there exists a direct relationship between pedagogical beliefs and practices. These studies suggest that teachers' use of educational technology is consistent with their beliefs about "good teaching". That is, when teachers hold traditional beliefs about teaching with technology, they choose technological software that is in harmony with such beliefs, whereas teachers with constructivist beliefs choose software that enacts student-centered practices (Bai & Ertmer, 2008; Ertmer et al., 2012; Niederhauser & Stoddart, 2001; Overbay et al., 2012; Windschitl & Sahl, 2002). The latter beliefs have also been associated with increased frequency of technology use (Hermans et al., 2008; Ravitz et al., 2000; M. Russell et al., 2003). These researchers conclude that teachers with constructivist beliefs and those who more strongly believe that technology is a useful tool for student-centered learning are more likely to use technology than teachers with traditional beliefs (Overbay et al., 2012). This has also led researchers to conclude that educational technology is a tool that can be used to support a number of instructional methods, whether traditional or constructivist (Niederhauser & Stoddart, 2001)

Other researchers have found inconsistent results regarding this relationship (Hammond, 2011). In a study examining the relationship between teachers' pedagogical beliefs and future technology use, Wang (2002) found no significant difference between pre-service teachers' perceptions of their teacher-centered and student-centered roles. However, when tested on their choice of technology uses, these pre-service teachers expressed a shift towards teacher-centered use. Furthermore, Liu (2011) confirmed this contradiction between teachers' beliefs and their practices. Despite the fact that most of the teachers described themselves as having student-centered pedagogical beliefs, they did not integrate constructivist learning methods with technology. The researcher attributed this inconsistency to external requests and attention to student test scores. Other reasons have been attributed to the possibility that the measure of teachers' beliefs may have failed to elicit the intended beliefs, and that other "different and weightier" beliefs may have influenced practice (Munby, 1982, p. 216). Therefore, researchers have concluded that technology does not initiate changes in teacher practice towards constructivist pedagogy (Palak & Walls, 2009; Windschitl & Sahl, 2002).

In general, Becker (1999) concluded that teachers with constructivist beliefs used technology more frequently and in more meaningful, high-level uses. By contrast, teachers with traditional beliefs used technology less frequently and in more low-level uses. Ertmer (2005) attributed the predominance of low-level uses to the fact that these uses precede high-level uses which require more time to emerge. Based on previous research, Ertmer claimed that it takes five to six years for teachers to accumulate enough expertise to use technology in constructivist ways. Hence, prolonged use of technology is thought to prompt teachers to change their practices towards constructivist approaches based on the notion that change in beliefs follows, rather than precedes change in practice.

Self-efficacy beliefs: Bandura's social cognitive theory has provided the theoretical framework for research on teachers' self-efficacy beliefs. According to Bandura (1984), perceived self-efficacy refers to "people's judgment of their capabilities to execute given levels of performance" (p. 232). Strong connections are often found between reported self-efficacy beliefs and subsequent practices, making self-efficacy beliefs crucial predictors of performance and its accomplishment. These beliefs further influence how people feel, think, and motivate themselves (Bandura, 1994). Therefore, people who have high self-efficacy beliefs face challenges, increase their efforts when their performances fail, persevere in spite of failure, and approach difficult situations unconcernedly. By contrast, people who hold low self-efficacy beliefs do not face difficult tasks, reduce their efforts, give up readily, and dwell on their deficiencies. They have low aspirations yet high levels of stress and anxiety (Bandura, 1984, p. 242).

Self-efficacy beliefs derive from four main sources of information: mastery experiences, vicarious experiences, verbal persuasion, and psychological states (Bandura, 1977, 1994). Among the four sources of self-efficacy beliefs, the most powerful are mastery experiences followed by vicarious beliefs as summarized in Table 2.4.

Table 2.4: Sources of self-efficacy beliefs

Source	**Explanation**
1- Mastery experiences	Successfully performing a task has the potential to raise self-efficacy beliefs which in turn raise the expectation of success in the future. Repeated failures reduce them.
2- Vicarious experiences	Observing other people perform certain tasks with success through sustained effort can increase the self-efficacy beliefs in one's capability to perform the same task. This source is most powerful when similarities are identified between the observer and the model.
3- Verbal persuasion	People can be convinced that they can succeed at a task. This

	source of self-efficacy beliefs can mobilize greater effort and persistence on a difficult task.
4- Psychological states	People rely on their emotional state in judging their capabilities. Some people view their emotional state as an energizing facilitator of performance, while others may view that same emotional state as a debilitator.

Tschannen-Moran, Woolfolk-Hoy, and Hoy (1998) defined teacher efficacy as “the teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context” (p. 233). Teacher efficacy beliefs should not be confused with actual teaching effectiveness as teachers may underestimate, overestimate or accurately reflect actual teaching competence (Wheatley, 2005). Researchers have shown teachers’ self-efficacy beliefs to be related to student achievement and motivation, teachers’ behavior in the classroom, the amount of effort they exert, the goals they set, their persistence when things go wrong, their resilience in the face of setbacks, the work they put in with struggling students, the enthusiasm they exhibit for teaching, and a greater commitment to teaching (e.g., Tschannen-Moran et al., 1998). Teachers’ efficacy beliefs have also been defined as both context and subject matter specific. What this means is that a teacher may feel very competent in one area of study or when working with a certain group of students and feel less capable of teaching other subjects or other groups of students (Tschannen-Moran & Woolfolk-Hoy, 2001).

Tschannen-Moran et al. (1998) contrasted the efficacy beliefs of pre-service and experienced teachers in terms of development and change. They explained the importance of providing pre-service teachers with opportunities for actual experiences in a variety of contexts with increasing levels of complexity and challenge. The development of teacher efficacy beliefs among pre-service teachers is deemed most important since teacher beliefs at this stage are considered most malleable. By contrast, experienced teachers’ efficacy beliefs have been found to be the most difficult to produce, sustain and even change. Raising efficacy levels among in-service teachers may include verbal persuasions in the form of professional development workshops or in-service programs. However, if persuasion is not accompanied with the development of new skills, the successful implementation of these skills, and increased student learning, then its impact may be temporary (Woolfolk-Hoy & Burke-Spero, 2005). Teachers develop a relatively stable set of beliefs with experience until a new task presents itself. New challenges can trigger teachers' re-evaluation of their competence to accomplish them (Tschannen-Moran et al., 1998). Consequently, teachers are said to re-evaluate their self-efficacy beliefs with the introduction of a new challenge, such as the integration of technology into instruction.

Researchers have found teachers' self-efficacy beliefs to predict to a considerable extent their use of technology as an important educational tool (Kinzie, Delcourt, & Powers, 1994; Marcinkiewicz, 1993/1994; Paraskeva et al., 2008; Ying-Chen & Kinzie, 2000). For example, in determining the factors influencing teachers' and students' engagement with ICT, researchers have found teacher self-efficacy to play a major role in determining teacher and subsequent student ICT use (Jamieson-Proctor, Burnett, Finger, & Watson, 2006; Yaghi & Ghaith, 2002). Research has also shown that teachers' self-efficacy towards using educational technologies may be influenced by several factors. Albion (2001) found prior experience with computers, time spent using computers for personal use, and instruction in specific computer uses to be influencing factors on pre-service teachers' self-efficacy beliefs for specifically measured computer applications. Ying-Chen and Kinzie (2000) found frequency of use, time, and instructional courses in computing to enhance pre-service teachers' self-efficacy beliefs.

Based on the four sources of self-efficacy beliefs, Albion (1999) suggested that the "ideal" method for developing teachers' technology self-efficacy beliefs is to provide them with training and support to work successfully with technology accompanied by practice during field experiences. To overcome logistical problems in vicarious experiences, Albion suggested developing multimedia materials that present pre-service teachers with examples of effective classroom use of technology. More recently, and in an Arab context, researchers attributed the increase in pre-service teachers' self-efficacy beliefs to mastery and vicarious experiences during their field practicum course (Al-Awidi & Alghazo, 2012). Teacher preparation courses should clearly address these sources of self-efficacy beliefs.

Similarly, in-service teachers may benefit from mastery experiences to increase their self-efficacy beliefs towards using technology as powerful instructional tools. Brinkerhoff (2006) examined the technology self-efficacy beliefs of in-service teachers who participated in a long-duration professional development academy. Gains in both skills and self-efficacy were attributed to the time and support provided across a two-year period. Participants had to complete a variety of projects. Learning in pairs or in groups presented the participants with opportunities for vicarious learning, which may have contributed to the growth in participants' technology self-efficacy. Therefore, increasing teachers' self-efficacy beliefs has been set high on the list of priorities in several studies (L. Wang, Ertmer, & Newby, 2004; G. Watson, 2006). In a longitudinal study extending 6 years, Watson (2006) concluded that self-efficacy beliefs may remain high even after years of taking part in professional development.

Value beliefs: Even though people may have high self-efficacy beliefs in their capability to accomplish a task, they may refrain from doing the task if they have no compelling reason to do it (Eccles & Wigfield, 2002). The self-efficacy theory discussed earlier does not address the reasons individuals have for engaging in different tasks. Teachers' value beliefs respond to the reasons they have for engaging with technology.

Teachers' value-related beliefs are their perceptions of the importance or utility of certain tasks (Kellenberger, 1996), and the relevance of these tasks for achieving particular learning goals (S. E. Anderson & Maninger, 2007). Whenever a new instructional tool is presented, teachers make value judgments about whether it is relevant to the goals they are already pursuing and so the higher the perceived benefit of the tool, the more likely it will be used (Ottenbreit-Leftwich, Glazewski, Newby, et al., 2010). Other researchers have also indicated that teachers who place a positive value on technology tend to use technology more frequently in their classroom practices (Becker, 1999; Funkhouser & Mouza, 2013; Zhao & Frank, 2003). Teachers do not spend time, effort and resources learning how to use technology innovatively if they do not value the outcomes from such learning (Zhao & Cziko, 2001).

Teachers' have been found to use technology in order to address both their own professional needs and learners' educational needs (Ottenbreit-Leftwich, Glazewski, Newby, et al., 2010). Teachers value the use of technology to attend to the following professional needs: facilitating classroom operations and organization, creating customized classroom materials, and engaging in professional development. Teachers also address the following student needs: engaging and motivating students, enhancing student comprehension and higher-order thinking, as well as equipping students with technology skills for future use. The underlying value in both cases is the enhancement of student learning.

Therefore, Ottenbreit-Leftwich, Glazewski, Newby, et al. (2010) suggested acknowledging and promoting teachers' uses of technology that align with their value beliefs and their existing instructional approaches, whether these pertain towards teacher-centered or student-centered methods, to make more probable the infusion of technology into teaching and learning. Hughes (2005) also advised embedding teachers' learning experiences in specific content areas and/or grades, explaining that "the more content-specific the example, the more likely the teacher will see value and learn it" (p. 296).

2.6.1.4 Final thoughts on teacher beliefs

In sum, teacher beliefs about technology are believed to play an important role in predicting whether teachers adopt technology or not. The types of beliefs impacting technology adoption have been identified as follows:

1. The teacher must believe that technology leads to higher levels of student learning and attainment and can meet higher-level goals that cannot be achieved without technology (Value belief)

2. The teacher must believe that using technology will not cause disturbances to the methods he or she believes will lead to the attainment of higher-level goals (Pedagogical belief)
3. The teacher must believe that he or she has or will have sufficient ability to use technology to meet these higher-level goals. (Self-efficacy belief)

Hence, measuring Lebanese teachers' beliefs about technology integration will provide insight into their current or future technology uses, as well as reveal any potential intrinsic barriers they may be facing. Identifying such barriers would be considered an important first step for finding practical solutions.

As previously discussed, intrinsic barrier are manifested in either teacher beliefs or teacher knowledge and skills. Though measures of beliefs and knowledge may yield important insights, connecting these two areas of research would logically create a deeper understanding about the reasons behind teachers' use (or nonuse) of technology to create an engaging and effective classroom environment (Abbitt, 2011a). Furthermore, Ertmer et al. (2012) claim that "the best way to bring more teachers on-board is not by eliminating more first-order barriers, but by increasing knowledge and skills, which in turn, have the potential to change attitudes and beliefs" (p. 433). How teacher knowledge and skills are defined, what their different types are, and how they are used in the study of technology integration are the topics of discussion in the next section.

2.6.2 Teachers' knowledge and skills

2.6.2.1 Defining knowledge of technology

Among the several barriers discussed in the literature which explain the reluctance of teachers to integrate technology in innovative ways is teachers' lack of relevant knowledge (Ertmer & Ottenbreit-Leftwich, 2010; Lawless & Pellegrino, 2007). This issue of what teachers should know about technology has received considerable attention from policy makers, researchers and teacher educators alike (Koehler, Mishra, & Yahya, 2007; Zhao, 2003). Law (2010) argues that the core knowledge that teachers need to acquire varies according to the purpose and expected impact of technology integration in the curriculum. The knowledge and skills required in a policy plan with a pedagogic rationale will differ from those prescribed by a socioeconomic rationale. A further consideration rests on whether teachers will be required to improve students' technical skills, improve students' learning, or reform and transform their teaching and students' learning (Law, 2010). Therefore, defining teacher knowledge of technology is not a straightforward or simple endeavor.

Several other reasons have been proposed explaining the difficulty associated with defining technological knowledge (Zhao, 2003). First, defining technology per se is difficult as it may encompass a wide array of mechanical artifacts, procedures and practices. Even when limited to computer technologies, the list of things that teachers need to know remains extensive. Second, technology can be taught/learned at different levels of abstraction. These levels of abstraction and attributes include the internal structures (how it works), functions (what it does), utilities (what problems it solves), and implications (what it means). Third, technology is in a state of constant change. Therefore, deciding what teachers need to know today may become outdated in a short period of time (Zhao, 2003). In addition to being *unstable* (rapidly changing), digital technologies are also said to be *protean* (usable in many different ways), and *opaque* (the inner workings are hidden from users) (Koehler & Mishra, 2008, p. 7).

Adding to the complexity of the matter, technology knowledge is integrated in an ill-structured, dynamic environment (Mishra & Koehler, 2006). Technology knowledge is, therefore, introduced as an additional domain of knowledge (Koehler & Mishra, 2008). This knowledge about technology includes three elements: (a) knowledge of problems that can be solved by technology, (b) knowledge of a technology that can solve their problems, and (c) knowledge of how technology can solve their problems (Zhao, 2003). Equipped with such knowledge, teachers become capable of making informed decisions of when and when not to use technology, as well as select appropriate technologies for identified problems (Zhao, 2003).

According to such an articulation of teacher knowledge, Zhao (2003) identified the breadth of what technologies teachers need to know as (1) technology for classroom management, (2) technology for instruction, (3) technology for teachers to know more about their students, and (4) technology for specific subject matter areas. Furthermore, teachers' technological knowledge depth may reside on three levels: mechanical, meaningful, or generative. Accordingly, teachers may adopt, adapt, or reinvent technologies (Zhao, 2003).

2.6.2.2 Types of knowledge

To further understand the knowledge base teachers bring into their classrooms, Mishra and Koehler (2006) proposed a conceptual framework for educational technology by building on Shulman's formulation of Pedagogical Content Knowledge. Mishra and Koehler, however, extended this framework to include the integration of technology into pedagogy and content teaching. Traditionally, researchers tend to focus on *what* teachers should know in order to incorporate technology into their teaching, rather than focusing on *how* such technology should be used (Mishra & Koehler, 2006). Even if teachers acquire the knowledge and skills prescribed by what they should know, they still may fail to integrate technology. What teachers need to know about technology should interface with what they actually do in their classrooms. Only then does technology cease to be an artifact and become a valuable pedagogical tool and a solution to educational problems (Zhao, 2003).

Technological Pedagogical and Content knowledge (TPACK) is the name given to describe how teachers' knowledge is the interplay of content (the actual subject matter that is to be learned and taught), pedagogy (the process, practice or methods of teaching and learning) and technology (both commonplace, like chalkboards, and advanced, such as digital computers) in specific contexts. TPACK emphasizes the connection among the three types of knowledge and how such interactions produce effective discipline-based teaching with educational technologies (Harris et al., 2009).

The types of knowledge resulting from combining the three knowledge domains include: Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPCK). Expert teachers bring all these forms of knowledge to play every time they teach. For example, to effectively use Webquests in a language course, the teacher must have broad knowledge of the language (content knowledge), how to use the right tools to create the Webquest (technological knowledge) and how to design a learning experience in which students use the Webquest (pedagogical knowledge). In addition, the teacher must also have knowledge of specific strategies to employ in guiding students' use of the Webquest (technological pedagogical knowledge), knowledge of the challenges students may encounter as they learn the content (pedagogical content knowledge), and knowledge of the limitations presented by using the Webquest (technological content knowledge). The intersections of these knowledge types contribute to how well the teacher is able to facilitate the project in total (technological pedagogical content knowledge) (see Hofer & Swan, 2006). Represented in figure 2.2, a concise description of the components of the framework follows.

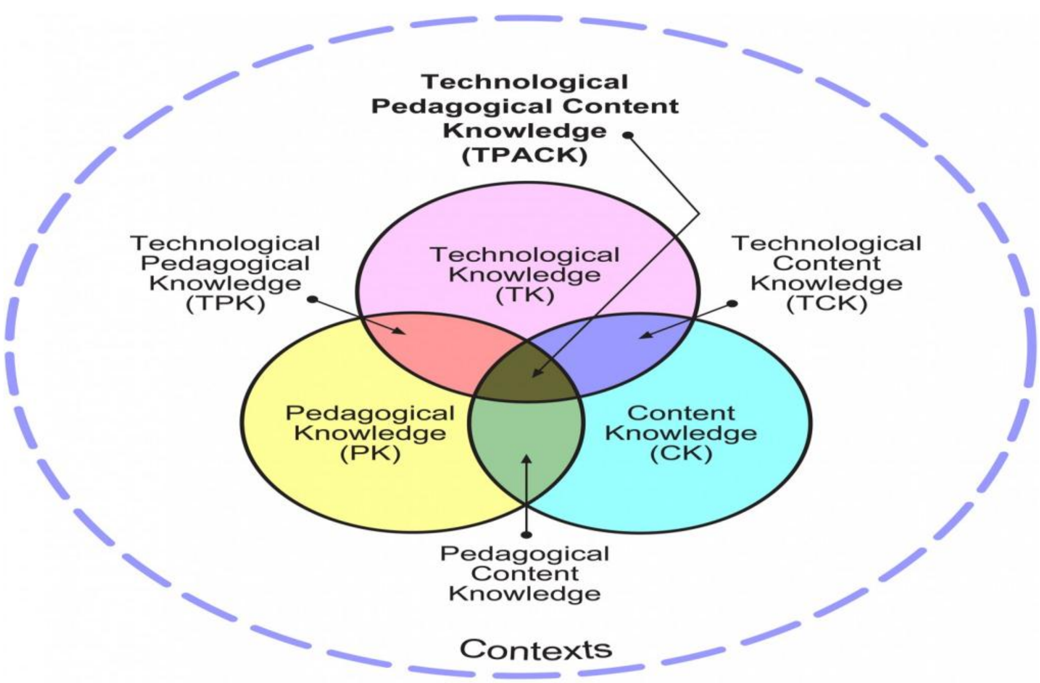

Figure 2.2: The TPACK model. Image source: http://tpack.org/

Content Knowledge (CK): Content Knowledge is knowledge about the subject matter being taught or learned. It comprises the concepts, facts, theories, ideas, organizational frameworks, methods of proof as well as established practices towards developing such knowledge inherent in the distinct subject matter areas.

Pedagogical Knowledge (PK): Pedagogical Knowledge is knowledge about the processes and practices of teaching including educational purposes, values, strategies and goals. It comprises knowledge of student learning, classroom management, lesson plan development and implementation, and student assessment. Pedagogical Knowledge requires an understanding of the cognitive, social and developmental theories of learning and how they are applied in practice.

Technological Knowledge (TK): Technological Knowledge is not as easily defined as content and pedagogical knowledge since it is in a constant state of flux. Technological Knowledge is knowledge about standard technologies and their modes of operation, involving the skills required to operate technological hardware and the ability to learn and adapt to new technologies.

Pedagogical Content Knowledge (PCK): Pedagogical Content Knowledge is knowledge of how to teach and learn specific content-based curricula, what teaching methods fit the content, how content can be arranged for better teaching and learning, and how the learning can be assessed and reported. It also comprises an awareness of students' prior knowledge, teaching strategies particular to different disciplines, common misconceptions, theories of epistemology, and the representation and formulation of concepts.

Technological Content Knowledge (TCK): Technological Content Knowledge is knowledge of the mutual relationship between technology and content. Teachers need to know how technology changes the subject matter, how it constrains the subject matter at times, and how it provides affordances and flexibility at others. Teachers also need to know how content dictates or shapes technological uses. Teachers are to choose among the wide array of technologies those which best suit the content being covered.

Technological Pedagogical Knowledge (TPK): Technological Pedagogical Knowledge is knowledge of the different technologies as they are used in teaching and learning as well as knowledge of how teaching and learning may be changed as a result of using these technologies. Since many technologies were not initially designed for educational purposes, teachers need to acquire the knowledge and skills which enable them to adapt such technologies for pedagogical purposes.

Technological Pedagogical Content Knowledge (TPCK): Technological Pedagogical Content Knowledge is a form of professional knowledge that teachers must draw upon every time they want to teach effectively with technology. TPCK goes beyond its individual components and their interactions. Instead, it arises from the way technology, pedagogy and content dynamically co-exist, co-constrain and co-create each other.

Each knowledge component is inherently complex as are the relationships among the components (Harris et al., 2009). Since merely knowing how to use technology is not the same as knowing how to teach with it, the TPACK framework helps researchers and teachers alike make sense of the interrelated relationships between pedagogy, technology and content that result from integrating technology into the teaching of subject matter content. Thoughtful integration of technology involves the interactions between these important components of teacher knowledge, without which technology integration is unlikely to succeed (Koehler et al., 2007). Teacher educators, too, are responsible for replicating these complex relationships in their methods courses, where pre-service teachers are already required to consider the integration of pedagogy and content (Angeli & Valanides, 2009; Shoffner, 2007).

2.6.2.3 Final thoughts on teacher knowledge

Going beyond techno-centric strategies and emphasizing the importance of integrated and interdependent knowledge, TPACK has been used in research on integrating technology in university courses and professional development programs. The model aims to present teachers with a practical example of what their knowledge and skills should look like and consequently ways to acquire such knowledge. The introduction of the TPACK construct as a way to understand the knowledge types needed to successfully integrate technology in instruction has led to the synthesis of a body of research (Abbitt, 2011b; Hofer & Grandgenett, 2012). Researchers have used the construct to develop pre-service teacher preparation programs and professional development courses. Other researchers have focused on generating, validating and using different instruments to measure teachers' TPACK (Abbitt, 2011b; Chai, Koh, Tsai, & Tan, 2011; Hofer & Grandgenett, 2012).

The TPACK model also provides a useful way to conceptualize teacher knowledge and skills for research purposes. Investigating Lebanese teachers' knowledge and skills uncovers how much they already know about technology integration for the teaching of English subject matter, which may be a further indication of how such technologies are currently being used or will be used. Insufficient knowledge may tell a story of non-use or a use of technology in pure technical ways.

Teachers' knowledge levels can account for the way in which they use technology if teachers have access to technological tools, are supported to use technology in their language teaching, are prepared to teach with technology, and are provided with professional development opportunities. Shortcomings in national policies, funding, and support create extrinsic barriers that may hinder technology integration. A discussion of such extrinsic factors operating at the three levels of the educational system follows in the next section.

2.7 Extrinsic factors associated with ICT integration

The majority of integration efforts have focused on eliminating the extrinsic factors hindering technology integration as they are easily measured and removed (Ertmer, 1999). In Lebanon and abroad, technology integration requires more than an enthusiastic teacher. National policies, universities and schools are held responsible for facilitating teachers' roles in enhancing student learning through technology. However, several factors which may enhance or obstruct technology integration have been found to operate within each of these contexts. These factors are discussed below.

2.7.1 Factors operating at the national policy level

Examining government policy illustrates the extent to which governments are interested in enhancing the use of ICT in schools as well as identifying any barriers in implementation (Younie, 2006). Therefore, several researchers have undertaken investigations to understand the discrepancies between policy and practice. These investigations have led to the identification of several barriers hindering technology integration at the national policy level. Five of these barriers are discussed below.

First, government officials have been accused of misunderstanding the issues associated with effective use of technology in instruction at schools (Mcgrail, 2005; Younie, 2006). Imposed policy decisions seem to be unresponsive to teachers' perspectives and tend to neglect their workplace constraints (Hennessy et al., 2005; Young & Bush, 2004). For example, Toll (2001/2002) spoke of "competing discourses of change" (p. 319) between policy makers and literacy teachers. Toll argued that such competing discourses are connected to power which is in the hands of policy makers and others who are primarily situated outside the classroom context. When conflicts in discourse occur, policy makers become frustrated by teachers who do not respond favorably to these changes. Teachers likewise become confused and resist the change altogether. In general, this miscommunication has been linked to a lack of research specific to certain countries (Albirini, 2008) and to an inadequate dissemination of international experiences (Chapman et al., 2004). Furthermore, only when teachers' challenging workplace conditions are better understood and when their opinions are actually heard can policy makers begin to provide suitable time, training and support that will encourage teachers to use technology more often and in a much more meaningful and informed way (Young & Bush, 2004).

Also at the national level, a second barrier identified to slow down technology integration is a lack of funding allocated for technological resources and access (Pelgrum, 2001; Schoepp, 2005). In many countries, generous funding has been provided to improve Internet connectivity, increase the ratio of computers to students, and provide laptops and online resources for teachers (Gray et al., 2007). Such generous investments would seem to support the debate that insufficient infrastructure is no longer the main barrier to technology integration. However, until this barrier is removed, “true curriculum integration is unlikely to take place” (Maddux, 1998, p. 8). Watson (2001) claimed that schools do not have enough hardware to implement ICT within curriculum settings. He described the ideal amount of resourcing to include a ratio of 1.25 machines to every pupil and personal computers for teachers on their own desks, all preferably laptops. Only then would it become realistic for schools to deliver a balanced ICT-integrated curriculum.

A third barrier operating at the national level lies in the unsuccessful translation of a policy into teachers’ practices. The integration of ICT, therefore, depends not only on the removal of barriers and the provision of equipment, but also on the priorities emphasized in the policy plan and how these priorities are interpreted in schools (Pearson, 2005). Teachers, for example, may lack the necessary knowledge and skills for transforming their practices as specified in a policy plan (Pelgrum, 2001). More specifically, Younie (2006) has identified several key factors for the unsuccessful translation of a national policy into teacher practices. These factors included (1) insufficient leadership and ICT expertise across multiple agencies, (2) disparities of funding, leading to (3) differing levels of ICT provision, (4) inequitable quality of ICT training and (5) the limited impact on pedagogy. A further example, and more specifically in the UK, the evaluation of policy documents revealed problems in implementing the policy and transforming it into practice along five key areas. Specifically these areas were (1) the multi-agency nature of the initiatives in the UK and their leadership (macro, meso and micro agencies were involved); (2) funding disparities that emerged and (3) how these impacted on differential technology resourcing and procurement between schools; (4) the UK's national ICT training programme for serving teachers; and (5) the impact on pedagogy, of which the latter to date, has been more limited than politicians had hoped (Younie, 2006). Researchers must be aware, therefore, that the development and implementation of government policy is "a complicated process, is multi-faceted and is far from a singular straight forward translation from policy to practice" (Younie, 2006, p. 386).

A fourth barrier identified in the literature is a lack of clarity in the definition of ICT and the rationales for including technology in the policy plan. This problem lies in a dichotomy of purpose between deciding whether IT is a subject in its own right, with its own knowledge and skill base, or whether it is a tool used for learning other subjects (D. M. Watson, 2001). This confusion of purpose has caused practical and technical difficulties faced by schools as they struggle to implement "a flawed policy" (p. 225). Selwyn (1999) has further argued that policy and discourse surrounding ICT are flawed and often lack a 'solid rationale' for its adoption in schools (p. 84). Learning *with* technology has suffered as a result, whereas learning *about* technology remains at the forefront of technology use. Watson (2001) further asserted, "Schools are attempting to implement ICT policies that cannot be realistically delivered" (p. 258). Hence, the failure of using educational technology at low levels, according to Watson, does not fall on the inadequacy of teachers, but rather their "proper professional reluctance to engage in a deeply flawed national rhetoric" (p. 261). This does not mean that a vocational and pedagogic rationale cannot co-exist and complement one another, but only under the auspices of a comprehensive policy that validates both and resources schools accordingly to avoid potential clashes among the two rationales.

Fifth, preparing the teaching workforce for effective technology integration is a final barrier discussed at this level. Some governments are becoming more aware of the fact that merely providing the necessary funding is insufficient to promote educational advances. Researchers assert, “Technology in and of itself does little to drive fundamental improvements in teaching and learning. Even with the comprehensive wiring and build-out of the telecommunications infrastructure in education, teachers continue to work incrementally to appropriate technology, building links step by step between their existing practices and the technological tools available to them” (Culp et al., 2005, p. 302). Hence, university courses and professional development programs become a national priority for governments aiming at transforming their teaching practices.

Finally, Younie (2006) emphasized the need for all of the factors “to be in place; materially with respect to resources and training and culturally, with respect to ICT being valued by leaders, in order to facilitate the development of effective subject pedagogy using ICT” (Younie, p. 399). Despite increased funding and training, Culp et al. (2005) contended that “much remains to be done and much remains to be learned” (p. 299).

2.7.2 Factors operating at the university level

This section examines factors which need to be in place for effective technology integration at the university level. Several researchers have expressed their concern regarding the preparation of pre-service teachers at various universities. Selwyn (2007) described the formal use of computer technologies in many areas of higher education as “sporadic, uneven and often low level” (p. 84). Some researchers have concluded that pre-service teachers are not being adequately prepared to teach with technology and most of them graduate using technologies they could already use (Egbert et al., 2002; Strudler et al., 1999; Tondeur et al., 2012). A similar concern has been echoed nationally. In a study conducted at the Faculty of Education at the Lebanese University, Saleh (2007) investigated the relationships among faculty members’ computer self-efficacy, perceived barriers to computer use, and computer skill level. Saleh expressed concern regarding the low levels of technology use and implementation throughout the university and the effect on preparing pre-service teachers who need to incorporate technology in their own teaching. To address the recognized problems in ICT at this level, universities have determined that they need to objectively evaluate pre-service teachers' technology preparation.

Several organizations have developed comprehensive standards and components which should be made available throughout the university program (ISTE, 2008; Partnership for 21st Century Skills, 2010; UNESCO, 2002). Acknowledging and measuring up to these standards and essential components, universities can ensure that teacher preparation courses are adequately preparing future teachers. For example, the framework proposed by UNESCO (2002) comprises ten essential conditions which need to be in place for successfully integrating ICT in teacher education programs:

1- Shared vision: The university has adopted a systemic commitment to technology. Leadership is described as proactive and supportive. Communication and collaboration among all parties is maintained.

2- Access: Access is consistent and adequate throughout the university environment. Access to technology appropriate to subject areas is also made available in classrooms and computer labs. Pre-service teachers also have access to exemplar models that demonstrate the kind of access desired in the classroom.

3- Skilled educators: Teacher educators possess the skills necessary to model and apply technology in the presentation and administration of their courses.

4- Professional development: All teacher educators involved in the preparation of pre-service teachers are provided with ongoing professional development opportunities.

5- Technical assistance: Teacher educators have access to timely technical assistance which gives them the confidence to use technology in their teaching and learning without worrying about breakdowns.

6- Content standards and curriculum resources: Teacher educators are knowledgeable in the content and pedagogies of their discipline. They use technology in meaningful and authentic ways to prepare pre-service teachers who meet the content and technology standards for their future students.

7- Student-centered teaching: Technology is used as an integral part of instruction. Pre-service teachers are given the opportunity to use technology to identify problems, collect and analyze data, draw conclusions, and convey results.

8- Assessment: Teacher educators carry out ongoing assessment of the effectiveness of technology for learning throughout the teacher preparation program. Changes to the strategies adopted or acquisition of resources are based on informed decision-making.

9- Community support: University-school partnerships are established and provide expertise, support and resources for technology integration.

10- Support policies: University policies support the implementation of technology. Expectations for technology use cut across the entire teacher preparation program and teacher educators are assured that their effort is valued through the provision of incentives and reward systems.

Successively, researchers have also identified their own set of conditions and factors which support technology integration throughout teacher preparation programs and which need to be in place before this can be realized. First, universities must have a rich technical infrastructure that is reliable and continually updated (Gomez et al., 2008). Second, teacher educators need to receive considerable amounts of training and support in developing effective classroom strategies and practical applications of technology (Thompson et al., 2003) which specifically target student-centered theories of learning (Seo, Templeton, & Pellegrino, 2008). Third, social networking among universities, schools and broader professional communities can play a vital role in bridging the gap between theory and practice (Belland, 2009; Brush et al., 2003; Gomez et al., 2008; Tondeur et al., 2012). Such experiences on the field have also been associated with the positive transfer of technological skills into the classroom and the development of pre-service teachers' TPACK (Polly, Mims, Shepherd, & Inan, 2010). Therefore, pre-service teachers should have the opportunity to visit technologically equipped classrooms, observe teachers using technology, and participate in student-centered projects using technology.

Fourth, the scaffolding pre-service teachers receive in the form of collaboration, modeling, and reflection in addition to skills training and follow up support are deemed necessary to sustain any change initiative within university courses (Ertmer, 2003). Fifth, there is a paramount need for a system-wide paradigm shift in thinking about organizational change in order to confront the “harsh realities” which have been creating barriers to technology diffusion in teacher education programs (Y. M. Wang & Patterson, 2005/2006, p. 70). Consequently, universities must develop well-established policy plans (Goktas et al., 2009; Lavonen, Lattu, Juuti, & Meisalo, 2006) which will (1) take faculty’s self-interests into consideration, (2) make explicit the core values underlining the change initiative, (3) evaluate student performance improvement resulting from faculty instructional development and technology-based teaching initiatives, (4) address differences in faculty needs through the implementation of multiple approaches, and (5) obtain the support of whoever controls the computing resources (Y. M. Wang & Patterson, 2005/2006). Consideration of these factors at the university level informs the analysis of data from Study 2 in Chapter 5.

Similar to teacher educators, teachers in schools face many of the same challenges, as they too are held responsible for technology integration. The next section discusses the factors operating at the school level.

2.7.3 Factors operating at the school level

There is widespread consensus among researchers regarding teachers’ resistance to take full advantage of the opportunities available through technology use (Becker, Ravitz, & Wong, 1999; Groff & Mouza, 2008; Harris et al., 2009; Levin & Wadmany, 2008; Underwood & Dillon, 2011). Teachers have been found to face the following extrinsic barriers: lack of quality software, inadequate infrastructure, poor training opportunities, poor fit with the curriculum, technical problems, poor administrative and technical support, poor funding, scheduling difficulties, limited access to the technology, and lack of vision as to how to integrate technology. Additionally, teachers may also face the following intrinsic barriers: lack of time, negative attitudes and beliefs towards technology, weak value beliefs in the effects of technology use, poor planning, lack of confidence and self-efficacy, lack of positive teaching experiences with technology, unwillingness to change, lack of technical skills, and lack of incentives and motivation (e.g., Ertmer et al., 1999; Hew & Brush, 2007; Mueller et al., 2008; Schoepp, 2005).

Extrinsic barriers are believed to be resolved quite easily as they are related to providing the necessary resources and technology training (Deaney & Hennessy, 2007). Intrinsic barriers, by contrast, are more difficult to resolve since they include defying belief systems and confronting classroom practices (Ertmer et al., 1999). Hence, in order to examine whether an innovation is to become common place, teachers' belief systems towards the innovation need to be identified as they have the potential to reduce or increase the effects of first-order barriers (Ertmer et al., 1999). Further, teachers' knowledge and skills constitute a primary requisite for meaningful technology integration. Teachers are under pressure not only to acquire technical skills, but also learn how to link technology use with specific content domains and change their teaching pedagogies (Bitner & Bitner, 2002). Teachers' beliefs, knowledge and skills enable them to tailor instruction to "digital natives" (Prensky, 2001; Tondeur, Devos, van Houtte, van Braak, & Valcke, 2009), students who are born into digital technology and are already using technology as an unremarkable aspect of their daily lives (Tondeur, 2007).

A number of researchers have addressed the reasons behind teachers' resistance and have suggested ways in which ICT can be better used (Osta, 2005; Pegg, Reading, & Williams, 2007; Vannatta & Fordham, 2004; Webb & Cox, 2004). In a similar vein, the proposed research aimed to reveal whether English teachers in Tripoli take advantage of technology or face certain barriers which prevent them from such use. The study then aimed to identify the reasons why and suggest ways in which ICT can be better integrated into the Lebanese context.

2.8 Conclusion

This literature review has presented a varied and wide range of theories and notions regarding the diffusion of technology into an educational system. These theories and notions are discussed consistently with one underlying aim in mind: to identify the barriers and enablers operating within the three levels of the Lebanese educational system.

The review also attempted to establish the theoretical foundation upon which the current study is based. The principle theme overarching the literature review is that ICT integration is a complex process of change required on more than one level and influenced by complex contextual factors. The Diffusion of Innovations Theory which was discussed in Chapter 1 provides the foundation upon which this complex process may be better understood and organized. Using this theory and the data gathered from the literature review, it was decided that three different but interrelating social contexts play influential roles in determining the diffusion of ICTs into the Lebanese English classroom. The research design, hence, was developed to address the factors that enhance or inhibit the integration process in these three contexts. The research design along with the research paradigm and methodology are the topics discussed in the next chapter.

CHAPTER 3 Methodological Approach

3.1 Introduction

Having presented an extensive literature review which created the context in which this study could be embedded, the thesis moves to an explanation of the research paradigm, methodology and design.

Like all social research, this study adopted a lens through which it investigated the issue of ICT integration in the Lebanese context. This lens influenced the way in which the research questions were formulated, how the data was collected and consequently how the data was analyzed and interpreted (Greene, 2007; Newman, Ridenour, Newman, & DeMarco, 2003). At the initial stages of the study, three major paradigms; positivism, interpretivism and pragmatism, which represent three different worldviews, were considered (Teddlie & Tashakkori, 2003). The debate between positivist and interpretive research rests on the distinction between quantitative and qualitative methodologies, with proponents on both sides criticizing the other's methods of study, rigor of its procedures, and the validity of its results (Tashakkori & Teddlie, 2003). The pragmatic paradigm emerged as a way of reconciling the differences among these paradigms (Tashakkori & Teddlie, 2003) and providing a much needed focus on the practicality of research in finding solutions to social phenomenon (Johnson & Onwuegbuzie, 2004). Aimed at investigating a social phenomenon and identifying potential problems, the study adopted the pragmatic paradigm as its worldview. In short, the study was driven by a pragmatic paradigm using a non-experimental, sequential mixed methods research methodology (Teddlie & Tashakkori, 2006).

This chapter first restates the problem and research questions discussed in Chapter 1. Then, the methodological orientation of the study is explained. Third, the three studies are described in terms of context, participants, and data collection and analysis procedures. In addition, issues of reliability and validity are discussed. Further, the limitations of the study are outlined and the final section offers a consideration of ethical issues. The chapter ends with a short conclusion for the research methodology adopted.

3.2 The problem restated

As discussed in Chapter 1, the integration of ICT in many educational settings around the world has been described as problematic, slow and patchy (Selwyn, 1999, 2007). However, many governments have revealed great initiatives for ICT through policy plans, funding schemes and training initiatives. Further, universities have developed ICT courses in an attempt to prepare a new generation of teachers capable of teaching with technology. Additionally, many schools have displayed enthusiasm for ICT through professional development opportunities and provision of hardware and software. Nevertheless, the integration of ICT has not met expected levels and solutions are required to overcome the difficulties facing its diffusion.

To understand the difficulties facing the integration of technology, researchers have identified several factors which can be classified as either inhibiting barriers or supporting enablers. Among the most cited extrinsic factors are associated with governmental support, and teacher preparation initiatives whether at the university or school level. Further, the most compelling intrinsic factors are associated with teachers' knowledge and beliefs (Chapter 2). Therefore, the study stresses the importance of uncovering the barriers facing ICT integration in Lebanon at the three levels of policy, university and school in an attempt to suggest solutions to these problems. The study further acknowledges the importance of defining the enablers of technology integration within these contexts in order to consolidate them and build upon their existence.

3.3 Research questions

To uncover the barriers facing ICT integration in Lebanon, four questions were developed according to the three contexts of the study:

RQ1: What are the national policies that support, fund and monitor the implementation of ICT in ELT and what barriers/enablers can be identified in the implementation of the policies?

RQ2a: How do Lebanese universities prepare pre-service teachers to integrate ICT into the English classroom and what barriers/enablers can be identified in the shaping of the pre-service teachers' preparation?
RQ2b: What are the environmental and individual characteristics influencing pre-service teachers' future integration of technology inside their classrooms?
RQ3a: What are the levels of ICT integration already reached by English teachers in Tripoli?
RQ3b: What are the environmental and individual characteristics influencing in-service teachers' integration of technology inside their classrooms?
RQ4: What inferences can be made for the future uptake of ICT in the Lebanese English classroom?

The research questions were posed in an attempt to identify the enablers and barriers impacting technology integration in Lebanon's English classrooms. The specific rationale for each research question is discussed below.

3.3.1 Government role in ICT integration

Research question 1 attempted to describe the government's role in supporting the integration of ICT in Lebanon's English curriculum. This question also sought to identify the factors which were either hindering or supporting technology integration in this context. The literature review undertaken in Chapter 2 stressed the importance of governmental support, funding and evaluation of educational technology progress. It was, therefore, important to understand how much attention and significance was given to this issue by the Ministry of Education and the Center for Educational Research and Development; a division of the Ministry of Education responsible for curriculum development.

3.3.2 Characteristics of educational technology courses

Research question 2a provided an opportunity to create an overall description of how pre-service teachers were being prepared to integrate ICT in their future teaching. It also attempted to uncover the barriers/enablers emerging from this description. As discussed in Chapter 2, ICT courses may be structured using different strategies, approaches and content goals. Several conditions must also be in place for effective teacher preparation. Researchers tend to agree on the importance of having certain characteristics inherent in educational technology courses, such as teacher trainer modeling, field experiences, reflection as well as technological skill acquisition among other criteria of success. Therefore, analyzing the courses using these criteria may reveal their effectiveness/ineffectiveness in preparing the future teaching generation.

3.3.3 Environmental factors and individual characteristics of pre-service teachers

Research question 2b described pre-service teachers' individual characteristics including their beliefs, knowledge and skills. These characteristics of pre-service teachers, discussed in Chapter 2, may be important in predicting their future ICT use. In addition, this question investigated pre-service teachers' perceptions of the environmental factors influencing this use. Thus, environmental and individual characteristics were investigated to complete the picture at the university context. The barriers/enablers emerging from the data gathered from the pre-service teachers were presented with those emerging from the description of the ICT courses.

3.3.4 Levels of ICT use

Research question 3a attempted to uncover the level of ICT use reached by English teachers in Tripoli. Teachers were then asked several questions about their level of technology use. These questions investigated teachers' experience with technology use, frequency of use, objectives pursued, and types of use whether inside or outside the classroom context. This investigation was significant in providing a clear description of ICT use at the school context.

3.3.5 Environmental factors and individual characteristics of in-service teachers

Using both quantitative and qualitative methods of inquiry, research question 3b reflected the importance of in-service teachers' beliefs, knowledge and skills in regards to technology integration. In addition, this question investigated teachers' formal preparation to integrate technology and how this may have affected their technology use. Therefore, addressing this question revealed the intrinsic barriers/enablers impacting ICT integration. Important insights were also revealed from an understanding of in-service teachers' workplace context, including the quantity and quality of technological equipment available and the types of support provided. Thus, environmental and individual characteristics were investigated to complete the picture at the school context.

3.3.6 Implications of the research for the future uptake of ICT

Research question 4 brings together the impact of all the barriers/enablers identified in research questions 1 to 3 and examines the implications these factors have on the current and future uptake of ICT in the Lebanese English classroom using the Diffusion of Innovations Theory discussed in Chapter 1. Research in the Lebanese context has been inadequate and poor. Therefore, the results of the study have implications on government, universities and schools' understanding of the ICT status and can provide a place where finding practical solutions can begin.

3.4 Pragmatism: a middle-ground approach to inquiry

In explaining pragmatism, Johnson and Onwuegbuzie (2004) stated that,

> It offers an immediate and useful middle position philosophically and methodologically; it offers a practical and outcome-oriented method of inquiry that is based on action and leads, iteratively, to further action and the elimination of doubt; and it offers a method for selecting methodological mixes that can help researchers better answer many of their research questions (p. 17).

Pragmatism is a worldview that is focused upon the inquiry problem under investigation and is concerned with finding practical solutions to the problem (Creswell, 2009). Among the various advantages of adopting pragmatism is that it allows for a "freedom of choice" where the researcher draws upon any method, technique and procedure to best fit the research purpose and reach a comprehensive understanding of the problem (Creswell, 2009, p. 11). From the research purposes, the questions are generated and are considered over and above the method used or the paradigm that underlies it (Tashakkori & Teddlie, 2003). Further, pragmatism allows researchers to engage in prolonged investigations, repetitive observations and triangulation of research findings (Onwuegbuzie & Leech, 2005) as mandated by the complexity of the contexts in which they work (Greene & Caracelli, 2003).

Another advantage of pragmatic research is the ability “to combine the macro and micro levels of a research issue” (Onwuegbuzie & Leech, 2005, p. 383). As such, pragmatism satisfies the concern of quantitative researchers about generalization and the desire of qualitative researchers to reflect participants’ voices (Onwuegbuzie & Leech, 2005). The quantitative data enhances the breadth of the study, while the qualitative data adds depth. Consequently, better inferences are made (Tashakkori & Teddlie, 2003). In short, pragmatism rejects the dichotomy between different paradigms, embraces the differences among them, and calls for practical, contextually responsive and consequential solutions to complex social phenomenon (Greene, 2007).

Therefore, pragmatism is an appropriate paradigm for understanding the complexities of ICT integration. This paradigm provides the necessary flexibility by embracing both qualitative and quantitative traditions and for its ability to place powerful methodologies and methods at the researcher’s disposal.

3.5 Mixed methods research

The mixed methods approach captures the essence of pragmatism in its emphasis on giving a comprehensive account of the historical, political, and social settings by using quantitative and qualitative methods of gathering data (Creswell, 2009). According to Johnson and Onwuegbuzie (2004) mixed methods research is:

> Inclusive, pluralistic, and complementary, and it suggests that researchers take an eclectic approach to method selection and the thinking about and conduct of research. What is most fundamental is the research question—research methods should *follow* research questions in a way that offers the best chance to obtain useful answers (p.17)

The major aim of using mixed methods is to answer research questions that could not be otherwise answered as comprehensively except with the use of both quantitative and qualitative methods. It does not imply the use of a particular type of evidence, but on the contrary, the evidence comes from using both sources (Rocco et al., 2003) in such a way that "the overall strength of a study is greater than either qualitative or quantitative research" (Creswell, 2009, p. 4). However, simply collecting and analyzing quantitative and qualitative data is not enough and both methods "need to be mixed in some way so that together they form a more complete picture of the problem than they do when standing alone" (Creswell & Plano Clark, 2007, p. 7). In this way, data collection and analysis become more accurate and the inferences made become more useful. Hence, the desired result from mixing methods of inquiry is stronger research (Rocco et al., 2003), greater diversity from different angles (Teddlie & Tashakkori, 2003) and better understanding of the phenomenon being studied (Greene, 2007).

This method depends on the belief that there exist "multiple legitimate approaches to social inquiry and that any given approach to social inquiry is inevitably partial" (Creswell, 2009, p. 20). For this reason in particular, mixed methods researchers forcefully advocate the potential of bringing out the strength from each method and using this strength to represent social phenomenon both numerically and textually (Greene, 2007). In fact, Newman et al. (2003) contended that qualitative and quantitative research make up a "false dichotomy" (p. 169) and that there are many ways to approach research depending on the researcher's purpose(s). On a practical basis, qualitative methods are appropriate for gathering data on some aspects of human behavior, while quantitative methods are appropriate for other types of human behavior (Greene, 2007). When the results converge or corroborate, deeper understandings are achieved and greater validity is enhanced. Equally possible is the divergence of the results. Mixed methods researchers do not see this dissonance as problematic. On the contrary, such divergence is believed to enhance the understanding of social phenomenon by generating empirical puzzles which require further examination, probing and contemplation (Greene, 2007).

Within a sequential strategy of inquiry, the findings from one method, the qualitative or quantitative, elaborate and expand on the findings of the other. Both methods are needed to capture a comprehensive understanding of a phenomenon; “systematically and coherently” (Onwuegbuzie & Leech, 2005). The sequential strategy of inquiry was manifested in this study in Studies 2 and 3. First, the study of university courses began with a qualitative method which involved a detailed exploration of ICT courses offered at Lebanese universities followed by a quantitative method which involved investigating pre-service teachers’ perceptions of both environmental and individual characteristics. Second, the study of English teachers began with a quantitative method measuring both environmental and teacher characteristics in the form of beliefs, knowledge and skills followed by a qualitative method which involved a thorough examination with a few cases.

This study aimed for a suitable balance between the qualitative and quantitative data to attain a comprehensive description of the extrinsic and intrinsic factors operating within the three study contexts and which impact the integration of ICTs in the Lebanese educational arena. The sequential mixed methods approach was adopted to capture a holistic picture of the ICT situation in Lebanon, and more specifically in Tripoli. Using the mixed methods research design opened up possibilities for generalizations to be made to a larger population.

Greene, Caracelli, and Graham (1989) have indicated five major purposes for using mixed methods research studies as follows:

Triangulation: the researcher’s purpose is to test convergence, corroboration and consistency among the results from different methods. With the intent to triangulate data, different methods are used to measure the same phenomenon. Throughout the study, triangulation helped to increase the validity of the conclusions and controlled some of the factors which may have influenced the results. In Study 1, the same data was collected from three different sources: interviews with leading policy makers, a conference proceeding, and the official document of the national strategic plan. Similarly in Study 3, using in depth interviews triangulated the results of the questionnaire investigating both environmental factors and in-service teachers’ characteristics.

Complementarity: the researcher's purpose is to elaborate, illustrate and clarify the results from one method by using another method. Quantitative and qualitative methods are used to measure different aspects of the same phenomenon. Further, the results from the different methods help to explain and broaden the overall inferences made from the study. In Study 2, the interviews with ICT lecturers and the quantitative data obtained from the pre-service teachers provided different perspectives and created a more complete understanding of the status of ICT integration at the university level.

Development: the researcher's purpose is to use the results from one method to help inform and shape subsequent methods. In Study 1, results from the initial interview with policy makers suggested that further investigations should be incorporated. Therefore, a document analysis was conducted and data from a relevant conference proceeding was included. Moreover, schools in Tripoli were randomly selected for the quantitative method. Then the results of the questionnaire were used to purposefully select a sample of three technology users and three non-users for the qualitative interviews.

Initiation: the researcher's purpose is to discover paradoxes and contradictions that lead to reformulated research questions, new insights, and original understandings. The purpose of initiation is to incite divergence, rather than convergence, of the research results. Though not an initial purpose of this study, the purpose of initiation was kept in the foreground as a possibility after the data collection and analyses stages were completed. For example, the in-depth interviews with the ICT lecturers and in-service teachers could provide insight on any contradictions found between the quantitative and qualitative features of the data collection which may require recommendations for further investigation.

Expansion: the researcher's purpose is to expand the scope and enrich the diversity of the investigation by using multiple methods for different inquiry parts. In this study, using multiple methods extended the breadth of the investigation and provided insight to the more general debate on ICT integration, specifically in the Lebanese context and more generally, in the Arab region. A comprehensive picture was sought through the use of the mixed methods approach. In short, the approach adopted encompassed a thorough review of the relevant literature both in Lebanon and worldwide, interview data from leading national figures in the field of ICT and

English language teaching (ELT), document analysis of the ICT strategic plan, interview data with ICT university lecturers, a quantitative e-questionnaire sent out to pre-service teachers, a quantitative questionnaire sent out to schools in Tripoli, and interview data from English teachers integrating and not integrating ICT in their English classrooms.

3.6 The three studies of the research

To eliminate ambiguity and enhance the manageability of the research, the study was divided into three manageable studies according to the different contexts of the research. Even though each of the three studies could stand on its own, together they presented pieces of a puzzle which provided a complete picture once joined together. The three studies were grouped by a common theme; Lebanon's need for favorable conditions at the national policy, university courses and school contexts to ensure quality ICT integration in the English classroom. The research model is illustrated in Figure 3.1 and explained next.

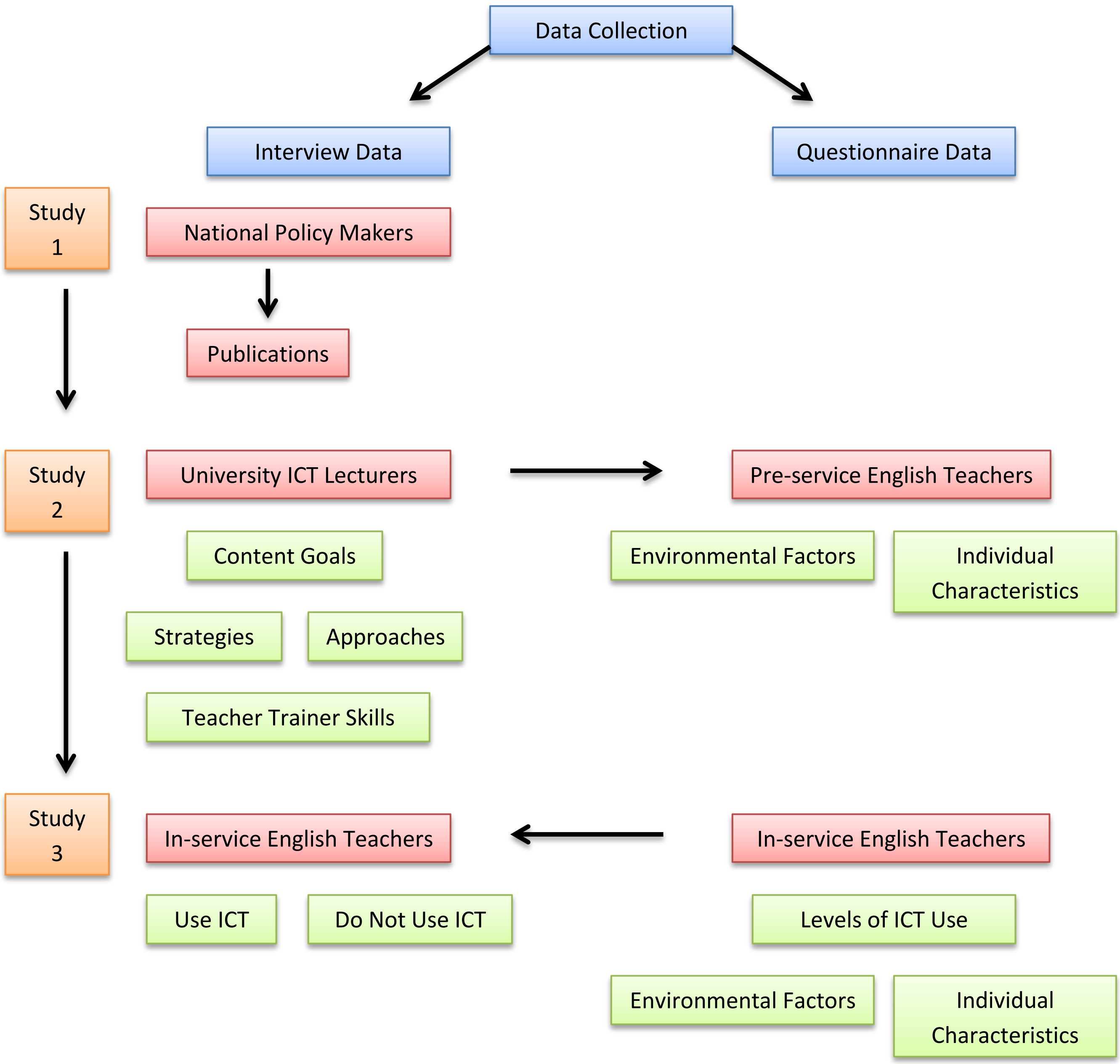

Figure 3.1: The research model

3.6.1 Study 1: Lebanese national policies targeting the integration of ICT in ELT

3.6.1.1 Research design

This study focused on the national policies that have been issued by the Lebanese government regarding the integration of ICT in ELT. The context for the inquiry into these national policies was not determined from the very beginning. The start of a potential thread began at the

Ministry of Education and at the Centre for Educational Research and Development (CERD), which is a division of the Ministry of Education responsible for curriculum development. As the study progressed and after the interviews with three policy makers, a national strategic plan was published by the Ministry of Education and a link to this document was located on the Ministry's website.

Even though some schools and some teachers have already begun the adoption of educational technology, the role of the government in supporting this adoption was vague. Central to this role of the government was the issuing of national policies to assist English teachers in moving from traditionally taught classrooms to more technologically-supported, learner-centered and collaborative classrooms. Since no official policy plan regarding the integration of ICTs in the English curriculum existed, interview data provided a description of the governmental commitment towards ICTs. An important aspect of the study was to reveal the governmental initiatives in regards to funding schools with technological devices as well as human resources sufficient enough for partial and complete integration of ICT. Without government support, the integration of ICT in Lebanese schools, and specifically in public schools, would fail to reach effective levels, if any level at all.

Therefore, the purpose of this qualitative study was to explore and describe the national policies issued by the Lebanese government in an attempt to regulate the integration of ICTs in English language teaching and learning.

3.6.1.2 Research participants

Interviews were conducted with three leading policy makers; two at the CERD and a third at the Ministry of Education in order to investigate the national policies, curriculum plans, funding schemes and any relevant statistical data. The first participant was an English coordinator and curriculum developer at the CERD, a second participant was a teacher trainer also at the CERD, and finally a third participant was a director at the Ministry. During the time of the study, the president of the CERD, Dr. Fayyad, was invited to a conference held at the researcher's workplace. The Conference for Innovation in Education held in May 2012 included a detailed description of the government's intentions to integrate technology into its educational system.

3.6.1.3 Data collection

The research investigation began with an examination of the national policies that addressed the integration of ICT in the English curriculum. Officials were asked to take part in interviews after having read and signed a consent form (Appendix H). The questions were generated to reflect the Lebanese context in terms of the present commitments and future intentions of integrating ICT in the English curriculum. Officials were asked to call attention to national policies, funding schemes and professional development programs currently in progress across Lebanon. They were also asked about the rationale for integrating ICT in the national curriculum. An interview instrument used during Study 1 was developed from a relevant survey (Gigling, 2004) and included other questions that relate to the objectives of this study. The interview questions needed to be refined for use with more than one participant and to address the specificity of the research questions. Refer to Appendix A for the complete set of interview questions.

A semi-structured and formal interview approach was adopted. A certain level of flexibility was maintained to follow up on the questions and raise issues for further discussion and clarification when required. Both open-ended and closed-ended questions provided a balance between the time available and the depth of answers.

Other sources requested for data included archival records in the form of unpublished research papers, national research reports, Department of Education publications, curriculum guidelines, conference papers, and education statistics. The participants of the study did not disseminate these sources. All documents available to them were maintained in confidentiality. These sources could have provided additional information about the extent to which ICTs were a major goal specifically in the English curriculum.

3.6.1.4 Piloting of the interview questions for policy makers

The questions used with policy makers were piloted at the initial stages of the study. Due to the unique characteristics of the participants in this study, the interview questions were piloted with a school principal who has taken an active role in introducing educational technology in a number of schools in Lebanon and abroad. He was asked to think aloud about what he thought the questions meant to him. He was also requested to ask for any clarifications about interview questions. The pilot proved to be practically beneficial as it raised issues related to translation issues and rewording of certain interview questions.

3.6.1.5 Data analysis

Data analysis from the interview with governmental officials and the document of the national strategic plan created a story of ICT integration at the national level. The data obtained from the interviews, the conference proceedings, the national strategic plan and further research publications was analyzed in chronological order to create a timeline for the progress of ICT integration at the government level. The data served to create a comprehensive picture of the role of the Lebanese government related to the presence of funding budgets, monitoring and evaluation schemes, rationale for ICT integration, professional development programs, and curriculum plans. Once the data was analyzed and interpreted, the extrinsic barriers and enablers operating at this level became clear. The analysis of barriers and enablers was presented simultaneously with reference to the literature review conducted in Chapter 2 and recommendations to overcome the barriers. Acknowledging these factors may provide policy makers with an understanding of the status of technology integration at the government level. Finding practical solutions for the barriers and consolidating the enablers may thus become possible.

Study 2 leads on from the first study. While the governmental support English teachers receive was not known before the investigation, universities were known to operate ICT courses. The universities have responded to the developments of technology by launching ICT courses which are aimed at preparing pre-service teachers to integrate technology in their teaching practices.

Hence, the theme in Study 2 revolved around the investigation of university ICT courses, the roles of teacher educators and the perceptions of pre-service teachers.

3.6.2 Study 2: University courses: structure, aim and relevance

3.6.2.1 Research design

The second study was conducted at Departments of Education within Lebanese universities. Most universities in Lebanon offered educational technology courses to prepare pre-service teachers to integrate ICT into their classrooms. Of the eleven universities that met the criteria of inclusion in the study, seven universities were randomly selected along with the pre-service teachers who had most recently taken the ICT course at these universities.

The intent of this mixed methods design was to collect complementary data on the same topic from the perspective of two different groups of participants. In this study, the qualitative interviews with ICT lecturers were used to gather data about the structure, aims and outcomes of ICT courses at different universities. Concurrent with this data, a quantitative e-questionnaire was used to examine the perceptions of pre-service teachers about the environmental factors and individual characteristics impacting their technology use and consequently evaluate the effectiveness of these courses. The results were used to understand whether educational technology courses across Lebanon met the criteria for effective preparation of pre-service teachers and to predict whether future teachers would use technology in their teaching.

3.6.2.2 Research participants

According to the Ministry of Education official website, there are thirty-one authorized universities in Lebanon. A preliminary search was conducted to find out the total number of universities which consisted of an Education Department, English Language Teaching Department, or English Language and Literature Department. Eighteen universities were found to include one or more of the aforementioned departments. All eighteen universities were contacted to verify the existence of an educational technology course. In total, eleven universities met the criteria of inclusion in the study. It was deemed that seven universities would constitute a representative sample of the eleven universities offering an educational technology course. Therefore, using the random sampling technique, all eleven universities were given equal chance to be chosen during the sampling process and researcher bias was consequently eliminated. This simple random sample was obtained by assigning each university a number and then drawing random numbers which identified the seven universities which participated in the study.

Interviews were conducted with the seven ICT lecturers responsible for both course design and implementation. Further, all the pre-service teachers enrolled in these courses were requested to participate in the study. These student teachers represented a cluster sample which was also randomly selected according to the previously selected universities. A total number of fourteen pre-service teachers took part in the questionnaire.

3.6.2.3 Data collection

The final sample of universities became the context for an interview conducted with the ICT lecturer. Participants were requested to provide accurate information regarding the educational technology course after having read and signed a consent form (Appendix I). Questions were formulated to obtain a clear representation of what the ICT course for training pre-service teachers consisted of. The questions targeted course structure, objectives and expected outcomes, as well as teacher educator roles and available infrastructure. They were asked to describe their courses physically in terms of infrastructure and practically in terms of student participation and activities. An interview instrument was developed from relevant material obtained from the OECD website (www.oecd.org/edu/research/42419091.pdf) and included other questions that relate to the objectives of this study. As with the interview with national policy makers, the interview questions with ICT lecturers needed to be adapted for use with diverse participants and course types. A semi-structured and formal interview approach was adopted. However, a level of flexibility was maintained to follow up on the questions and raise further questions according to participants' answers. Both open-ended and closed-ended questions were included in the interview protocol and provided a quick and succinct means of comparing data across the seven universities. Refer to Appendix B for a complete set of interview questions.

Following these interviews, ICT lecturers were requested to contact enrolled student teachers in their educational technology courses. After their completion of the course, an email with a link to the e-questionnaire was sent out to all the pre-service teachers in this randomly selected cluster sample. In the email, student teachers were provided with a consent form (Appendix J) informing them about the objectives of the study and requesting their consent to participate in the study. It was also explained that all the information they provided would be kept strictly confidential and under no circumstances would their responses be released to the university.

The e-questionnaire first gathered information about demographics (gender, age, teaching grade level), technology use, and pedagogical uses of ICT. Refer to Appendix C for the complete set of questions regarding student teachers' perceptions of the environmental factors operating at the investigated universities. Further inquiries included investigating pre-service teachers' beliefs, knowledge and skills; factors claimed to either inhibit or encourage the integration of ICTs in teaching. Pre-service teachers' perceptions of their pedagogical, self-efficacy and value beliefs were assessed using an adapted version of the Teachers' Beliefs regarding Technology Use Survey (TBTUS) (Park & Ertmer, 2007/2008). Refer to Appendix D for the TBTUS instrument. Additionally, to measure pre-service teachers' perceptions of their knowledge and skills, an adapted version of the Survey of Pre-service Teachers' Knowledge of Teaching and Technology was used (Schmidt et al., 2009). Refer to Appendix E for the TPACK instrument.

3.6.2.4 Piloting of Study 2 instruments

A. Piloting of the interview questions for university ICT lecturers

The 33 questions of the interview with ICT lecturers were piloted on three academics with expertise in psychology, English language teaching, and educational technology. All three academics were professors in Departments of Education in the US, Lebanon, and Australia respectively. The three academics crosschecked the alignment of the questions to the identified aims of the study. Minor amendments were made through rewording, adding, and eliminating certain questions.

The table which specifies the questions amended according to the feedback received from the academics is provided in Appendix M. Whether or not the suggested amendments were made and how these were made are also included.

B. Piloting of the TBTUS survey

The original 54 quantitative TBTUS was piloted with a convenience sample of 4 middle school English teachers and 4 other teachers who had previously taken an educational technology course during the completion of their Master's degree. The first four teachers also acted as a focus group and provided feedback on the structure of the questionnaire and the language used. The feedback resulted in grouping and then deleting repetitive items, rewording others and adding statements related to cooperative, competitive and individualistic teaching methodologies. These additional items were adapted from other questionnaires devised by Benjamin (2003) and the Teaching, Learning, and Computing Survey (Becker & Anderson, 1998). The final version of the TBTUS included 48 items designed to collect quantitative data on a Likert scale of 1 (strongly disagree) to 5 (strongly agree). The third response (neither agree nor disagree) was added to the Likert scale to provide participants with a gradation which included a neutral response. The only difference between the TBTUS used for pre-service teachers and that used for in-service teachers is the wording of survey items 43 to 48. The future form "will" was used with verbs in the pre-service teacher's survey, while the present simple form was used in the in-service teacher's survey. A summary of the feedback received from the pilot is provided in Appendix N.

C. Piloting of the TPACK survey

The TPACK survey was piloted with the same convenience sample as the TBTUS. This survey did not include as many amendments. However, certain survey statements not related to the teaching of the English language or technological knowledge were directly excluded from the survey. Further changes included substituting the word *literacy* for *English subject matter* and deleting items 48-58 as they do not relate to the TPACK construct. Remaining in the TPACK questionnaire were 19 items designed to collect quantitative data on a Likert scale of 1 (strongly disagree) to 5 (strongly agree). The constructs remaining in the questionnaire were Technological Knowledge (TK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPCK).

3.6.2.5 Data analysis

The analysis of the data obtained from the seven ICT lecturers began after transcribing each interview and obtaining verification for the transcription by the respondent. To answer research question 2a, the data were analyzed directly as cross-case comparisons, rather than analyzing the data as university-level case studies. Using the constant comparative model, a search for themes related specifically to duration, number of courses available, structure and requirements, aims and objectives, teacher educator roles, available infrastructure and student participation in the educational technology courses was conducted. Data analysis also included searching for themes related specifically to strategies, approaches, technology content goals and broader context. This model allowed for the emergence of themes running through each interview with the ICT lecturers. The themes could be constantly compared as they emerged directly from the data. As each program was analyzed, the course requirements and structure were further compared to the availability of essential conditions for effective pre-service teacher preparation from the literature review. Data were organized and labeled into tables to permit conclusion drawing. For ease of reading, reference to specific sections of the lecturers' interviews was displayed after quotations. Thus, UA55 refers to the 55th interaction in the interview with the ICT lecturer at university A. The data obtained from the interview with the ICT lecturers was further analyzed for barriers and enablers and presented together with the analysis of the pre-service teacher questionnaire data discussed next.

Descriptive statistics of the results of the pre-service questionnaire displayed the degree of available software, hardware and support. Additionally, descriptive statistics revealed the types of pedagogical uses of technology practiced during the course and pre-service teacher confidence levels to continue using these same technological tools in their classrooms. Further discerned were pre-service teachers' perceptions of their beliefs towards technology integration and their perceptions of their technological, pedagogical and content knowledge and skills. Acknowledging such perceptions may, on one hand, inform universities about the success of their courses in improving pre-service teachers' knowledge and skills and changing their beliefs, and on the other hand, motivate them to make informed decisions about better ways to prepare future teachers. The analysis of the data obtained from the pre-service teachers was coupled with the analysis of barriers and enablers identified from the description of the ICT courses. In this way, both extrinsic and intrinsic factors were analyzed within the university context. These factors were presented simultaneously with reference to the literature review conducted in Chapter 2 and recommendations to overcome the barriers.

Going down the hierarchical structure, the practice of in-service English teachers was the focus of Study 3. While Study 1 and 2 investigated technology adoption issues extrinsically as they relate to national policies and university courses across Lebanon, Study 3 investigated the factors operating in one major Lebanese city, Tripoli.

3.6.3 Study 3: Adoption of ICT in ELT: Tripoli English teachers speak up

3.6.3.1 Research design

The third study addressed the levels of ICT use reached in Tripoli by English teachers. A mixed methods design was used, which allowed for collecting quantitative data followed by in depth qualitative interviews. In the first quantitative part of the study, instrument data examined in-service teachers' demographic characteristics followed by their levels of ICT integration. Accordingly, their educational and administrative uses of technology were investigated. Further, teachers' perceptions of the environmental factors influencing their use of technology were examined, in addition to their formal educational technology preparation. Finally, the questionnaire explored in-service teachers' perceptions of their beliefs, knowledge and skills. In the qualitative follow-up, the environmental factors available at the schools and individual characteristics of in-service teachers were further investigated with a small sample of English teachers in Tripoli. The qualitative results added a personal perspective to the quantitative results. Participants took part in two iterations of interviews which probed further explanation of the questionnaire data.

3.6.3.2 Research participants

Researchers have acknowledged the differences between elementary, middle, and secondary students' and teachers' uses of technology (Webb & Cox, 2004). Because variations in technology use exist among different groups of learners from different cycles, there was a need to focus the aim of this investigation on a particular age group. As mentioned earlier, the school system in Lebanon is divided into 5 cycles. The pre-K cycle (nursery, KG1 and KG2), first cycle (grades 1, 2 and 3), second cycle (grades 4, 5 and 6), third cycle (grades 7, 8 and 9), and fourth cycle (grades 10, 11 and 12). In terms of technology access and use, third cycle English teachers in Tripoli schools were chosen. Several reasons lie behind this choice. First, the third cycle is situated between the end of the elementary cycle and the beginning of high school. At the end of this cycle, obligatory education ends and students may continue school, pursue vocational education or drop out of school. Hence, the third cycle is a decisive phase for many students and they consequently need to be equipped with the necessary skills to participate in the information society whatever their choice may be. Courtney, Anderson, and Lankshear (2010) emphasize this critical age in learners' engagement with digital technologies. They caution that the middle school years "provide a crucial 'turning point' from being engaged with digital technologies to disengaging with them for formal school requirements" (p. 238).

Furthermore, when the decision is made to pursue high school or vocational education and then university education, English and ICT skills acquired during the third cycle may become necessary for success in future educational endeavors. As mentioned above, the third cycle is when IT becomes an independent subject taught once a week according to the currently implemented national curriculum. Consequently, English teachers have the opportunity to make use of these pure technical skills for language development. Additionally, students undergo the first national official exam at the end of this cycle, i.e., in grade 9. If research on ICT's educational benefits proves to be true, then students' English exam scores may be enhanced as a result of learning English through technology. In terms of international studies, not many studies focus on middle school students in terms of technology use, and most studies target primary or secondary students (Divaharan & Ping, 2010; Hadjithoma & Eteokleous, 2007; Hermans et al., 2008; Loveless, 2003; Webb & Cox, 2004). Moreover, third cycle students' language abilities are supposedly considered more advanced than primary students and they are capable of using technology more independently than primary students. This situation presents English teachers with opportunities to take advantage of students' previously acquired skills in English and use them in advancing both language and technological skills. On a subject matter level, the number of English periods begins to decrease gradually at this level with the introduction of more subject matter areas into the curriculum. With a further declining focus on language at the secondary level, the third cycle presents the last opportunity for students to enhance their literacy skills; otherwise it may become even more difficult for them to make up for learning gaps accumulated from previous years. Finally, the researcher teaches and coordinates English within this cycle and has noticed students' interest in technology peaking at this developmental period.

In terms of school type and number, Tripoli city and suburbs house schools of three types, public, private non-paying and private schools. In the city, Tripoli has 95 public schools, 16 private non-paying schools, and 42 private schools whereas Tripoli suburbs have 12 public schools, 1 private non-paying school and 7 private schools. The number of schools in Tripoli is summarized in Table 3.1 according to their type.

Table 3.1: Number and types of schools in Tripoli city and its suburbs

	Tripoli city	Tripoli suburbs
Public	95	12
Private non-paying	16	1
Private	42	7

Source: Centre for Educational Research and Development, Lebanon 2009.

However, the medium of instruction in these schools is not always in English. With English as the medium of instruction, the number of schools decreases. Of the 95 public schools in the city, 3 have an English section. Of the 12 public schools in the suburbs, none have an English section. Of the 17 private non-paying schools in the city and the suburbs, none of the schools have an English section. Of the 42 private schools in the city, 17 schools have an English section. Of the 7 private schools in the suburbs, one school has an English section. The number of schools with an English section is summarized in Table 3.2.

Table 3.2: Number of schools with an English section in Tripoli

	Tripoli city	Tripoli suburbs
Public	3	0
Private non-paying	0	0
Private	17	1

In total, there are 173 schools in Tripoli and its suburbs, 21 of which have an English section. Of the 21 schools with an English section, 17 have cycle 3 (grades 7, 8, and 9) students. These were the schools that met the criteria of inclusion in the study.

Using the random stratified sampling technique, a representative sample of both public and private schools was selected (N=12). The proportional stratified sampling technique was used before the random sampling to ensure the inclusion of both private and public schools according to their actual numbers in Tripoli. The principal was asked to participate in the study.

Nine principals accepted to send a quantitative questionnaire to all the third-cycle English teachers working at these schools.

After analyzing the questionnaire data, a qualitative study became necessary. Purposive sampling was used to choose a group of three teachers who were using ICTs and another group of three teachers who were not according to the results obtained on the questionnaire.

3.6.3.3 Data collection

The data from the questionnaire was descriptive in nature. Demographic data, levels of ICT use, the types of available access and support, the types of educational and administrative ICT uses, and in-service teachers' formal technology preparation were assessed using an adapted and combined version of the Teaching With ICT Audit Survey (TWictAS) (Albion, Jamieson-Proctor, & Finger, 2010), the Teaching, Learning, and Computing Survey (Becker & Anderson, 1998), and the Stages of ICT Integration (Newhouse et al., 2005). Refer to Appendix F for the complete set of questions. Additionally, in- service teachers' perceptions of their pedagogical, self-efficacy and value beliefs were assessed using an adapted version of the Teachers' Beliefs regarding Technology Use Survey (TBTUS) (Park & Ertmer, 2007/2008). Finally, to measure in-service teachers' perceptions of their knowledge and skills, an adapted version of the Survey of Pre-service Teachers' Knowledge of Teaching and Technology was used for the in-service teachers (Schmidt et al., 2009). Piloting of the TBTUS and TPACK was discussed in the previous section. The questionnaire was given to the in-service teachers at the nine participating schools. Teachers were also provided with a consent form (Appendix K) informing them about the objectives of the study and requesting their consent to participate.

After analyzing the questionnaire data, six participants were asked to participate in an interview by signing a consent form (Appendix L). These teachers were asked to clarify the information they provided on the questionnaire. Two sets of interview data were administered. The first set of questions was an iteration of similar questions asked during the questionnaire. Therefore, in depth data was sought about participants' perceptions of the availability of resources, access and support, their uses of technology inside their classrooms, their value and self-efficacy beliefs, their knowledge and skills, the role of technology in changing teaching and learning, and finally their educational background. The second set of interview questions was generated and conducted after initial analysis of the first set of questions. This preliminary analysis indicated the need for further answers to obtain an even deeper level of understanding of the teachers and their contexts. Therefore, the second set of questions inquired about participants' perceptions of their responsibilities as teachers, methods adopted by other English teachers, favorite teaching practices, tensions facing teachers to modernize teaching practices, and finally their perception of being included in the change process at their schools. Refer to Appendix G for the complete set of interview questions.

3.6.3.4 Data Analysis

Descriptive statistics revealed participating English teachers' general demographic information Further, descriptive statistics measured the levels of technology use reached by English teachers, the types of educational and administrative technology uses and their formal technology preparation. Lastly, descriptive statistics revealed participants' perceptions of their beliefs, knowledge and skills. After describing the data, inferential statistics in the form of t-tests was performed on the data obtained from the pre-service and in-service teachers on the TBTUS and TPACK instruments.

The analysis of the questionnaire data included the identification of several barriers and enablers emerging from the results. Research findings, thus, were presented in a clear and straightforward manner. The analysis was presented simultaneously with reference to the literature review conducted in Chapter 2 and recommendations to overcome the barriers.

Thematic data analysis using the constant comparative model was used to look for emerging themes running through each interview with the English teachers. Keywords from the transcripts were identified and compared to the existing themes. If the keyword did not fit existing themes, a new theme was created or the theme most closely associated with an existing theme was adjusted. The themes were then grouped into seven sections according to their discussion of similar topics. Finally, these themes triangulated the questionnaire results and in some cases even provided explanations for certain contradictions. For ease of reading, reference to specific sections of the teachers' interviews was displayed after quotations. Thus, (TA/5[10-13]) refers to teacher A's answer to question 5 and including lines 10-13 from the transcription of the interview data.

If English teachers in Lebanon are to receive appropriate support strategies from the government or the private sector, then there is an urgent need for valid and reliable information regarding their existing ICT competence, the factors that enhance or hinder their development of ICT skills and the level of ICT integration they have reached. The analysis resulting from both the quantitative questionnaire and qualitative interview led to a description of the extrinsic and intrinsic factors impacting the diffusion of ICTs into the Lebanese English classroom. Such factors were the last investigated in this study.

3.7 Reliability and validity

Because this investigation cannot be seen as a pure quantitative or qualitative study, the issue of the quality of the research had to be examined from both angles. Positivists talk about the quality of their studies using terminology such as *reliability*, *internal validity* and *external validity*. By contrast, interpretivists use the terminology *dependability*, *credibility* and *transferability* respectively to talk about the trustworthiness of their studies (Onwuegbuzie & Johnson, 2006). The terminology most commonly cited in research studies will be used in this chapter. Thus, issues of reliability, internal validity and external validity will be discussed next.

Ensuring the reliability of the study relies on the quality of the instruments used. Several instruments created by other researchers were used. All these instruments were proven by their developers to have high internal consistency and reliability.

Validity is defined as how accurately the conclusions and inferences made by the researcher actually reflect the participants' realities of the social phenomenon (Creswell & Miller, 2000). Validity can be strengthened when the consistency among the research purposes, questions, and methods used is examined (Newman et al., 2003). Concerning internal validity, this study does not attempt to make a causal relation between the different aspects of the study. For example, in Study 2, the results obtained from the interview with the ICT lecturers were not linked in a causal relationship to the probability of pre-service teachers to integrate educational technology in their future classrooms. The research objective was to obtain an overall picture of an unknown context and perhaps open the door for more comprehensive studies, which seek causal relationships as their ultimate goals. Furthermore, the triangulation of the data has the potential to increase the validity of the results and hence their depiction of the ICT status in Lebanon. Both qualitative and quantitative methods of collecting data were included within the research design of Study 2 and 3. Hence, the ability to maximize the validity of the studies was increased.

External validity concerns the generalization of the research results to other settings. Caution was taken not to generalize from these results to other settings outside Lebanon. However, the study did seek to provide evidence of the ICT status in Lebanon, and using the three studies described above provided an overall picture of this status. Study 1 was by nature a national endeavor and the results obtained can be generalized across the Lebanese context. Study 2 took into consideration a representative sample of the universities in Lebanon which included a Department of Education generally and an ICT course specifically. Hence the results obtained from this study can also be generalizable across the Lebanese context. Study 3, by contrast, depicted the use of educational technologies by in-service English teachers in Tripoli. The results obtained in this study may have limited external validity in terms of the ability to generalize the findings obtained from this study to other cities in Lebanon. However, the results from the first two studies revealed the extrinsic barriers and enablers affecting all Lebanese English teachers and consequently what remains context bound are the intrinsic factors to technology integration. Hence, the status of educational technology in Tripoli English classrooms may provide insight into its status elsewhere in Lebanon since extrinsic factors have been found to influence teachers' intrinsic characteristics related to technology integration. Further, using the quantitative data assisted the qualitative data by providing a way to identify representative cases for in depth interviews with in-service English teachers. In this sense, the quantitative data became useful for establishing the generalizability of the qualitative results.

From a qualitative perspective, the following steps were taken into consideration to enhance the internal validity of the research:

Auditability: the dependability of the collected interview data was enhanced by keeping an audit trail tracing the data back to their source. All statements made during an interview were transcribed, dated, and coded to ensure that the identity and location of the data was traceable.

Member checking: the participants in the research verified the data as representing their exact words. Softcopies were sent to these individuals via email with a request that they verify the transcribed data as representing their actuality. Further, the data obtained from the questionnaire deepened the understanding of the interview data for the same participant. Obtaining results from the same participant represented another way of indirectly verifying the results for that participant.

Triangulation: the use of a mixed methods research design produced corroborating data whereby the qualitative data was compared to and complemented by the quantitative data. The first study of the national policies sought corroborating evidence collected through the interview with government officials and published documents. These two sources of data helped enhance the validity of the study. Further, the data obtained from the interviews with the ICT lecturers provided useful information to the quantitative data obtained from the questionnaire of pre-service teachers. Similarly, the quantitative data from the questionnaire of in-service teachers was enhanced with in depth interviews with a smaller sample.

Peer review*:* by nature, this study underwent various peer reviews with the researcher's supervisors. Ongoing feedback before, during and after data collection helped to further explore the emerging themes, including their validity.

3.8 Limitations of the research design

This study aimed towards a comprehensive investigation of the ICT status in the English classrooms of Lebanon by using both qualitative and quantitative data gathering techniques. However, the individual descriptive studies have certain characteristics which may not be found in other contexts. The limited number of interviews conducted in Tripoli schools involved in the research was not representative of all the schools across the Lebanese context. There are many social, political and economic factors which interplay at each and every educational institution in Lebanon, making these institutions practically unique. The descriptive nature of the study characterizes schools as users or non-users of technology, but does not delve into the quality of ICT integration and its effect on student performance.

Second, the number of participants did not reach the amount desired, thus limiting the entire study as a whole. It was expected that many more pre-service teachers would respond to the e-questionnaire. Also, the number of questionnaires received from in-service English teachers was not as first estimated.

Third, because the findings of the research are all based on self-reported data, respondents can subjectively bias the findings (Overbay et al., 2012; Petko, 2012). For example, when judging their levels of technology use or when describing environmental and individual factors, it might have been necessary to obtain the same data from student questionnaires or observational data (Petko, 2012). Caution was thus taken not to draw impractical conclusions or far-reaching recommendations.

Fourthly, there may be limitations in interpretation produced by the researcher's own perspective. Educated in Australia until the age of twelve, I am influenced by western educational beliefs. Further, as noted in Chapter 1, I became an adopter of ICT in the context of my constructivist approach to teaching English. Thus, my perception of traditional teaching practice may be through this personal professional lens.

Lastly, Lebanon continues to undergoing extreme political and military upheavals and this situation has affected all aspects of life and most importantly for this study, the Ministry of Education. During the course of the study, two new presidents were elected to form a new cabinet and all ministries had new secretaries. The political situation is so volatile that nobody can predict what may happen next. However, this situation is reflective of the Lebanese context and further investigations into the political barriers impeding ICT integration is a research study in its own right.

3.9 Consideration of ethical issues

Considering ethical issues, the two descriptive studies involving research on humans have potential risks on the participants involved. Though minimal, these risks may have caused unintended harm. First, some university ICT lecturers and teachers may have felt offended by the interview questions if they did not live up to their expectations of what it meant to be an educator in the 21st century. They may have also felt under pressure to answer in a way that did not offend the institution in which they worked and made a living. They may have also felt a negative representation of the universities' or schools' image in a PhD dissertation and hence provided inaccurate information. To overcome these potential risks, participants were confirmed about the confidentiality of the institution's name and their personal information. They were given written confirmation that the research results would not in any way be used against them or their institution's reputation. Also, the study required a statement of informed consent by participants which included all the information they needed to know before participating. In this statement, they were assured that their participation in this study was completely voluntary and withdrawal was possible at any point during the conduct of the research. Finally, ethical clearance was sought from Macquarie University prior to the commencement of the data collection. Ethics clearance was obtained in March 2012. Data collection pursued accordingly. It will be noted on Appendices H-L that there has been an unavoidable change in Principal Supervision during this project not of the researcher's volition.

3.10 Conclusion

This section of the research proposal has described the research design, including the pragmatic paradigm and sequential mixed methods research methodology. Further, it has been stated that the overall study was divided into three smaller studies to enhance the manageability and clarity of the research. These studies were described in regards to context, participants, and data collection and analysis methods. Further, reliability and validity issues were discussed. The chapter ended with a consideration for the limitations of the research and the ethical conduct of the study.

Having provided a detailed description and interpretation of the research methodology adopted in this study, the thesis will now move on to Chapter 4, which provides a detailed account of the findings from Study 1: Lebanese national policies targeting the integration of ICT in ELT.

CHAPTER 4 Data Description and Analysis at the Policy Level

4.1 Introduction

Having described the research methodology directing this study in the previous chapter, this chapter presents the findings of Study 1: *Lebanese national policies targeting the integration of ICT in ELT*. Reference to the literature review (Chapter 2) for understanding ICT integration is maintained throughout the discussion. This investigation sought to understand the national policies issued by the Ministry of Education in Lebanon in regards to the integration of technology in the Lebanese educational system. The findings in this section represent an investigatory description of the national policy context. The purpose of this preliminary investigation was to discover whether the Lebanese government has been supporting the integration of ICT. In addition to research findings and conference proceedings, three policy makers who had been working on a national ICT strategy at the time of the study were interviewed and asked about the current government role in setting the stage for ICT integration at Lebanese schools. As the educational technology integration process begins to unfold at the national level in Lebanon, it is important to document this process in order to contribute to the global discourse on technology integration in schools worldwide. The dearth of published research on the government's role in the integration process indicated the need to pursue research that contributes to the integration of technology in the Lebanese educational system. Little research prior to the launching of the first national strategic plan had been found in refereed journals; a fact that made tracking this initiative a national imperative. Findings from such an attempt are presented next.

4.2 Description of national policy initiatives (RQ1)

The situation in Lebanon does not differ too much from that of other developing countries (Albirini, 2008) and even developed countries (Cuban, 2001) in their early days of integrating technology into educational settings. Like these developing nations, inadequate financial and human resourcing often jeopardized any national reform endeavors. However, unlike many developing countries, Lebanon may be considered a ‘post-conflict nation’ after having endured a fifteen year civil war, an Israeli conflict in 2006 (Burns, 2012) and more recently several internal conflicts and political instabilities. Therefore, Lebanon’s educational technology integration efforts were still considered to be at the emerging stage (Burns, 2012). While the direct impact of these constraints has greatest impact on the public sector, the private sector has not been totally exempted from these same limitations. Consequently, the quality of education in the country is negatively affected, especially among students from the lower stratum of society.

Information technology (IT) was first introduced as a separate subject into the Lebanese curriculum in 1997, with the implementation of the New Framework for education. Students in grades 7 to 12 were taught pure technical skills at a time when the majority of public and private schools lacked sufficient technical infrastructure. In 2000, the first ICT in education project, SchoolNet Liban, was launched with the aim of modernizing the overall education system and connecting public and private schools. However, only 105 public schools were part of the project in 2011 (Burns, 2012). Between 1999 and 2005 training workshops for teachers were prepared. However, the limited follow up led to an average of 20-25% of public schools incorporating IT as a separate subject into their curriculum (Khaddage, 2012).

Following the 2006 armed conflict, USA business leaders (including Microsoft, Intel and Cisco) established a fund for Lebanon called the Partnership for Lebanon. The partnership “was formed in response to the crisis and to help the Lebanese people create long term economic growth, prosperity and stability in Lebanon” (Partnership for Lebanon, 2008). The partnership along with the national Telecommunications Regulatory Authority was able to update the communications infrastructure by improving broadband access, speed and affordability. In education, the partnership established the National Education Network (NEN) which connected and equipped 50 public schools to the Ministry of Education and Higher Education (MEHE, 2012).

Another initiative launched by the partnership was piloted in 2008. The program "School in a Box" aimed at the integration of ICT in public schools. It also provided the basic foundation for the transition from teacher-centric education delivery to learner-centric methods using ICT in teaching and learning. The program received $250,000 in funds and was piloted at 7 public schools. Finally, to prompt dialogue among education decision-makers and practitioners about the future of education in Lebanon, the partnership held monthly workshops which helped to establish a common vision and strategy for the future of education. As promising as these projects may sound, the problem remained in the lack of follow up and ongoing support (Khaddage, 2012). Not all public schools received the same amount of funding and support with some rural schools missing out completely on basic hardware, trained teachers and the necessary upgrades for ICT integration (Nasser, 2008). As a result, technology was not widespread at the majority of public schools with the major impediments lying in technology provision and Internet connectivity (Burns, 2012). Past initiatives, therefore, emphasized access to hardware, software, connectivity and resources. The majority of initiatives and ICT programs implemented between 2000 and 2011 were primarily small scale, uncoordinated, lacked consistent follow-up, and did not measure impact. Additionally, a lack of research and evaluation of these initiatives and programs made it difficult for future initiatives to be built on a solid knowledge base (Burns, 2012).

Following the 2009 termination of the partnership, a five-year program called D-RASATI (Developing Assistance to Schools and Teachers Improvement, or my studies in Arabic) was launched in 2010. D-RASATI was described as a comprehensive school improvement program funded by the US Agency for International Development (USAID) with a budget of $75 million. Together with the MEHE, the project aimed to achieve the following results at all 1,281 public schools in Lebanon by the year 2015:

- Improve student learning outcomes
- Help teachers use more effective teaching practices by strengthening the Ministry's capacity to provide high-quality, in-service professional development

- Help school leaders use participatory and evidence-based approaches to manage school improvement by training over 400 school principals to lead school improvement planning activities
- Fund school infrastructure and physical learning environments by repairing 300 schools and equipping many others with science laboratories and ICT equipment
- Promote a common understanding among school communities of what effectiveness means and requires
- Promote a common vision for educational improvement among government and communities and create productive and sustainable relationships (D-RASATI, 2010)

In September 2011, the Ministry working in cooperation with the Center for Educational Research and Development (CERD) and D-RASATI began work on a national strategic plan for the integration of ICTs in Education (Participant 3, interview). An expert panel prepared this strategy at the Ministry and CERD in collaboration with international experts. The final version of the strategic plan was made public on the 31st of July 2012. The interviews documented here were completed in April 2012 and the conference was held in May 2012. Therefore, the presentation of the data in this section will include the interviews and conference proceedings first, followed by data triangulated from the official document of the national strategy.

The strategy was founded on six key components (Fayyad, 2012):

First Component: Technology and Infrastructure in Schools: The major goal of the first component was to provide the methods, techniques, and programs that support educational objectives. The strategic plan aimed to accomplish this by (1) providing state of the art technologies for the teaching and administrative cadre, (2) providing computer labs for students equipped according to international standards, (3) providing iPads, tablets or computers at suitable prices and (4) providing Internet connection at all public schools (Fayyad, 2012). The term ‘access’ in the official document of the national strategic plan was broadly defined. It encompassed the availability of technology tools for student needs, proximity and ubiquity of digital devices and Internet connectivity, and finally, the ability of teachers, students and principals to use technology for purposeful and meaningful work (MEHE, 2012).

Second Component: Technology and the School Curriculum: The major goal of the second component was to integrate technology within a new curriculum framework by (1) introducing an IT subject as an independent subject starting from cycle 2 of elementary education and (2) using ICTs to support the learning of basic scientific concepts for learners at all pre-university levels (Fayyad, 2012). The CERD was in the process of revising the Lebanese national curriculum to make it based on competencies, rather than knowledge. The revision was scheduled to be completed in 2017 (MEHE, 2012). Technology would be integrated within this revised curriculum to promote key competencies, deepen content knowledge and cultivate digital age literacies (MEHE, 2012).

Third Component: Technology and Instruction: The major goal of the third component was to establish a digital resource database which consisted of sample lessons and activities based on the use of ICTs. The objective of a digital database was to improve teaching and learning outcomes. The digital platform was created under the direct supervision of the CERD. The CERD was also responsible for producing and publishing any textbook compatible with this digital platform (Fayyad, 2012). If implemented, the national strategic plan would depend on teachers' abilities to integrate technology into their content areas using effective pedagogical practices that have been proven to qualitatively enhance student learning (MEHE, 2012).

Fourth Component: Technology and Assessment: The major goal of the fourth component was to use ICTs to develop a digital assessment system that takes into consideration and balances all assessment types (formative, summative and diagnostic) as well as the standards of assessment (reliability, validity, fairness and transparency). This system would mandate the development of students' skills in using the digital system (Fayyad, 2012). However, the current assessment system could not be revised and reformed except after the complete revision of the instructional curriculum. Without revision and reform of the assessment system, curriculum, instruction and technology use would not produce the anticipated outcomes (MEHE, 2012).

Fifth Component: Technology and Professional Development for In-service Teachers: The major goal of the fifth component was to develop teachers' skills and competencies and those of the trainers in using ICTs. The five year plan involved training approximately 30,000 teachers; approximately 10,000 at the secondary level, 3000-4000 at the preschool level and 21,000 at the basic level (cycle 1, 2, and 3). The plan commenced with a survey sent to all public teachers to indicate their ICT levels and divide them into homogeneous groups. When data collection was finalized and analyzed, the plan would be launched at the beginning of the new academic year 2012-2013 (Fayyad, 2012). The strategic plan proposed the phasing out of professional development that started with technology instead of content. Instead, the document stressed the importance of enhancing teachers' content, instructional, and assessment skills. Technology would not be taught as isolated and operational skills, but rather the focus would be on developing the conceptual and instructional skills that teachers need in order to use certain technologies that promote student learning (MEHE, 2012).

Sixth Component: Technology and Educational Leadership: The sixth component aimed at establishing a digital culture among the administrative staff of public schools. The strategic plan aimed to accomplish this goal by training principals at the schools to enhance their technological skills in managing their schools and training the staff at the Ministry and the CERD in order to make them innovative leaders of the 21st century (Fayyad, 2012). This idea is reiterated within the document of the national strategic plan. One of the essential goals of this component was to develop digital age leaders who promote the use of technology to improve instruction, develop a school-based technology plan, and use technology for professional purposes (MEHE, 2012).

According to Fayyad, the strategic plan had already accomplished a few goals, which included the following:

- 161 schoolbooks from grade 9 to 12 were transformed into digital books and have been distributed.
- Approximately 1000 teachers have already been trained to use ICTs in their lessons in collaboration with the British Council.
- Inclusion of the IT subject as an independent subject starting at cycle 2
- Piloting the use of iPads and IWBs at 10 public schools
- Providing iPads at low prices and working on providing them for free

According to interview participants, the Ministry did not have a national policy for ICT in education as yet. Insufficient planning resources, limited availability of ICTs in schools, and a limited budget were among the reasons why the Lebanese government could not create a national policy (Participant 3, interview). However, the Ministry has implemented ICT in education as part of the regular program of the Ministry and under an ad hoc committee (Participant 3, interview). Yet, no documentation was disseminated by the respondents. Curriculum guidelines and education statistics were still at the time under development. In addition, pilot studies were being undertaken at several public schools (Participant 3, interview).

In place of a national policy, the government initiated a strategic plan. It was a plan that targeted the entire curriculum without special attention to one subject over the other (Participant 2, interview). The strategic plan was still a confidential document at the time of data collection and had not been disseminated to the public. The strategic plan was scheduled to be reviewed by international partners and evaluators. After this step, the plan required consensus at the government level by the Council of Ministers (Participant 2, interview).

Though not a policy, the national strategic plan was described as serving all four rationales for integrating ICT in the national curriculum; the economic, social, educational and catalytic rationales (Participant 2 and 3, interview). However, according to the strategic plan document, strongly highlighted were only the economic and social rationales. The document stated, "The ultimate goal then of the strategic plan is to use technology to enhance and support changes in *all components of the educational system as they affect teaching and learning* to prepare students in Lebanon to take their places as high-achieving, highly competent and highly skilled workers, learners and citizens of a knowledge-based society that increasingly relies on and interacts with digital tools and information" (MEHE, 2012, p. 7)

At the time of writing, the strategic plan did not include a master plan or budget plan. The government was not obligated to finance the plan nor was it compulsory for the plan to be implemented. According to one of the respondents, the 1997 curriculum faced similar barriers. The government was not obligated to finance the implementation of the new curriculum and therefore, it did not finance it because of limited financial resources (Participant 2, interview).

> … it doesn't have a budget plan per se, but it has estimates, how much it is going to cost the government but the government isn't obligated to provide the money. This is what happened in the 1997 curriculum, the government didn't have enough money to resource all the schools…

The monitoring and evaluation scheme of the strategic plan was the responsibility of the CERD. However, with a limited number of inspectors per teachers in public schools, their task exceeded the practical (Participant 2, interview). The CERD was also the organization responsible for overseeing the implementation of the plan. In this regard, the CERD worked on revising the curriculum and developing the textbooks. However, the CERD did not include prescriptive language about ICT use within its textbooks because according to one of the respondents, many schools did not have the necessary infrastructure (Participant 2, interview).

> …There is not going to be a part in the English textbook where ICT is integrated, it is only a recommendation. If there are schools that don't have the infrastructure, it is not fair to do this. This is where we go back to the budget plan. If all the schools are well equipped of course we will do this. This applies to both public and private schools; some are in a terrible position.

The strategic plan was simply a recommendation to integrate ICT in education; it was not mandatory (Participant 2, interview).

> [The policy plan] has the vision, but it is not obligatory, I don't know whether the government will budget or finance it because it is a lot of money, the budgeting into details hasn't been tackled. It is a strategic plan it is not a policy. In the policy there is a budget and it is obligatory.

The organizations responsible for pre-service teacher training included both private universities and the national university. They were responsible for preparing pre-service teachers. There was no national accreditation that required student teachers to demonstrate their technical skills or their pedagogical competence related to ICT. Universities were considered important contributors in the preparation of pre-service teachers. When the CERD issued the plan, universities were called upon and informed of the developments occurring within the Lebanese educational system. They were held responsible for restructuring and redesigning their courses accordingly (Participant 2, interview). In-service teachers, by contrast, were not provided with direct professional development through the CERD. Through 'Train the Trainers' scheme, the CERD in collaboration with the British Council were responsible for training the coordinators at public schools. They in turn became responsible for training the in-service teachers working within their departments. However, the CERD did not follow up with the trainers within their schools nor did it evaluate the effectiveness of the training on preparing in-service teachers to teach with technology. Private schools were free to request such training, however, the government did not have direct authority over private schools and so such training may have been requested or not (Participant 1, interview).

The resources at the policy-making level were described as being both sufficient (Participant 2, interview) and insufficient (Participant 3, interview). Through D-RASATI, policy makers underwent intensive workshops and analyzed strategic plans from other countries. Additional informational resources that would be useful included scientific evidence on the effectiveness of ICT in education, cost benefit analysis, content development principles (when to buy, adapt, develop), and fundraising, private-public partnership scenarios (Participant 2, interview) as well as technology (hardware, software), and examples of good classroom practice videos (Participant 3, interview).

4.3 Extrinsic barriers and enablers: Analysis and recommendations (RQ1)

As discussed in the literature review, several factors are considered essential for the successful implementation of a national policy. First and foremost, researchers advocate the presence of a clear framework which sets the scene on a national level and creates the enabling environment where technology can be deployed, used and consequently integrated (MEHE, 2012). The national strategic plan, when disseminated and implemented, could play this encapsulating role. Therefore, the enabling factor operating at the national level was manifested in the government's awareness of the importance of creating and disseminating the national strategic plan which was founded on a comprehensive understanding of ICT integration in Lebanon and abroad (Burns, 2012). The plan was also carefully designed and took into consideration several aspects of the education system where ICT will eventually be integrated. This awareness of the ICT status has been considered a necessary first step for further progress at this level (Chapter 2, 2.7.1).

However, several barriers from the description of previous and current national initiatives have been identified and henceforth discussed.

Barrier 1: Lack of government funding

The OECD (2001) report recommended a number of directions for policy making. Those mentioned by Fayyad (2012) included infrastructure, software, professional development, assessment, and school leadership. Therefore, the strategic plan catered to several directions recommended by the OECD (2001) report. Nonetheless, the national strategic plan failed to address several other important conditions. Chief among these was the lack of government funding and official approval from the Council of Ministers. According to Culp et al. (2005), funding from multiple sources is a necessity without which a plan remains dysfunctional. Further, unequal distribution of funding and implementation were apparent in several initiatives including the latest national strategic plan. Previous and current initiatives were limited in scope with numbers including 50 schools, 7 schools and 10 schools out of the 1,281 public schools in the country. It seemed as though previous initiatives remained at the pilot stage and hence failed to make it to the implementation phase possibly due to a shortage in funding which led to disparities in distribution. Finding disparities in funding provision between schools, Younie (2006) concluded that such discrepancies reveal inconsistencies at best and ethically unacceptable inequality at worst. Such was the case at many Lebanese schools to date.

Barrier 2: Shortage in technological equipment and other resources

In a critical review of the educational technology status in Lebanon, it was also found that the challenge in providing technological equipment in Lebanese schools was not only about the number of computers currently available (or not available) at these schools. A major challenge was in the location of these technologies within separate computer labs for the purpose of IT classes. To add to this challenge, the telecommunications environment, which provided Internet connectivity to the public, was not supportive of technology integration at schools. For example, Internet fees were relatively high compared to other countries, bandwidth connectivity was slow, and Internet coverage to many parts of Lebanon was inconsistent and expensive. These barriers made Internet access unaffordable and unattractive to schools. Even when schools obtained Internet access, they could not access simulations, instructional videos and other resources because the Internet was not high speed (Burns, 2012). The document only 'hopes' that Internet cost is reduced with improvements in bandwidth in the mobile, wireless and broadband Internet markets (MEHE, 2012, p. 8).

Barrier 3: Little follow up and support

Adding to the magnitude of barriers facing ICT integration in Lebanon, respondents mentioned a lack of follow up and support for the implementation of ICT plans. Culp et al. (2005) asserted the importance of increasing and diversifying research, evaluation and assessment among their recommendations for effective policy making. Without valuable assessment procedures, the implementation of the national strategic plan would not be based on solid ground for further progress. Policy makers must assess the status of ICT in schools and monitor the progress of schools in implementing policy requirements. Such assessment provides valuable data which informs future policies and worthwhile investments.

Barrier 4: Incomplete Integration of ICT within the existing curriculum

In terms of Tanner's (2003) differentiation of ICTs, the Lebanese national strategic plan seemed to view ICT as a tool or resource which supported and extended teaching and learning across the curriculum. Therefore, Lebanon seemed to be struggling to achieve Type B integration where ICTs are used to enhance students' abilities within the existing curriculum (DETYA, 2002). The Lebanese approach has been to adopt a huge project such as the national strategic plan and consequently the government became responsible for specifying, managing and overseeing the integration of ICT across the national curriculum (Tondeur et al., 2007). The development and take up of Internet-based educational opportunities had not been mentioned in the strategic plan, a fact which does not point towards the start of Type C or D any time soon. Although huge amounts of organizational funds were going into Type B integration, economics could play a great deal of influence over the way in which the Lebanese government deploys ICT equipment in education when the plan is presented to the Council of Ministers.

Further, the document stated that the strategic plan builds upon and serves several major Lebanese government educational initiatives. One of these initiatives was the revision of the national curriculum by the CERD to integrate ICT into the curriculum. However, one of the respondents, specifically responsible for textbook production, indicated the impossibility of such an endeavor due to the lack of technological resources at many Lebanese public schools. Furthermore, though curriculum change is generally achieved by government initiatives in Lebanon, the national strategic plan did not affect the implementation of the current national curriculum and a prospective curriculum had to wait till 2017 before its development and implementation.

Barrier 5: Exclusion of ICTs from the formal assessment of learners

It must be noted that the national strategic plan was relatively comprehensive and policy makers were well aware of the importance of total curriculum reform. However, if schools did not become obliged to integrate ICTs into the curriculum, the way they were obliged to include other subjects and themes in the 1997 curriculum framework, then the government cannot guarantee the success of the plan. One way the government can ensure this obligation is by emphasizing ICT competencies and skills in their official examinations. Current official examinations do not incorporate the assessment of students' IT skills, let alone their abilities to use ICT during subject matter assessment. The current curriculum focuses on preparing students to succeed on two high-stakes examinations. These examinations rely heavily on a student's ability to recall declarative knowledge. This is one of the reasons why teachers focus so heavily on completing curriculum requirements through lectures and demonstrations (Burns, 2012).

Barrier 6: Inconsistencies among policy makers

Apparent from the information provided by different policy makers, the stories they told were deeply engrained in the context of their work environments and the nature of their responsibilities. Therefore, inconsistencies were noticed among policy makers at the CERD and the Ministry of Education. Whereas one respondent responsible for the development of English textbooks at the CERD mentioned the absence of prescriptive language for the integration of ICT in these textbooks, Fayyad's (2012) conference participation pointed towards the transformation and distribution of 161 books into digital books. This respondent also mentioned a lack of infrastructure at many schools to be the reason behind the impracticality of including ICT as an imperative component in textbooks. Another inconsistency was found among the respondents who found resources at the policy making level to be of sufficient quality and those who found them to be insufficient. Furthermore, two policy makers described the rationale for ICT integration to include all four rationales as discussed by Hawkridge (1990) (Chapter 2, 2.3.1), whereas the national strategic plan alludes more powerfully to the economic and social rationales driving curriculum reform.

Barrier 7: Exclusion of the private sector from the plan

Another significant finding pertains to the fact that the national strategic plan did not encompass the private sector. This sector was relatively autonomous and self-governed when it came to organizing the teaching and learning process. This sector was also responsible for developing its own policies and plans that lead in the long run (i.e. in grade 9 and 12) to meeting the attainment targets put forward by the government. Thus, private schools enjoyed the freedom to integrate technology into their curriculum or not. Therefore, the process of ICT integration at the time of the study was school-based and in certain cases, even teacher-initiated. The national strategic plan could best be described as advisory rather than mandatory.

Barrier 8: Problems with professional development

The national strategic plan took into consideration the professional development of in-service teachers. One of the policy makers responsible for teacher professional development indicated the beginning of such an initiative. However, since the initiative depended on a train-the-trainers scheme with no direct follow up from the Ministry or the CERD, policy makers could not guarantee the accurate implementation of the plan. Furthermore, the amount of professional development provided to in-service teachers was insufficient. Teachers were offered five days of professional development on average each year. This professional development was provided primarily through the CERD which was not mandated to work inside teachers' classrooms (Burns, 2012).

Barrier 9: Problems with teacher preparation

Another significant finding revealed the failure of the initiative to take into consideration pre-service teacher preparation courses. Participants negated the presence of a national accreditation body that required student teachers to demonstrate their technical skills or their pedagogical competence related to ICT. In this sense, universities were not required to incorporate ICT into their curriculum, though many of them have as will be discussed in the next chapter.

Barrier 10: Inconclusive language throughout the strategic plan

As mentioned above, the official document of Lebanon's national strategic plan was issued in July 2012. Representatives from the Ministry of Education, CERD, and D-RASATI developed the document. The document sets the stage for technology integration at Lebanese schools.

However, it does not confirm the implementation of the strategic plan. Inconclusive language is located throughout the document. For example, only 'if implemented', the ultimate goal of the strategic plan was to 'use technology to enhance, and support changes in *all components of the educational system as they affect teaching and learning* to prepare students in Lebanon to take their places as high-achieving, highly competent and highly skilled workers, learners, and citizens of a knowledge-based society that increasingly relies on and interacts with digital tools and information' (MEHE, 2012, p. 7). Preparing highly skilled workers conforms with an economic rationale for the integration of ICTs in schools, whereas preparing citizens of a knowledge-based society alludes to a social rationale. Elsewhere in the document, the probability of implementation is further stressed. The national strategic plan, 'if followed', will serve as a guide for what to do and what not to do to ensure 'a greater likelihood' that educational technology can support reforms in teaching and learning (MEHE, 2012, p. 9). Additionally, the objectives of the national strategic plan, 'if followed' can serve as a pathway for implementers as well as indicators for performance monitoring and evaluation (MEHE, 2012, p. 26).

Barrier 11: Other barriers listed in the strategic plan

In addition to the barriers previously mentioned, the strategic plan lists a number of barriers facing the educational system in Lebanon and how the plan could help to address such challenges. The challenges are listed here due to their comprehensive nature in summarizing the barriers facing the integration of technology in such an educational system. These barriers are:

- A perceived lack of high-quality instruction in government schools, particularly at the pre-secondary level
- A shortage of teachers in specific subject areas and in certain regions of the country
- Comparatively low achievement levels of students in Lebanon vis-à-vis their international peers
- A national curriculum that does not integrate technology

- Poor to uneven technology infrastructure and Internet connectivity in Lebanese schools, particularly in certain regions
- A focus on high-stakes examinations— the Brevet and Baccalaureate—that do not reflect the types of skills necessary for a digital age, such as critical thinking and information literacy skills
- Uneven teacher professional development and the lack of a functioning teacher support system
- A lack of data at the national level (MEHE, 2012, p. 10-11)

4.4 Conclusion

It must be acknowledged that the national strategic plan does mark “a first step in Lebanon’s journey towards technology integration in school” (MEHE, 2012, p. 5). The description of the national activities currently taking shape alludes to the presence of several enablers which may constitute the building blocks whence further activity can be built. Comparing these enabling factors to the directions listed in the OECD (2001) report, the national policy plan has acknowledged the necessity of these conditions in transforming the educational system through ICT. Therefore, the plan sets the stage for technology integration at schools through a most compelling argument. The next step would necessarily be to obtain approval at the Council of Ministers and henceforth begin the implementation, observation, evaluation and revision stages.

As discussed in Chapter 2, five major barriers have been found to hinder technology integration at the national policy level. In fact, these barriers align with those identified within the Lebanese context. In this way, a clear lack of government funding for equipment and other resources was identified. Further, government officials risk being accused of misunderstanding ICT issues at schools because of the inconsistencies found in their discourses. Furthermore, the unsuccessful translation of the policy plan into teachers’ practices may be caused by the little follow up and support, the incomplete integration of ICT within the existing curriculum, the exclusion of ICT from the formal assessment of learners, and the exclusion of the private sector from the plan.

These issues differ from those identified in the literature review, thus adding further knowledge in this area. Furthermore, clarity in the definition and rationales for ICT integration was lacking among the respondents and the document. Lastly, problems with professional development and teacher preparation were identified.

Therefore, in light of the aforementioned situation, Lebanese schools should be encouraged to develop their own ICT policy plans (Pelgrum, 2001). Research asserts the supposition that the implementation of national initiatives is not a direct translation from government documents to practice (Tondeur et al., 2007). Teachers have been reported to struggle to implement flawed policies that do not have a clear purpose; whether IT is a subject in its own right or whether it is a tool used for learning other subjects (Younie, 2006).

If lessons could be learned from other governments, then the Lebanese Ministry of Education and the CERD should take into consideration funding disparities, technology deployment and sustainability, in-service teacher professional development, and pre-service teacher preparation programs (D. M. Watson, 2001). They must also understand that preparing a curriculum framework for the use of technology in schools is a long, complex and expensive process and finally they must consider conducting periodic revisions in light of technological changes (Younie, 2006). Lastly, creating national websites where teachers can find resource materials for web-based learning and cooperation with other colleagues, and creating databases with exemplary best practice materials could establish a common discourse among policy makers and in-service teachers (Fluck, 2001). To sum up, the integration of ICT into the Lebanese educational context is still in its early years, and consequently “much remains to be done and much remains to be learned” (Culp et al., 2005, p. 299).

Having presented the finding from Study 1, the thesis will now move to Study 2 where an investigation of educational technology courses took place. Additionally, Study 2 examined the pre-service teachers’ perceptions of environmental and individual characteristics impacting their future uptake of educational technology.

CHAPTER 5 Data Description and Analysis at the University Level

5.1 Introduction

In the previous chapter, an investigation of the policy level led to an overall description of the Lebanese government's role in promoting the use of educational technology in schools across the country. This chapter further reports the research findings from Study 2: *University courses: structure, aim and relevance*. This study was guided by two questions (RQ2a and RQ2b) which inquired into the university courses and the potential barriers/enablers identified at this level, in addition to the environmental and individual characteristics influencing pre-service teachers' future integration of ICT inside their classrooms.

Initially, the study sought to investigate the courses through which pre-service teachers were being prepared to integrate technology into their future instruction at a representative sample of universities across the Lebanese boarders. The chapter therefore provides a general description of the educational technology courses in Lebanon. Then, the strategies implemented in each of these courses are presented. Further, the approaches, technology content goals, and broader context of the ICT courses are elaborated. The course objectives and the role of the ICT lecturers are further discussed. The chapter then outlines the essential conditions for implementing ICTs which were in place within the university courses described.

Following this description, the results of the questionnaire administered to the pre-service teachers who had taken these courses are revealed. These results pertain to the environmental and individual characteristics believed to influence pre-service teachers' future use of technology. Pre-service teachers provided evidence for the technologies used, the confidence levels acquired and the support provided during the course. Further, the lens for understanding and analyzing pre-service teachers' individual characteristics is an amalgam of two separate bodies of literature (Chapter 2, 2.6). The first body of literature documents the significance of three types of beliefs (pedagogical, self-efficacy and value beliefs), in influencing classroom practice regarding technology integration while the second body of literature asserts the importance of pre-service teachers acquiring technological pedagogical and content knowledge (TPACK).

The description of both sets of data is then used to analyze the extrinsic and intrinsic barriers and enablers (Chapter 2, 2.5) influencing the effective preparation of technology at the university context.

5.2 Description of educational technology courses in Lebanon (RQ2a)

There are thirty-one authorized universities in Lebanon according to the Ministry website. Eighteen include a Department of Education and/or an English Language and Literature Department. All these universities were initially contacted to verify the existence of an educational technology course. The remaining universities were excluded from the study because they either did not have an Education Department or because the medium of instruction was purely in French. An educational technology course was not present in any of the English Language and Literature departments. Eleven universities met the criteria of inclusion in the study. A random selection of seven universities became the context for interviews conducted with the ICT lecturers who designed and delivered the educational technology course. Information was sought about the way teachers were being prepared to integrate technology in their future teaching. A detailed description of these programs is provided in Table 5.1. The seven universities are referred to as UA, B, C, D, E, F and G.

Table 5.1: General description of the ICT courses investigated (N=7)

Description	UA	UB	UC	UD	UE	UF	UG
	Preschool-Primary-Lower and Upper Secondary	Primary	Preschool-Primary-Lower and Upper Secondary	Primary-Lower and Upper Secondary	Preschool-Primary	Primary	Primary
Type of degree	BEd	BEd	BEd B.A in English Language and Literature B.A in English Language Teaching	BEd	BEd B.A in English Language and Literature	B.A in English Language Teaching	BEd
Name of course	Computers in education (obligatory) Instructional media and techniques (elective)	Instructional Computer Applications in Education Computer-based Instructional Strategies	Instructional media and techniques	Educational Technology	Computers in Education	Integrating Technology into the Education Curriculum	Instructional Technology
Number of years offered	10 years	2 years	10 years	2 years	12 years	3 years	4-5 years
Prerequisite	None	Use of Computer Applications in Education	Fundamentals of education	General university requirements including technology course	General university requirements including technology course	General university requirements including technology course	Computer Fundamentals and its Applications
Number of students	5	4	15	30	10	7	24
Passing grade	70	60	60	60	60	60	50
Technical support	Yes-very good	Yes-very good	Yes-very good	Yes- good	Yes- good	Yes-very good	Yes- good
Comfort level	Very good	Very good	Very good	Very good	Very good	Very good	Very good

Six universities offered a Bachelor of Education and two universities offered a Bachelor of English Language Teaching. Two universities also offered a Bachelor of Arts in English Language and Literature; however, this program was offered through the Humanities Department. The educational technology course at both universities was offered only through the Department of Education.

All universities targeted the preparation of pre-service teachers for primary school teaching. Only three prepared pre-service teachers for lower and upper secondary school teaching. However, only two of these universities required their teachers to take the educational technology course as a requirement for the English Language Teaching program. The third university offered the preparation of pre-service teachers for teaching at the secondary level through the B.A in English Language and Literature, which did not include the educational technology course.

With different names and emphases, all universities offered a standalone educational technology course. Two universities also provided pre-service teachers with an additional educational technology course. At one university, this second course was mandatory while at the other university the course was optional. Five universities provided a pure technological course offered as a general university requirement at the beginning of the program.

The total number of students taking these courses during the spring semester in 2012 was 95 pre-service teachers ranging from four to thirty students in any one course. It should be noted that 3 universities had other branches in different regions in Lebanon, but their students were not considered.

The courses had been offered for an average of seven years, ranging from a minimum of two years to a maximum of twelve years. The passing grade for the courses ranged from 50-70, with the majority of programs having a passing grade of 60. Technical support was provided at all universities and was rated as ranging from good to very good. All ICT lecturers perceived their comfort level with technology as being very high.

5.3 Strategies implemented during the educational technology courses (RQ2a)

Several strategies can be implemented by university lectures in order to prepare their pre-service teachers for technology integration in their future classrooms (Chapter 2, 2.3.2). As shown in Table 5.2, all seven university courses investigated provided their pre-service teachers with technology training using the single course strategy. Accordingly, the preparation of pre-service teachers took place through an isolated course among several other courses which constituted the entire program. One of the major advantages of the single course strategy is that a wide range of technological skills may be taught to all students. In addition to the single course strategy, four universities further adopted two or three other strategies. The evidence provided by the interview participants and which revealed the strategies they had adopted is presented next.

Table 5.2: Strategies used to incorporate technology into the ICT courses investigated (N=7)

Strategies	**UA**	**UB**	**UC**	**UD**	**UE**	**UF**	**UG**
1- Integrated							
2- Multimedia						✓	
3- Education faculty	✓				✓		
4- Single course	✓	✓	✓	✓	✓	✓	✓
5- Modeling							
6- Collaboration							
7- Field based							
8- Workshops							
9- Access	✓	✓					
10- Mentor teachers							

5.3.1 The education faculty strategy

Only two universities focused on improving the attitudes, abilities and use of technology by education faculty. Both universities offered ongoing support to education faculty through workshops targeting technological skills. The workshops held at university A and E followed a similar pattern. Both involved all university professors in order to train them on generic technological applications such as Moodle, Blackboard, the library catalogue, Turn It In software, and “whatever is common to all instructors” (UE).

> Everybody got training on the Blackboard system that we are using as a platform for our courses and the banner system. So we all had training sessions on the administrative IT to manage our courses or registration or administrative operations… so there is often training sessions like this, anything that is needed by the instructor bodies at large. (UE41-43; 49-50)
>
> It’s not a training program. We have an office called Academic Computer Center that offers courses about blended learning,…Photoshop,…everything you would like to know as a teacher or as a professor. (UA62-64)

Both ICT lecturers agreed that the support provided by the university for the education faculty was helpful and ongoing.

> The university is holding several sessions every year. They offered the Blackboard in the fall…. for the new comers there is always reoffering. (UE47-48)
>
> They are very helpful and they support the whole campus. It is ongoing support… even if you have a specific topic, they create a specific workshop for two colleagues and you can even negotiate any kind of schedule. (UA66; 70-71)

Other universities were either dissatisfied with the support provided to the education faculty or did not provide such support in the form of workshops. Teacher education faculty were required to possess the necessary technological skills and their individual efforts to acquire these skills was commended (UB and UG). The dissatisfaction with the type of support offered indicated several challenges which rendered the professional development ineffective. Among these challenges were the small-scale participation, unpreparedness of participants and language barriers.

> I wouldn't say it was major, but we did get someone from the British Council who came from London 3-4 years ago and we asked some of the instructors to attend this workshop and it was a week long. They taught them how to use technology in teaching, but whether it was effective or not, whether they are using it or not, I don't know. Some professors, say 15-18 attended and not everybody was ready for it. The instructor who came was speaking English and not all the teachers understand English. (UG50-54)

5.3.2 The multimedia strategy

Only one ICT lecturer mentioned the multimedia strategy in the form of case studies presenting examples of technology being used in real classrooms. This strategy offers similar advantages to the modeling strategy, although the mode of presentation is electronic rather than in real-time.

> I think that good examples of lessons will give them a clear idea of what is expected of them. I always show them plenty of examples, things that I've prepared things from my friends. I give them the resources and samples on USB and they go home and look at them. (UF98-100)

5.3.3 The access strategy

The seven lecturers stated having access to a variety of technological tools and resources. However, they differed in the quantity of resources available. A summary of the technological equipment available at these universities is presented in Table 5.3.

Table 5.3: Technological equipment available for the ICT courses investigated (N=7)

Technological device	UA	UB	UC	UD	UE	UF	UG
1- PCs	✓	✓	✓	✓	✓	✓	✓
2- IWB	✓	✓	✗	✗	✗	✗	✓
3- Video conferencing system	✓	✓	✓	✓	✗	✓	✗
4- Audio equipment	✓	✓	✓	✓	✓	✓	✓
5- Digital cameras	✓	✓	✗	✗	✗	✓	✗
6- Digital video cameras	✓	✓	✗	✗	✗	✓	✗
7- Projection system	✓	✓	✓	✓	✓	✓	✓

Two universities placed particular emphasis on the access strategy. According to Table 5.3, these universities were the only two that mentioned being fully equipped with personal computers, interactive whiteboards, video conferencing systems, audio equipment (including software), digital photo cameras (including editing software), digital video cameras (including editing software), and projection systems.

All the other universities had personal computers, audio equipment and projection systems. No other technological devices were cited at these universities. One technological device of particular interest to the educational arena nowadays is the interactive whiteboard (IWB). This technological device was among the least cited technological tools available at these universities.

5.3.4 The collaboration, field-based and mentor teacher strategies

According to the model described by Kay (2006), the standalone educational technology course excludes the possibility of training pre-service teachers through the integrated and workshop strategies. However, the single course strategy is quite compatible and should be enhanced with the collaboration, field-based, and/or mentor teacher strategy through modeling and/or authentic activities (Chapter 2, 2.3.2). None of the universities conducted the field-based component of their program with a particular emphasis on technology.

> There is no formal requirement for students to integrate technology during the practicum course. (UD55)

A field-based component was not a university requirement at one university.

> They don't do field placements. It's the university policy. (UF46)

Another participant expressed a relative situation in regards to field-based technology integration.

> It depends on the teachers and the schools where they conduct their field experiences…if they are placed in a school that is technology oriented, definitely they will use technology in their practice teaching, if they are in a school that is not equipped or doesn't have any use of ICT, there is no requirement for them to do so. It depends on

> the logistics whether they can order a computer with a projection to do their practice teaching, or whether the school has a computer lab. (UE65-69)

Since a field-based component associated with the single course strategy was missing in all the university programs, the mentor teacher strategy became impractical. There were no formal requirements for mentor teachers to integrate technology during student teachers' field placements.

> … we are just grateful that they are allowing us, so it's up to them. (UC83)

According to participant E, there was a high possibility that mentor teachers were incorporating technology during student teachers' field experiences at ICT equipped schools.

> We can't impose this on the schools. But we select the schools in which our students do their practice. The schools that we select are updated schools and they do use technology in their teaching. (UE72-73)

Though all participating universities integrated technology into the pre-service teacher preparation program through the single course strategy, they differed in the types of approaches adopted and the kinds of technology content goals pursued, both of which led to different course requirements and learner activities. These characteristics were embedded within the broader context of the ICT course discussed next.

5.4 Approaches, technology content goals and the broader context of the ICT courses (RQ2a)

A variety of approaches and technology content goals were registered at the seven universities. Among the most common approach mentioned was the authentic experiences approach noted at five universities. The second most common method was the information delivery approach noted at four universities. Using these approaches among others, the ICT lecturers taught a variety of technology content goals. The broader context of these universities was similar in the way that the preparation of pre-service teachers took place through one or more isolated courses. The approaches, content goals and broader context of the educational technology courses are summarized in Table 5.4.

Table 5.4: Approaches, technology content goals and broader context of the ICT courses investigated (N=7)

Description	UA	UB	UC	UD	UE	UF	UG
Approaches	Authentic experiences	Information delivery Hands-on skill building Authentic experiences	Information delivery Authentic experiences	Information delivery Hands-on skill building	Authentic experiences Information delivery	Authentic experiences Observations and models	Hands-on skill building
Technology Content Goals	PPT MS Word Excel Blogs Wikis Moodle Google Docs Google sites Picasa Flash Paintshop DreamWeaver Webquests	PPT MS Word Animations Hot potatoes Video files MovieMaker Photoshop QuizMaker	PPT Blog Video files Audio files Web 2.0 Internet	PPT MS Word Troubleshooting Simple hardware and software Google Docs	PPT MS Word Excel LOGO IT curriculum analysis Internet	PPT MS Word Excel Blog Online testing Publisher Hot Potatoes	PPT MS Word Excel Blog Audacity MovieMaker Activinspire
Broader Context	Mandatory course Optional course	Two mandatory courses	Standalone course	Standalone course	Standalone course	Standalone course	Standalone course

5.4.1 Approaches to technology integration

Five universities provided pre-service teachers technology training through authentic experiences. They taught *with* technology as opposed to teaching *about* technology. Two of these university courses could be described as consisting of a problem-based component. Pre-service teachers were required to locate an educational problem and then using specific technological tools, they were required to map out a solution to this problem.

> I teach my students how to use a wiki and to work in a group to search for a project and they have to implement an activity using the tool such as raising awareness about pollution, obesity, alcohol… They choose and it has to be educational and so they learn not only how to use the tool but even using educational approaches…We have Webquests, Google docs, Picasa web albums, they have to take their own pictures. When you talk about raising awareness about pollution they have to go outside and bring their own pictures, they have to resize their pictures. We talk about resolution and how to play with images. (UA22-25; 29-32)

> Actually we start with a global thing like when we work on Excel, I put a problem: you have a certain amount of money to go shopping and you have a list of items with the prices. Some of them are discounted, some of them are not and you are limited with this amount of money. Build a model on Excel that will tell you when you exceed your budget and give you a kind of alarm that you are exceeding and that will help you reconsider your shopping items in a way to remain in this. So the problem is holistically posed from the beginning. Now not everybody knows Excel, not everybody knows how to solve this problem, so we start breaking it down together. So we have the farfetched objective that is there, then we start looking for the path to reach this together… what are the components needed, how can we go about it, what are the functions under Excel that are needed to do this. (UE127-136)

Still within the authentic experiences approach, five universities used a project-based approach. Pre-service teachers were required to complete educational projects using specific technological tools.

> They have to come up with a whole lesson for a grade level with three different levels in the class through technology… they have to create technology aids for this lesson that would be supplements that reinforce the concepts. (UB28-29; 35-36)

> They have a website evaluation assignment where they have to evaluate the credibility and reliability of a website to understand cyber literacy and information literacy…The second project has to do with creative work or project. They do picture mounting and we have some of their projects displayed. Then they have to choose either to design a bulletin board or a game… Then of course we have the web 2.0 and these are the guidelines on what to put on the website. (UC31-32; 33; 37-38)

> They do projects and assignments all through the course. The assignments include a grade book on spreadsheet, various applications of spreadsheets in building tests or exercise practice for the students, LOGO assignment, summary of the informatics curriculum, they will not necessarily be IT teachers but when they teach a certain subject it is important that they know what their students are learning in the IT course so they can use those applications for their purpose of teaching. They build their CV for a teaching position and usually this is the context in which we develop their word processing skills…. And they also prepare a lesson for the school curriculum to be taught through PowerPoint. (UE19-30)

> They do three projects: First they prepare the unit plan then they choose one lesson and they prepare that lesson thoroughly…The second project is to prepare online tests…The third project is preparing the blog related to the same lesson. (UF14-15; 19; 21)

Also within the authentic experiences approach, two universities used simulations of field activities as one of the activities conducted in the computer lab where the course took place. The purpose of this activity consisted of teaching the lessons they had prepared using technology to their peers in a simulated classroom context.

> We have microteaching and we simulate classes, we do this in the ICT course. (UE69)

> They take the role of the students and the teachers. They do the project that the students are supposed to take in the class. They do a dual work as if they are teachers and they want to teach their students. (UF16-18)

Four universities also incorporated a second approach to technology integration within pre-service teacher preparation programs. This approach, termed information delivery, refers to the way the instructor of the ICT course delivers important information on specific technology integration content. Within this approach, two universities included readings through a prescribed book as a component of the course.

> … this textbook is the best book on integrating technology; I have been using this text book since the fourth edition, and it's the tenth but it is still the best book on educational technology, of course the emphasis has shifted on visual principles... (UC28-30)
>
> Currently we are using a Pearson textbook. They do some readings; they use it as a reference for developing their lessons, or for ideas for the history of computers or the components of a computer system for school. (UE33-35)

Also under the information delivery approach, two other universities depended upon lectures as a method to convey information to the pre-service teachers taking the course.

> There is educational theory about the inquiry-based education, active learning and distance learning and of course Bloom's Taxonomy… they have a test about midterm based on the theory they took. (UB24-25; 41)
>
> During the course, one part is only like lecture and the second part they sit in the laboratory. I start with simple hardware and software computer because some of them they are not aware of the computer. (UD13-14)

And finally, three universities used the hands-on skill building activities approach to help pre-service teachers acquire the necessary technical skills for technology integration. However, it was used as the sole approach at university D. At university G, this approach was used alongside the information delivery approach. At university B, it was incorporated with authentic experiences and information delivery approaches.

> It was… how to use… PowerPoint while giving the course just to show the students the technology... And part of this course is how to use the computer, if a student has any problem using the computer a minimum troubleshooting for the teacher how to handle this problem…And after when they start practicing the computer, I gave them projects for PowerPoint, for just to give me information about Activeboard.... (UD9-17)
>
> We teach them how to use Microsoft Word to make an interactive test… do some restrictions for the students can't change any questions... The same thing for Excel, we teach them how to make their grades and how to make an interactive test… we use a lot

> of interactive PowerPoint how to make the students more motivated, and use some advanced applications, going from one slide to another. We ask them to do a multimedia package… in the PowerPoint they have an embedded object that lets them go from the PowerPoint to the lesson plan... We teach them sound editing like Audacity and Moviemaker to build a multimedia package. At the end… we either teach them how to create a blog or how to use the interactive board to do a lesson and questions for the students. …The final project, the students have to make a presentation so its not only they give it to the instructor but they have to explain how they made this project. We also ask them skill questions to make sure they know how to do this... (UG22-32; 35-38)

5.4.2 Technology content goals targeted

In terms of technology content goals, Microsoft Office software was prominent at all seven university programs. The presentation tool, MS PowerPoint, was the most cited generic software used by teacher educators and pre-service teachers. Other Microsoft Office software included MS Word and Excel. Further, web 2.0 tools were mentioned at four universities. With interactive whiteboards at only three universities, teachers were trained to use the Activinspire software which accompanies this device at only one university. Less common technology content goals included: Google Sites, Google docs, Moviemaker, Photoshop, Dream Weaver, Paintshop, Picasa, Audacity, LOGO, Hot Potatoes and Moodle. Using these applications and programs, university lecturers took on several roles and targeted several objectives as described next.

5.5 Objectives of the courses and the role of the ICT lecturer (RQ2a)

Towards the end of the interview, ICT lecturers were requested to either agree or disagree to a list of course objectives which they pursued. The objectives pursued were varied and plentiful. Only few objectives were excluded from the course syllabi. They were also requested to provide a description of their role as a teacher trainer in preparing student teachers to integrate technology into their future teaching. Several roles are described below.

5.5.1 Objectives of the ICT courses

ICT teacher educators were asked about the objectives which they pursued to prepare student teachers to use the technological content goals noted in the previous section. The majority of responses indicated a full range of objectives targeted by the ICT course. The objectives pursued during the courses are presented in Table 5.5.

According to Table 5.5, the objective receiving the least attention was to facilitate teaching pupils with disabilities mentioned only by two participants. All other objectives were commonly pursued at most of the universities. All seven universities seemed to agree on the importance of achieving certain objectives, such as using technology for communicating and networking. They also agreed on the importance of using technology as a management tool for organizing work and keeping records, for preparing lessons and for finding digital learning resources. In addition, participants placed emphasis on the use of technology by student teachers in their future professions to facilitate teaching specific concepts or skills.

Table 5.5: Objectives pursued during the ICT courses investigated (N=7)

Objective	**Explanation**	**N**
1- Use of technology for communicating and/or networking		6
2- Use of technology for student teachers' own development and learning		6
3- Use of technology as an assessment tool		5
4- Use of technology as a management tool:	for organizing their work and keeping records	7
	for preparing lessons	7
	for finding digital learning resources	7
	for designing and producing their own	5

	digital learning resources	
5- Student teachers' future integration of technology:	to facilitate teaching specific concepts or skills	7
	to support various student learning styles and to personalize learning	5
	to facilitate teaching pupils with disabilities (cognitive, physical, behavioral)	2
	to support activities that facilitate higher-order thinking	5
	to support creativity	5
	to foster pupils' ability to use technology in their own learning	6

5.5.2 The role of the ICT lecturer

In general, these teacher educators had very different perceptions of their roles. One teacher educator in particular exemplified student centered constructivist pedagogy and viewed herself as a "facilitator" of student learning.

> In education we focus a lot on the constructivist approaches and active learning approaches. So the course is problem based, I play the role of facilitator of following up on what they are doing, if they have problems or questions that I may help with. But basically we try to keep them active during the sessions and in between sessions doing things. (UE84-87)

Another ICT lecturer believed her role was to help student teachers become "self-learners" (UA) by asking questions and going beyond what a single course can offer them. Yet another ICT lecturer saw her role as a guide who helps learners "understand technology and not to abuse it. Not to do old things in new ways but do new things in new ways" and "know that technology is not the panacea of whatever problems we have, it's just one of the tools and we have to know when and how to use" (UC99-98; 102-103).

Other lecturers, by contrast perceived their roles in a more limited way, including a technology specialist “to teach the students how to use new forms of technology and the older classic forms of technology like Microsoft office” (UB74) and supporter who “encourages them to use technology. I always tell them that they have to use it because when they go to the schools these days they ask them if they know computers” (UG85-86).

5.6 Essential conditions for implementing ICTs (RQ2a)

Additionally, according to the essential conditions for implementing ICTs in teacher education (UNESCO, 2002), all of the ICT lecturers interviewed alluded to the presence of several essential conditions (Chapter 2, 2.7.2). Three conditions, in particular were in place at all seven universities. These included the importance of access, skilled educators, and technical assistance. The condition of learning through student-centered methods was addressed at five of the universities. However, none of the educational technology courses met all ten of the essential conditions necessary for the creation of a supportive environment at the university level. Table 5.6 presents a summary of the conditions which were in place at the seven universities investigated.

Table 5.6: Presence of the essential conditions within the ICT courses investigated (N=7)

Conditions	UA	UB	UC	UD	UE	UF	UG
1- Shared vision	✓	✗	✗	✗	✗	✗	✓
2- Access	✓	✓	✓	✓	✓	✓	✓
3- Skilled educators	✓	✓	✓	✓	✓	✓	✓
4- Professional development	✓	✗	✗	✗	✓	✗	✗
5- Technical assistance	✓	✓	✓	✓	✓	✓	✓
6- Content standards	✗	✓	✗	✗	✓	✓	✗
7- Student centered teaching	✓	✓	✓	✗	✓	✓	✗
8- Assessment	✗	✗	✗	✗	✗	✗	✗
9- Community support	✗	✗	✗	✗	✗	✗	✗
10- Support policies	✗	✗	✗	✗	✗	✗	✗

Two universities mentioned the presence of a shared vision with another committee and IT office, which were responsible for system wide technology integration. At the other universities, commitment to technology integration seemed to be at the course level, rather than at the system level.

> There is a committee, we have the coordinator of the committee and members. The members could be instructors and IT staff as well. The job of the committee is to provide the Dean with the most important software; pedagogical and other, the equipment that we need, if there is any problems, if there is a need for training. (UG69-72)

The second condition, access, was a strategy adopted by all seven universities, though in varying degrees. As mentioned earlier in section 5.3.3, two universities in particular were highly equipped with technological devices. Though access was more or less available at the universities participating in the study, only one university mentioned the presence of technology at the schools where pre-service teachers conducted their field placements. Another ICT lecturer indicated that implementing technology on the field was not a university requirement, while most also mentioned the impracticality of imposing technology use on the cooperating schools.

In regards to the third essential condition, skilled educators, all the ICT lecturers interviewed were skilled educators in the field of technology and its applications in education. All participants perceived their level of technology expertise as being very comfortable using technology in their classrooms. Beyond the use of PowerPoint as a presentation tool, little can be said about the other teacher educators working at the different departments of education.

> It depends on the employer if he wants to use technology. (UD49)

> There is encouragement for everybody to use technology but this is not mandatory. (UE56-57)

> All the teachers in our department are encouraged to use technology because we have portable LCDs to use in our classes... We are supposed to use PowerPoint, videos, sounds to have very interactive classrooms. (UF38-40)

> As of last year, many of the instructors are using PowerPoint to present their lessons. They are doing it by themselves… the number of instructors are increasing... But there are no formal requirements; we can ask them that there are no more handwritten tests so it has to be typed... (UG64-68)

Two universities, in particular, met the fourth condition of providing professional development to education faculty. As mentioned earlier in section 5.3.1, professional development was provided to all teacher educators at these two universities through the workshop strategy. At the other universities, teacher educators were not aware of the availability of workshops.

> Our teachers know how to use technology and we use technology a lot in the search for articles, and we use the Blackboard… for student assignments, downloading material, YouTube, they use that in their teaching. They do come with the skills, but it does happen that one of us knows something… so we would teach it… (UC55-59)

Technical assistance was provided at all the universities participating in the study. It was also described as being good to very good. Technical support was offered informally to the other teacher educators upon their request.

> We have a huge department that supports any problem. We know certain people in person and I call them and I request that person. Some of the time I can do it myself. But it is because I don’t have administrative rights on our computers... (UA57-61)

> Whenever we have a problem in the lab we get support immediately. (UE40)

> We have IT people in each branch, so if we have problems and we do have a lot of problems because all the students use the computers, but we really need more IT support because of the problems. (UG47-48)

Three universities in particular seemed to be aware of the fifth condition, content standards and curriculum resources particular to certain subjects. Two of these universities required simulations of field-based experiences by having their pre-service teachers teach the content of the lessons they prepared to their peers. A third university also requested that pre-service teachers prepare a lesson that targeted a specific content area and grade level. However, one of the ICT courses had a mixed population of students, with some students attending the educational technology course coming from the Psychology or Philosophy Departments. With such a diverse student audience, the content standards and curriculum resources may have received less emphasis.

> One of the assignments is to create a lesson on Google docs and they share it, but they don't implement the lesson because they are not all education majors. (UA40-42)

Another essential condition that was in place within five programs was the provision of student-centered approaches as described earlier in section 5.4.1. ICT lecturers prepared courses in which technology was used as an integral part of pre-service teacher learning. In two programs in particular, students investigated problems, collected and analyzed data, drew conclusions, and conveyed results using electronic tools which they used to accomplish these tasks. The other three used authentic experiences in the form of project-based learning. In these settings, too, pre-service teachers were at the center of the learning process creating technological artifacts which could be used in their future teacher professions.

A seventh essential condition for technology integration within teacher preparation programs is ongoing assessment. This condition includes the importance of assessing the effectiveness of technology for learning throughout the teacher preparation program. In this regard, none of the ICT lecturers believed their universities assessed pre-service teachers' competencies related to ICT except through their courses.

> The final assessment is not related to ICT. We have only these courses. (UA105)

Within the ICT course, student outcomes were generally assessed using a variety of authentic assessment techniques as well as traditional paper and pencil exams.

> Each assignment has a grade and a percentage. Like most of them are 15%, for example the Picasa web album it is very easy do, it has 5%, the PowerPoint has more work so it is 15%. Then there is a final test, it is 20%. (UA43-45)
>
> Each project comes with a rubric where they know the criteria and if we are going to evaluate them we have the Blackboard, I post it on the Blackboard as they're designing the material (UC39-41)

> I prepare a very specific checklist. The lesson plan, unit plan, creativity, punctuality, their interaction with their friends, and I tell them I am going to grade according to these. There is a part for the portfolio related to the lesson plan and the other projects related to working on the computer. They do a midterm and a final as well. It is paper and pencil because it is the university requirement to do so. (UF27-30)

Finally, two essential conditions not in place at the teacher preparation program included community support and support policies. Community support was not made available through the ICT courses. No university-school partnerships had been established among any of the participating universities. Furthermore, none of the ICT lecturers knew of the presence of a policy at the university to promote or support ICT-based innovations by teacher trainers in their teaching. Some were even unsure whether a policy existed or not.

> There is no policy. Lately after huge discussions, all the professors are convinced that they can implement technology in their teaching... (UA77-78)

> …I'm not sure in the mission statement or in the strategic plan for the university over the 5 coming years and I'm almost sure that there is something about technology. (UE54-55)

Lastly, all ICT lecturers confirmed the absence of any national accreditation which requires student teachers to demonstrate their pedagogical competence related to ICT.

> There's nothing formal nationwide to require such things… I don't think there is any requirement for certification about technological skills. (UE82-85)

5.7 Results and analysis of the questionnaire data (RQ2b)

The overall purpose of the e-questionnaire was to measure pre-service teachers' perceptions of the environmental and individual characteristics operating at the university context. Part I of the survey sought to obtain demographic data from the participants, information about their technology use during the educational technology course, and their confidence levels in using ICTs after taking the course. Part II consisted of two separate questionnaires, one which measured pre-service teachers' perceptions of their beliefs towards technology integration and the other which measured pre-service teachers' perceptions of their knowledge and skills.

Descriptive statistics revealed whether they possessed positive or negative beliefs regarding the integration of educational technology, in addition to the level of technological, pedagogical and content knowledge these teachers possessed. Measuring pre-service teachers' perceptions of their beliefs, knowledge and skills makes it possible to predict their future practices. Therefore, acknowledging such perceptions may, on one hand, inform universities about the success of their courses in improving pre-service teachers' knowledge and skills and changing their beliefs, and on the other hand, motivate them to make informed decisions about better ways to prepare future teachers.

5.7.1 Demographic data

Of the 95 students taking the educational technology course in the spring semester in 2012, only 14 responded to the e-questionnaire. The link to the e-questionnaire was forwarded by the participating ICT lecturers to their students. ICT lecturers also sent two reminders to their students encouraging them to take part in the survey after being prompted by the researcher. However, the response rate remained relatively low at 14.7%.

According to Table 5.7, the majority of respondents were females, except for one male respondent. They were mostly within the age range of 18-22 as indicated in Table 5.8. The target grade level which the respondents were being prepared to teach was mostly the primary level as revealed in Table 5.9. Only 29% of the respondents indicated that they would be teaching cycle 3 after graduation. This cycle in particular was chosen for further investigation at the school level in Chapter 6. Furthermore, not all of these participants were majoring in English language teaching since the courses did not target one subject matter as mentioned by the ICT lecturers. Therefore, only a small percentage of pre-service English teachers who have the necessary training to use technology at the third cycle graduate each year. The fact that most of the universities provided technology training to pre-service teachers regardless of the content domain created a lack of focus on English subject matter and the specific pedagogies associated most commonly with the teaching and learning of English language arts. Furthermore, since only Departments of Education offered some sort of technology training, other prospective

English teachers majoring in English Language and Literature at the Departments of Social Sciences across the country would not have received any sort of technology training.

Table 5.7: Pre-service teachers' gender (N=14)

Gender	Total	Percentage
Female	13	93%
Male	1	7%

Table 5.8: Pre-service teachers' age range (N=14)

Age range	Total	Percentage
18-22	10	71%
23-26	3	21%
27-32	1	7%

Table 5.9: Pre-service teachers' prospective grade level of teaching (N=14)

Grade Level	Total	Percentage
Preschool	5	36%
Cycle 1	6	43%
Cycle 2	5	36%
Cycle 3	4	29%
Cycle 4	1	7%

5.7.2 Available technological devices and support

Similar to ICT lecturers, pre-service teachers were asked to indicate their use of technological devices during the course. 86% of the respondents indicated using personal computers. More than half of the respondents also mentioned using projection systems (64%) and audio equipment (57%). Other technologies were not used as frequently. Interactive whiteboards, digital cameras and video conferencing systems were used only sparingly while digital video cameras were not used at all. Table 5.10 provides a summary of pre-service teachers' responses to this question.

Table 5.10: Technological equipment used at the universities investigated (N=14)

Technological device	Participants	Percentage
1- PCs	12	86%
2- IWB	5	36%
3- Video conferencing system	1	7%
4- Audio equipment	8	57%
5- Digital cameras	4	29%
6- Digital video cameras	0	0%
7- Projection system	9	64%

According to the responses of the ICT lecturers to this question as summarized in Table 5.3, pre-service teachers seemed to agree with their teacher educators about the availability of several technological tools where they had taken the course. They agreed on the wide presence of personal computers, projection systems and audio equipment, as well as the limited availability of digital cameras, video cameras and interactive whiteboards. They disagreed on the use of video conferencing systems. Even though ICT lecturers noted their availability, pre-service teachers did not use them as indicated in their responses. Such discrepancies between availability and use can be resolved when teacher educators take note of all the technological equipment they have available and start integrating them into their courses. Due to the unavailability of other devices, pre-service teachers were not given the opportunity to use them.

Respondents were also asked about the technical support available at their universities. As shown in Table 5.11, 71% indicated the presence of technical support. A possible reason for 14% of respondents to suggest the lack of technical support could be that IT personnel catered to the needs of teacher trainers rather than students who could seek technical support directly from their teachers.

Table 5.11: Presence of technical support at the universities investigated (N=14)

Technical Support	Total	Percentage
Yes	10	71%
No	2	14%
Don’t know	2	14%

When asked about the quality of this technical support, 36% of respondents indicated that it was mediocre, and 14% indicated that it was poor. 50% agreed with their teacher educators and indicated that it was good to very good. Table 5.12 presents the findings for this question.

Table 5.12: Quality of the technical support at the universities investigated (N=14)

Quality	Total	Percentage
Poor	2	14%
Mediocre	5	36%
Good	5	36%
Very good	2	14%

5.7.3 Uses of technology within the course

Pre-service teachers were asked about the extent to which they used technologies in certain ways during the course they had taken. Each item on this part of the questionnaire had the following response choices: (a) never, (b) sometimes, (c) about half the time, (d) often, and (e) almost always. Responses on each item were scored from 1-5 (1= never; 5= almost always) and then mean scores and standard deviations were calculated for each item. A low mean score represented a low frequency of use, whereas a high mean score indicated a high frequency of use. The median value was 3.0. A summary of the mean scores and standard deviations for the extent that technology was used is presented in Table 5.13.

Table 5.13: The extent to which technology was used at the universities investigated on a Likert scale of 1-5 (N=14)

Use of technology		**Mean**	**Standard deviation**
1- Use of technology for communicating and/or networking		3.0	1.41
2- Use of technology for student teachers' own development and learning		3.57	1.15
3- Use of technology as an assessment tool		2.85	1.35
4- Use of technology as a management tool:	For organizing your work and keeping records	4.21	0.69
	For preparing lessons	4.14	1.09
	For finding digital learning resources	3.42	1.01
	For designing and producing your own digital learning resources	3.64	1.15
5- In your future integration of technology:	To facilitate teaching-specific concepts or skills	3.64	1.0
	To support various student learning styles and to personalize learning	3.07	1.14
	To facilitate teaching pupils with disabilities (cognitive, physical, behavioral)	2.64	1.27
	To support activities that facilitate higher-order thinking	3.21	1.31
	To support creativity	3.78	1.31
	To foster pupils' ability to use technology in their learning	3.35	1.08
Total		3.42	1.15

Generally speaking, the mean score for all the technological uses listed on the questionnaire was 3.42 with a standard deviation of 1.15. This result indicated the presence of a variety of ways in which technology was used quite often during the educational technology courses. However, a closer examination of the mean scores for individual items revealed more emphasis placed on certain ways technology was used. As presented in Table 5.13, participants mentioned using technology as a management tool for organizing their work and keeping records the most (M=4.21) followed by using technology as a managerial tool for preparing lessons (M=4.14). This result corroborates with the data obtained from the teacher educators presented in Table 5.5. Among the objectives they pursued, using technology as a management tool for organizing work and keeping records as well as preparing lessons was common to all seven universities.

Furthermore, the use of technology to facilitate teaching pupils with disabilities (cognitive, physical, behavioral) registered the least mean score (M=2.64). Pre-service teachers were not exposed to specific uses of assistive technologies that support the learning needs of students with certain disabilities. This result reiterates the findings from the interview data. Teacher educators also indicated that using technology this way was not among their priorities. The general structure of the standalone course and the time allocated may not have been sufficient for preparing pre-service teachers in specialized uses of technology. Instead the focus was on general applications that organized their work and supported lesson preparation.

Further, according to the questionnaire results, pre-service teachers indicated that the use of technology as an assessment tool was not frequent during the course. Pre-service teachers used technology as an assessment tool only sometimes (M=2.85). However, this result contradicts the findings from the interview during which most teacher educators mentioned pursuing this objective. Perhaps having to do their own exams and quizzes in the traditional paper and pencil method led pre-service teachers to overlook technology as an assessment tool and use it more as a management tool.

Finally, the interpretation of the data presented in Table 5.13 indicates the use of technology in several different ways and for an extended period of time. Other uses of technology did not receive equal emphasis and consequently it is doubtful that pre-service teachers would use technology in these ways in their future classrooms.

5.7.4 Pre-service teachers' confidence levels

Also in part I, participants were asked to indicate their level of confidence to integrate technology in the previously mentioned ways. Each item on this part of the questionnaire had the following response choices: (a) not confident at all, (b) somewhat confident, (c) confident, and (d) very confident. Responses on each item were scored from 1-4 (1= not confident; 4= very confident) and then mean scores and standard deviations were calculated for each item. A low mean score represented a low confidence level, whereas a high mean score indicated a high confidence level. The median value was 2.0. Pre-service teachers' perceptions of their confidence levels are represented in Table 5.14.

Table 5.14: Pre-service teachers' confidence levels for the ways technology was used at the universities investigated on a Likert scale of 1-4 (N=14)

Use of technology		**Mean**	**Standard Deviation**
1- Use of technology for communicating and/or networking		3.0	0.78
2- Use of technology for student teachers' own development and learning		3.21	0.69
3- Use of technology as an assessment tool		2.71	0.82
4- Use of technology as a management tool:	For organizing your work and keeping records	3.21	0.69

	For preparing lessons	3.28	0.61
	For finding digital learning resources	3.07	0.91
	For designing and producing your own digital learning resources	2.85	0.77
5- In your future integration of technology:	To facilitate teaching-specific concepts or skills	2.92	0.73
	To support various student learning styles and to personalize learning	2.85	0.94
	To facilitate teaching pupils with disabilities (cognitive, physical, behavioral)	2.57	1.01
	To support activities that facilitate higher-order thinking	2.85	0.94
	To support creativity	2.85	1.09
	To foster pupils' ability to use technology in their learning	2.85	0.94
Total		2.94	0.84

According to the results presented in Table 5.14, pre-service teachers' perceptions of their confidence levels to use technology in specific ways were all above the mean score. The average mean score registered for this question was 2.94 with a standard deviation of 0.84. The highest confidence level was registered on using technology for preparing lessons (M=3.28) and for organizing their work and keeping records (M=3.21). Interestingly, these two items were also among the most commonly cited by both teacher educators in Table 5.5 and by student teachers in Table 5.13.

Though above the median value, the lowest confidence level was recorded for using technology to facilitate teaching pupils with disabilities (M=2.57). Not surprisingly, this item was the least cited by both teacher educators and pre-service teachers in Tables 5.5 and 5.13 respectively. Similarly, lower confidence levels were also recorded for using technology as an assessment tool. The mean score registered for this item was 2.71. For this particular use, teacher educators disagreed with student teachers on the extent to which technology was used in this way during the course as discussed in the previous section. Pre-service teachers indicated infrequent use of technology as an assessment tool and conceived their confidence at a lower level compared to the other uses of technology.

An interpretation of the data as presented in Tables 5.13 and 5.14 indicated higher confidence levels for the most frequently mentioned technology uses and conversely lower confidence levels for less frequent technology uses. When pre-service teachers indicated high frequency of use, their perceptions of their confidence levels increased. Overall, pre-service teachers' perceptions of their confidence levels registered relatively high scores for all uses of technology. Such high confidence levels could indicate that pre-service teachers will use technology in their future professions. Considering higher confidence levels on certain uses of technology, pre-service may actually use technology in these same ways too.

However, researchers have cautioned against assuming that higher confidence levels automatically translate into higher levels of technology use in the classroom (Wentworth et al., 2008). There are several reasons which explain this lack of direct relationship between confidence levels and actual uses. First, most pre-service have not been exposed to technology during their K-12 education. Thus, their experiences as teachers do not include technology integration into instruction. Second, the focus on acquainting pre-service teachers with specific technology uses rather than on how to integrate them into instruction may enhance confidence levels but does not provide them with guiding models which they can follow once they begin teaching (M. Russell et al., 2003). Third, facilities, hardware, software and other technological resources may be unavailable at the schools where pre-service teachers conduct their field-based experiences and consequently lead to their reluctance to exert further efforts on the integration of technology into their lessons (Choy et al., 2009).

5.7.5 Evaluation of the teacher trainer

Finally, participants were asked to indicate the extent to which their teacher trainer modeled combining content, technologies, and teaching approaches effectively in their teaching. 78% of the respondents agreed or strongly agreed that their teacher educator had modeled combining all three knowledge types in their classes. This result is confirmed from the findings of the interview data during which teacher educators indicated high levels of comfort and competence using technology for their courses.

5.7.6 Results obtained on the TBTUS questionnaire

In part II, participants were asked to indicate their level of agreement on two separate questionnaires: the Teachers' Beliefs regarding Technology Use Survey (TBTUS) and the Survey of Pre-service Teachers' Knowledge of Technology, Pedagogy, and Content (TPACK).

The adapted version of the TBTUS consisted of 48 items divided upon the three belief domains: pedagogical, self-efficacy, and value beliefs. Participants' responses ranged on a Likert scale of 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree. The first 29 statements on this questionnaire included items which measured pre-service teachers' pedagogical beliefs. Of the 29 items, 7 statements supported constructivist beliefs and 22 statements supported traditional beliefs. Scores for the statements supporting traditional beliefs were inverted. The result of this process was an overall index of the participants' perceptions of their pedagogical beliefs which either aligned with the theories and practices of constructivist learning or with those of traditional teaching. Items 30-36 included statements which measured respondents' perceptions of their self-efficacy beliefs. Finally, items 37-48 included statements which measured respondents' perceptions of their value beliefs towards technology integration in the classroom.

The maximum score which could be recorded by individual respondents was 5.0. Obtaining this score meant that participants' perceived pedagogical beliefs were constructivist in nature, they had high self-efficacy beliefs and believed highly in the value of technology for educational purposes. To obtain this mean, participants would have to strongly agree with the 7 items that comply with constructivist learning as well as the statements on the self-efficacy and value constructs and strongly disagree with the 22 items which comply with traditional teaching. Conversely, the minimum score which could be recorded was 1.0. Obtaining this score meant that participants' perceived pedagogical beliefs were traditional in nature, they had very low self-efficacy beliefs and did not value technology use. To obtain this mean, a participant would have to strongly disagree with the 7 items that comply with constructivist learning as well as the statements on the self-efficacy and value constructs and strongly agree with the 22 items which comply with traditional teaching. The median value was 3.0.

The overall mean score for the 14 respondents on the TBTUS was 3.63 with a standard deviation of 0.63. This score indicated that participants had positive beliefs towards technology after taking the educational technology course. However, closer scrutiny of each of the three belief constructs revealed differences in the level of perceived positive beliefs. The average mean score for each belief construct is presented in Table 5.15.

Table 5.15: Mean scores recorded by pre-service teachers for the three belief constructs on a Likert scale of 1-5 (N=14)

Type of Belief	**Mean Score**	**Standard Deviation**
Pedagogical Beliefs	3.01	0.38
Self-Efficacy Beliefs	4.11	0.47
Value Beliefs	3.78	0.45
Total	3.63	0.63

As shown in Table 5.15, the majority of the respondents' perceived pedagogical beliefs could be described as traditional in nature. The general mean score for the pedagogical beliefs subscale was 3.01. Overall, most of the participating teachers' perceived beliefs were in tune with traditional, teacher-centered beliefs (N=11) and only few teachers' beliefs occupied a middle ground between constructivist and traditional ends (N=3). A possible explanation for this result could be attributed to pre-service teachers' early experiences as students and the way they were instructed throughout their education. Carefully sequenced content, a focus on the textbook, and teachers who have total control of what students learn and how they learn are common in many classrooms in Lebanon (Chapter 1, 1.5). Personal histories create an accumulated knowledge base which influences pre-service teachers' conceptions about teaching and learning. These conceptions are not easily replaced or removed (Katic, 2008). Therefore, teacher education programs have a more challenging responsibility in changing these "deep-seated" beliefs and replacing them with other more constructivist beliefs (Bai & Ertmer, 2008, p. 95).

Moreover, the results presented in Table 5.15 indicated high levels of perceived self-efficacy beliefs. The mean score for this subscale was a high score of 4.11. Hence, pre-service teachers believed in their ability to integrate technology in their future classrooms. Since pre-service teachers were not involved in vicarious experiences, a possible source for such high perceptions of self-efficacy beliefs derives from mastery experiences acquired after successfully completing the educational technology course. Teacher educators also provided verbal persuasions as evidenced by their descriptions of their roles in section 5.5.2 above. Pre-service teachers were perhaps convinced that they could integrate technology successfully into their classrooms when they completed the activities prescribed by their teacher educators. These two sources of self-efficacy beliefs were perhaps behind pre-service teachers' heightened perceptions in their abilities.

Furthermore, pre-service teachers' perceived value beliefs were relatively high. The mean score on this construct as indicated in Table 5.15 was 3.78. The result obtained on this construct indicated that pre-service teachers believed technology could have measurable benefits on student learning. They also revealed a relatively strong intention to use technology in their future teaching. A possible explanation for high levels of value beliefs pertains to pre-service teachers' involvement in a variety of activities, whether authentic or not, which involved several common technology content goals. The hands-on nature of most of the course requirements perhaps led to pre-service teachers' perceptions of the value of technology on student learning.

This disparity between the results obtained on the pedagogic beliefs construct versus the self-efficacy and value beliefs constructs could mean that pre-service teachers will be more prone to use technology in their future classrooms in traditional and teacher-directed ways. Unless pre-service teachers change their pedagogical beliefs and feel comfortable teaching in constructivist ways, they risk adjusting technological uses to fit their pre-existing beliefs.

To further understand the intricate nature of participants' belief systems, the following two sections take note of the mean scores of each item on the TBTUS. Then, a description of the three lowest mean scores recorded and the three highest scores registered is presented and discussed in some detail.

5.7.6.1 The three lowest mean scores obtained on the TBTUS

The three items on the questionnaire which had the lowest mean scores belonged to the pedagogical beliefs construct. A description of these items is presented in Table 5.16.

Table 5.16: The three lowest mean scores obtained on the TBTUS on a Likert scale of 1-5 (N=14)

No.	Statement	Mean	Standard Deviation
3	If students are not doing well, they need to go back to the basics and do more drill and skill development.	2.07	0.73
14	Students learn most effectively when lessons are broken down into sequential steps.	2.07	0.73
22	I am responsible for what students learn and how they learn.	2	0.67

Responses to the items presented in Table 5.16 had an effect of reducing the overall mean of the pedagogical beliefs subscale. These items represented a clear indication of strong beliefs in traditional theories and practices. The lowest mean scores registered items which reflected respondents' beliefs in their responsibility for what students learn and how they learn. This belief is at the heart of a traditional methodology where the teacher is considered the sage on the stage and learners are considered passive absorbers drilling bits and pieces of knowledge broken down into sequential steps. This description of pre-service teachers' beliefs further consolidates the probability that pre-service teachers' future engagement with educational technology will involve teacher-directed tasks and activities that typically include technological software designed for drill and skill development.

5.7.6.2 The three highest mean scores obtained on the TBTUS

The highest three scores obtained on the TBTUS included one item from the pedagogical beliefs construct and two items from the self-efficacy beliefs construct. The three items and their mean scores are presented in Table 5.17.

Table 5.17: The three highest mean scores obtained on the TBTUS on a Likert scale of 1-5 (N=14)

No.	Statement	Mean	Standard Deviation
4	In order to maximize learning, I need to help students feel comfortable in discussing their feelings and beliefs.	4.35	0.49
32	I am confident that I can develop effective lessons that incorporate technology.	4.28	0.61
33	I am confident that I can use technology effectively to teach content across the curriculum.	4.35	0.63

The item on the questionnaire which had the highest mean score pointed to the importance of creating a learning environment where learners are comfortable discussing their feelings and beliefs. From a constructivist perspective, this item is thought to be conducive to student learning. However, it is not uncommon for traditional teachers to create such learning environments in their own ways. Consequently, this item does not particularly necessitate the change of classroom practices from teacher-centered to learner-centered practices.

The remaining two items with the highest mean scores belonged to the self-efficacy beliefs subscale. Pre-service teachers indicated a strong perception in their ability to develop and use educational technology to teach specific content. It may be concluded that having such confidence in their abilities will help pre-service teachers in integrating technology in their future classrooms.

5.7.7 Results obtained on the TPACK questionnaire

The adapted version of the TPACK questionnaire consisted of 19 items divided upon four of the seven knowledge domains. Items pertaining to Content Knowledge, Pedagogical Knowledge and Pedagogical Content Knowledge were eliminated from the questionnaire as it was determined that these knowledge domains were not directly developed during the educational technology course. Through the administration of an e-questionnaire, pre-service teachers were requested to indicate what they perceived to be their levels of Technological Knowledge TK, Technological Pedagogical Knowledge TPK, Technological Content Knowledge TCK, and finally Technological Pedagogical Content Knowledge TPCK. Participants' responses ranged on a Likert scale of 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree. The first 7 statements in this questionnaire included items which measured pre-service teachers' Technological Knowledge. Statement 8 was the only item which measured Technological Content Knowledge as the focus in this research was English subject matter. Items 9-13 included statements which measured respondents' Technological Pedagogical Knowledge. Finally, items 14-19 included statements which measured respondents' Technological Pedagogical Content Knowledge.

The maximum score which could be obtained on this questionnaire by individual respondents was 5.0, further indicating pre-service teachers' perceptions of high levels of knowledge and skills in integrating technology. Conversely, strongly disagreeing on each item of the questionnaire would result in a mean score of 1.0 and indicate very low perceptions in their knowledge and skills. The median value was 3.0.

The overall mean score for the 14 respondents on the TPACK was 3.94 with a standard deviation of 0.70. This score indicated that participants perceived their knowledge and skills in using technology to teach specific content to be high. The mean scores and standard deviations registered on each of the four knowledge domains are presented in Table 5.18.

Table 5.18: Mean scores recorded by pre-service teachers for the four knowledge constructs on a Likert scale of 1-5 (N=14)

Knowledge type	**Mean**	**Standard Deviation**
TK	4.05	0.65
TCK	3.71	0.72
TPK	3.97	0.70
TPCK	4.03	0.76
Total	3.94	0.70

As shown in Table 5.18, the mean scores obtained on all four knowledge domains were higher than the median value. The interpretation of the data indicated that participants possessed high levels of knowledge and skills and felt competent enough to successfully implement technologically enhanced lessons. Consequently, they had knowledge of pure technical skills, knowledge of specialized technologies suited for specific content, knowledge of technologies suited for specific methods of instruction, and finally knowledge of technologies that lead to student learning of content by implementing suitable methods of instruction. Considering the fact that the majority of educational technology courses did not provide specialized training in using technology for subject matter areas, these participants had lower perceived TCK levels compared to the other knowledge domains. This result reinforces the importance of providing specialized focus for the uses of technology that target certain subject matter rather than training pre-service teachers on generic technology applications. Furthermore, their TPK and TPCK were infused with their perceived pedagogic beliefs presented in Table 5.15 and which were found to be in tune with traditional teaching methods.

Given the fact that participants registered high levels of perceived knowledge on all four domains could mean that the educational technology course had a great impact on enhancing their knowledge and skill repertoire. This result confirms research on the benefits of the standalone technology course in providing an overview of using technology in teaching and enhancing pre-service teachers' knowledge and skills (Lambert et al., 2008). Consequently, pre-service teachers may in the future integrate technology successfully by giving careful attention to the interactions between technology, pedagogy and content.

5.8 Extrinsic and intrinsic barriers and enablers: Analysis and recommendations (RQ2a)

Similar to the analysis of Study 1 data, analysis of Study 2 will focus on identifying the barriers and enablers found at the university context. Analysis will be referenced to the research studies included in Chapter 2. Analyzing the data obtained from the interview and the questionnaire data revealed several factors that hindered and others which enabled technology integration at Lebanese universities. The factors hindering technology integration included extrinsic barriers concerned with the environmental characteristics of the courses analyzed from the perspective of the ICT lecturers and pre-service teachers. These extrinsic barriers were first manifested in either a total absence of an educational technology course (N=1) or an educational technology course which focused solely on the acquisition of technical skills (N=2). Intrinsic barriers, by contrast, pertained to the individual characteristics of the pre-service teachers and how these could affect their future use of technology in their classrooms. Furthermore, both extrinsic and intrinsic enablers were identified at the university context. These enablers indicated the presence of a supportive environment for technology integration and several individual characteristics which can lead to pre-service teachers' future adoption of technology in their classrooms.

As noted in Chapter 4, the analysis of each study is completed independently and the discussion will also include relevant recommendations for overcoming the barriers and consolidating the enablers.

5.8.1 Extrinsic barriers

Barrier 1: Insufficient exposure to technology training

With the single course being the common strategy at all seven universities, such exposure to technology integration may be considered insufficient. At two universities in particular, there was heavy emphasis upon mastery of hardware and software functions rather than training the student teachers on how to use these functions for educational purposes. Such courses may lead to technology learning, but not necessarily to technology use (Kay, 2006; Y. M. Wang, 2006). Even though undertaking a standalone technology course has been associated with the development of a strong foundation of technology knowledge and skills (Kay, 2006), researchers have cautioned that the acquisition of these skills and knowledge tends to be separated from the overall teacher education curricula and pre-service teachers are unable to translate their newly acquired knowledge and skills into their field experiences (Brown & Warschauer, 2006; Choy et al., 2009). Pre-service teachers need to be prepared to apply a range of technological tools that enhance student learning. Such preparation requires a certain level of sophistication that goes well beyond what a single educational technology course can offer (Strudler et al., 2003). Consequently, many teachers in Lebanon may not feel prepared to teach in technologically rich environments (Brown & Warschauer, 2006; Egbert et al., 2002).

However, with the educational technology course only recently taking shape in most of the teacher preparation courses at Lebanese universities, eliminating the need for a standalone technology course at this point may seem impractical (Dutt-Doner et al., 2006). Therefore, Lebanese universities need to revise the instructional content of their technology courses in such a way that effective approaches to technology integration into classroom teaching and learning are made explicit. Educational technology courses should be designed according to social constructivist learning theories with a particular emphasis on collaborative student projects which address particular curriculum areas. In the long run, however, Lebanese universities must begin to plan and implement systemic and systematic program-wide integration of technology if pre-service teachers are to be provided with authentic experiences in their courses and enough practice on the field (Strudler et al., 2003).

Barrier 2: Failure to provide comprehensive combined strategies

Across the Lebanese universities investigated, there was only one university which combined three strategies; the single technology course strategy associated with the education faculty and access strategies. Three universities combined their single technology course strategy with another strategy. The remaining three universities implemented the single technology course strategy solely. Previous research has stressed the importance of incorporating several strategies rather than adhering to a single strategy (Brown & Warschauer, 2006; Mims et al., 2006; Strudler et al., 2003). The benefits of adopting combined strategies are the significant gains in attitudes, ability and use of technology (Kay, 2006). Pre-service teachers are able to learn, use and reuse their technological skills within multiple strategies and take part in numerous activities which consolidate their skills. This integrated strategy has also been found to support pre-service teachers' gradual learning of increasingly complex technological skills as they progress through the program and apply these skills in their practicum courses (Collier et al., 2004).

Barrier 3: Lack of a shared vision and compartmentalization of educational technology courses

None of the Lebanese universities examined had formulated university-wide policies which promoted the integration of technology throughout the teacher education program. However, having well-established policy plans is considered one of the essential enablers for technology integration at the university level (Goktas et al., 2009). The importance of developing a university-wide policy plan is that it allows for such systemic and systematic change efforts to take shape over a long period of time with constant adjustments and modifications occurring along the way (Tondeur et al., 2012). Through the role of top management in policy planning and implementation (Lavonen et al., 2006), universities ensure the creation of a shared vision among all teacher educators (Thompson et al., 2003). A technology plan at the university level should be developed collectively by all teacher educators, supported technically and instructionally by specialized team members, aimed at the empowerment of teacher educators, and constantly updated (Goktas et al., 2009; Tondeur et al., 2012).

The compartmentalization found among the education courses prevented the cooperation among teacher educators in sharing a common vision for their department. Creating this common vision particularly lies in the collaborative efforts of teacher educators who deliver methods courses, practicum courses and the ICT courses. Working together to create a shared vision, these teacher educators are able to adopt an integrated strategy that indirectly incorporates several other strategies such as the modeling, collaboration, mentor and field-based strategies. Technology thus becomes the vehicle that connects the entire pre-service teacher preparation program (Gomez et al., 2008).

Barrier 4: Lack of mastery experiences through trialability on the field

Six of the seven universities required that their pre-service teachers complete a field-based component at Lebanese schools. However, none of the universities included field experiences connected to the educational technology course. Pre-service teachers were not required to use technology as part of their practicum. At one university only, pre-service teachers may have been provided with the opportunity to practice their technological skills on the field depending on the school in which they conducted their field experience. However, if future teachers in Lebanon are to use technology as a tool to enhance student learning, then they must have field sites where they can observe and actively participate in effective uses of technology (Brush et al, 2003). Pre-service teachers need to trial, experiment and reduce their uncertainty about the effects of technology integration, as it becomes possible for them to learn by doing prior to adopting.

According to Roger’s diffusion theory, potential adopters progress along five stages. The progression from the knowledge level to the decision level is believed to commence at the teacher preparation program (Lambert & Gong, 2010). The fourth level, or the implementation stage, requires pre-service teachers to implement technology integration inside real classrooms. Consequently without a field-based component within the pre-service teacher preparation program, it may become difficult for these pre-service teachers to move on to the implementation and further to the confirmation level. This process of trialability of an innovation is considered an essential characteristic influencing its adoption.

Similarly, Bandura’s discussion of the sources of self-efficacy beliefs places mastery experiences as the leading basis for developing pre-service teachers’ self-efficacy beliefs. With strong self-efficacy beliefs developed on the field, it may be possible for pre-service teachers to sustain their use of technology after graduation (Chapter 2, 2.6.1.3). To take advantage of the many benefits of field-based strategies, ICT lecturers at Lebanese universities must begin to establish robust partnerships with schools known for their integration of technology in subject matter teaching and learning.

Similar to the ICT lecturers in this study, researchers have noted the difficulty of finding technologically rich field placements for their pre-service teachers. These difficulties include (1) the lack of technology at participating schools, (2) the reluctance of technologically-rich schools in allowing pre-service teachers to conduct their practicum, or (3) the lack of alignment between how technology is taught at the university and the way it is used by in-service teachers (e.g. Polly et al., 2010). The first difficulty has been reported by previous research conducted in Lebanon (Nasser, 2008; Yaghi, 1997) and confirmed in Study 3. A large number of Lebanese schools have low levels of technology availability, many of which may be the context for pre-service teachers’ field experiences. Furthermore, ICT lecturers alluded to the presence of technology at some schools, however, they had not developed partnerships with these schools and consequently could not “impose” technology integration on the cooperating teachers. The third difficulty requires further research to investigate whether there is alignment between technology integration at schools and technology acquisition at universities.

Barrier 5: Lack of observability provided through vicarious experiences

At the Lebanese universities investigated, none of the ICT lecturers depended upon modeling as a strategy for integrating technology into their teacher preparation programs. The modeling strategy consists of exposing pre-service teachers to good examples of technology integration (Ottenbreit-Leftwich, Glazewski, & Newby, 2010) and is mostly associated with a field-based strategy or an integrated strategy (Kay, 2006). However, student teachers were not required to participate in field-based experiences that specifically incorporated technology use. As a result, they did not observe in-service teachers using technology effectively. Also at these universities, an integrated approach was not adopted and so other teacher educators may not have modeled technology use beyond PowerPoint presentations of their lectures. Furthermore, when asked about their role in preparing pre-service teachers to use technology, none of the ICT lecturers mentioned modeling effective uses of technology to teach specific content.

Since most pre-service teachers acquire their practices from observing their mentor teachers and teacher educators, being exposed to these vicarious experiences has several benefits. Pre-service teachers will be able to learn from real examples of effective technology use (Ottenbreit-Leftwich, Glazewski, & Newby, 2010), enhance their self-efficacy towards technology (L. Wang et al., 2004), transfer technological skills to future classroom instruction (Kay, 2006; Lambert et al., 2008) and create true learning communities where participants serve as both teachers and learners (Ertmer, 2003). As a starting point, teacher educators in Lebanon should begin by enhancing the skills of other teacher educators.

Additionally, ICT lecturers need to become role models for effective technology use in teaching subject-specific content. They must model the very tools they want their pre-service teachers to model for their students (Doering et al., 2007). Until the integration strategy becomes entrenched within their programs, ICT lecturers must take on a double responsibility to compensate for the difficulty in finding technology-using teacher educators who are able to model technology use (Thompson et al., 2003).

Since pre-service teachers were not exposed to technology integration in their field experiences, mentor teachers can be brought into the classroom through videos, CD-ROMs, or web pages that show effective examples of technology being used in real settings (Brown & Warschauer, 2006; L. Wang et al., 2004). Using the multimedia strategy in the absence of the modeling strategy can also ensure the quality of the technology integration being observed. Being able to manipulate the video adds further benefits resulting from analyzing and evaluating the lessons observed (Ottenbreit-Leftwich, Glazewski, & Newby, 2010).

Barrier 6: Lack of pre-service teacher reflection

Reflection has been used in many teacher preparation programs as an approach to helping pre-service teachers become technology-integrating graduates (Brush et al., 2003; Ottenbreit-Leftwich, Glazewski, & Newby, 2010; Tondeur et al., 2012). However, none of the ICT lecturers explicitly stated using this approach in their standalone courses. Engaging pre-service teachers in reflections about their attitudes regarding the role of technology can reveal whether they have negative attitudes (Brush et al., 2003) and consequently addressing these attitudes becomes possible. In addition to attitudes, pre-service teachers should be prompted to reflect on their learning experiences, the strategies they are implementing, the reasons behind those choices, and ways of improving them (Ottenbreit-Leftwich, Glazewski, & Newby, 2010). Furthermore, reflection encourages pre-service teachers to address uncertainties in their learning, modify their approaches, and document their growth as reflective practitioners who will encourage such 21st century thinking in their own learners (Lambert & Cuper, 2008).

Since reflection does not occur naturally or automatically, teacher educators need to design tasks that support deep and analytical reflection (Thompson et al., 2003). Teacher educators in Lebanon can engage pre-service teachers in reflection without making major changes to their programs. Several methods for encouraging reflection have been discussed in previous research, such as discussion groups (Tondeur et al., 2012), reflective journals (Ertmer, 2003), electronic portfolios (Ottenbreit-Leftwich, Glazewski, & Newby, 2010), multimedia records of pre-service teachers' teaching practices (Gomez et al., 2008), and debriefing sessions with peers after field experiences (Brush et al., 2003). Teacher educators are then required to provide timely feedback on these reflections and to challenge pre-service teachers constructively through ongoing communication (Thompson et al., 2003).

Barrier 7: Insufficient professional development for teacher educators

With only two of the seven Lebanese universities offering professional development for their teacher educators, it may be possible to suggest that not all teacher educators possessed the knowledge, skills and self-efficacy beliefs to teach or model technology integration to pre-service teachers in Lebanon (Tondeur et al., 2012). Teacher educators' proficiency with technology is considered a major barrier to technology integration at the university level (Mims et al., 2006). Teacher educators are first required to have the knowledge and positive beliefs towards technology to support pre-service teachers' learning (Howland & Wedman, 2004). If teacher educators are not using technology in their courses, pre-service teachers may likewise be unmotivated to do so in their future classrooms (Kay, 2006).

Further, teacher educators at the investigated universities did not receive sufficient professional development to support their technology uses in their courses. When teacher educators acquire the necessary skills to integrate technology provided through training, they can redesign their courses and model effective technology use for pre-service teachers (Howland & Wedman, 2004; Mims et al., 2006; Tondeur et al., 2012). To learn these skills, teacher educators should participate in workshops, lecture series, technology courses, and have easily accessible consultants. They should then be exposed to demonstrations of specific uses of technology, examples of technology being used, and hands-on technology experiences (Mims et al., 2006; Tondeur et al., 2012). Furthermore, in designing these faculty experiences, Lebanese universities must ensure that they are ongoing, content-focused, site-based and involve teacher educators as active learners (Strudler et al., 2003). A final suggestion is the importance of establishing an instructional technology center similar to that found at two of the universities investigated. The major goal of this center is to lead the department to use technological tools effectively, integrate them into their courses and offer in-service training on a regular basis (Goktas et al., 2009).

Barrier 8: Differences in the availability of technology resources

Through the interview data, it was noted that the seven universities differed in terms of the technological resources available to them. Two universities in particular placed emphasis on the access strategy which addressed the need for hardware, software and support (Kay, 2006). Lebanese universities must ensure that their pre-service teachers have access to a variety of technological tools which are commonly found and used at schools. Having access to technological resources is considered a key enabling factor that increases the probability of teaching and learning with technology (Strudler et al., 2003; Tondeur et al., 2012).

Furthermore, all ICT lecturers noted conducting their courses in a computer lab, rather than a normal classroom. The context of the computer lab may expose pre-service teachers to certain strategies that may differ from those used in a classroom. Unlike a typical classroom, the computer lab normally has fixed positions, limited sightlines, and does not offer the flexibility of physical movement. Furthermore, other teacher educators may be discouraged to move their classes into the computer lab (Tondeur et al., 2012). As recommended by researchers, technology should be dispersed throughout the environment of the institution (Tondeur et al., 2012). There should be a robust technical infrastructure that teacher educators can access and depend upon for their regular work (Gomez et al., 2008). With restricted access to technology at some of these universities, effective uses of technology by all teacher educators becomes difficult (Kay, 2006). Furthermore, without such access, other strategies, and more specifically the integrated strategy, are bound to fail (Kay, 2006).

It must also be acknowledged that providing the software, hardware and support should not be seen as an end in itself (Gomez et al., 2008; Kay, 2006). While it is a first step, the access strategy must be coupled with other strategies if such technological tools are to be used in meaningful and effective ways (Kay, 2006).

Barrier 9: Lack of clear focus on one subject matter and/or grade level

Most universities had pre-service teachers take the educational technology course without considering the subject area discipline or the grade level they will teach. Therefore, pre-service teachers majoring in English language arts sat alongside mathematics and science majors and at one university, alongside psychology and philosophy majors. Further, primary pre-service teachers took the same course as secondary teachers. With such a varied student body, teacher educators were obliged to cater to different subject areas and grade levels.

However, each subject matter area creates a specialized community of practice that consists of particular literacies communicated among its members (Gomez et al., 2008). Further, the TPACK framework specifies the necessity of integrating technology in a particular subject matter area (Mishra & Koehler, 2006). In addition to the general productivity tools required of all pre-service teachers, the technological tools and applications used by English teachers may differ to a large extent to those used in other discipline areas (Partnership for 21st Century Skills, 2010). Additionally, skills-based courses taught in isolation of subject-specific contexts are inadequate in preparing pre-service teachers to teach with technology. They also fail to establish pedagogical connections between the affordances of technology and the teaching of a specific subject area (Angeli & Valanides, 2009). Providing a wide range of opportunities for using technology to teach English subject area is one way teacher educators can scaffold the learning of specific technologies, pedagogies, and content goals (Pope & Golub, 2000). Therefore, teacher educators need to ensure that pre-service teachers are exposed to and know how to use the technologies that are part of their professional communities of practice (Gomez et al., 2008).

Furthermore, different educational software programs are designed to accomplish specific goals and therefore seem to be compatible with different grade levels. Therefore, it may have been challenging to make clear distinctions between the technological tools appropriate for older learners and those more suitable for a younger audience. Given the importance of this distinction, teacher educators can divide their classes according to the professional needs of their student teachers.

Barrier 10: Limited scope in the assessment of ICT skills

In all of the educational technology courses investigated, pre-service teachers were assessed using rubrics for their projects and traditional paper and pencil assessment. The latter has been associated with negative attitudes towards technology and its effectiveness in measuring ICT competencies (Tondeur et al., 2012). However, none of the ICT lecturers mentioned the presence of program-wide evaluations conducted at their universities to evaluate graduating pre-service teachers' ICT competencies except through their courses.

Further, evaluations should also be conducted at the course level. Collecting continuous feedback about course outcomes should be done systematically before, during and/or after the course. ICT lecturers can collect data through discussions, questionnaires, interviews and observations (Lambert & Gong, 2010; Lavonen et al., 2006). They can examine pre-service teachers' competencies in using ICTs, and their self-efficacy beliefs (Lambert & Gong, 2010), as well as the effectiveness of the strategies implemented, and their own ICT competencies (Lavonen et al., 2006). Teacher educators should also critically evaluate the technology content goals they teach to remain updated with any changes in the field (Pope & Golub, 2000).

The ICT lecturers interviewed also confirmed that there was no national accreditation requiring pre-service teachers to demonstrate their pedagogical competencies related to ICT. The ICT lecturer interviewed at the national university also verified the absence of a national policy. Though having an effect on the integration of technology (Lavonen et al., 2006), universities have no direct control over national policies and consequently teacher educators face this barrier which has originated at the national level.

5.8.2 Intrinsic Barriers

Barrier 11: Pre-service teachers' perceptions of their pedagogical beliefs in tune with traditional teaching practices

The majority of pre-service teachers perceived their pedagogical beliefs to be in tune with teacher-centered theories and practices. As discussed in the literature review (Chapter 2, 2.6.1.3), pre-service teachers with traditional beliefs choose technological software that is in harmony with such beliefs. There exists, therefore, a possibility that the respondents' future uses of technology will include low-level uses of technology that replicate their previous experiences as learners in traditional classrooms. Further, researchers have found a relationship between constructivist beliefs and frequent technology use. Teachers with constructivist beliefs also tend to engage their learners in student-centered learning activities using technology rather than to reinforce skills (Bai & Ertmer, 2008). Therefore, teachers with traditional beliefs may not engage in effective technology integration and only use technology as an add-on to their lessons infrequently. Since pre-service teachers must decide on the way they will use technology in their field experiences and their future classrooms (Wentworth et al., 2008), teacher educators should help them develop a clear vision of their roles as facilitators of student learning with technology (Y. M. Wang, 2002). Teacher educators should, therefore, create constructivist learning environments in their own classrooms and integrate technology in such ways as well (Sang, Valcke, Van Braak, & Tondeur, 2010). Pre-service teachers would, thus, be provided with effective models of technology integration on which they can base their future technology uses.

5.8.3 Extrinsic enablers

Enabler 1: Presence of technology training at Lebanese universities

An important starting point for many universities in Lebanon is that all but one incorporated an educational technology course in their pre-service teacher preparation programs. This points to the awareness present at these institutions of the importance of preparing pre-service teachers to use technology in their future classrooms.

Similarly, many pre-service teacher preparation programs worldwide have adopted the standalone educational technology course as the only strategy through which pre-service teachers are introduced to 21st century skills (Kay, 2006). The strategy of using a single technology course is not without its benefits especially when it is carefully designed, incorporates effective instructional strategies (Lambert et al., 2008), and combines pedagogical concepts, knowledge of content and curriculum, and technology training (Lambert & Gong, 2010). In this way, these courses have been found to lead to positive results on participants' perceived beliefs about the usefulness of technology in enhancing teaching and learning (Lambert et al., 2008), their self-efficacy towards integrating technology and their technical knowledge and skills (Kay, 2006; Lambert & Gong, 2010).

Enabler 2: Exposure to a variety of technology content goals

Through their course descriptions, the ICT lecturers mentioned a variety of technology content goals, which they incorporated into their educational technology courses. Many of the technology content goals were also similar among the seven courses investigated, such as Microsoft Office software and Internet resources.

Similar to previous research, all the ICT lecturers focused on computer-based content, perhaps leading from their belief in the importance of computer-based programs for the preparation of pre-service teachers to use technology in their future classrooms (Ottenbreit-Leftwich, Glazewski, & Newby, 2010). Other technology content goals included Web 2.0 technologies and internet-based programs which are currently taking lead in the education of students. Being exposed to these and other technology content goals is a necessary first condition for using them especially in cases where pre-service teachers work in technologically equipped schools. Further, being aware of the enormous amount of technology programs and applications which can be tailored for instruction may open the door for further investigation after graduation.

Enabler 3: Presence of sufficient technical support

All ICT lecturers rated the technical support at their departments as being good to very good. The technical support available at these universities is considered an important enabler as it positively influences the work of ICT lecturers within their courses. Pre-service teachers also benefit from the presence of adequate support when using technological tools outside classroom times. At these universities, special units and personnel were responsible for providing technical support to the teacher educators. These centers were also responsible for teacher educator training at two universities.

Enabler 4: Provision of authentic activities and student-centered learning

The majority (N=5) of ICT lectures designed their courses with particular emphasis on hands-on, learner-centered tasks. Constructivist learning opportunities were provided to pre-service teachers through project-based and problem-based learning tasks.

Preparing technology-enhanced multimedia materials which target specific learning outcomes has the potential to increase pre-service teachers' self-efficacy beliefs, their knowledge base and their professional growth with respect to multimedia technology skills (Seo et al., 2008). When presented to their peers, such authentic experiences provide pre-service teachers with experiences in problem solving and decision making skills without the logistical issues associated with application in the field (Ottenbreit-Leftwich, Glazewski, & Newby, 2010). Such authentic learning experiences provide pre-service teachers the opportunity to learn by doing, rather than watching technology being used by instructors (Tondeur et al., 2012). Pre-service teachers have been found to appreciate authentic learning experiences as they feel a strong sense of achievement from applying their knowledge in the context of the pre-service teacher classroom (Seo et al., 2008; Tondeur et al., 2012).

5.8.4 Intrinsic enablers

Enabler 5: Pre-service teachers' heightened perceptions of their self-efficacy beliefs

The pre-service teachers participating in this study perceived their self-efficacy beliefs to be in the high range. Therefore, they believed in their ability to comfortably integrate technology in their future classroom practices. Researchers have emphasized the importance of self-efficacy beliefs in predicting classroom technology use (Albion, 2001; S. E. Anderson & Maninger, 2007; Park & Ertmer, 2007/2008). Teachers with high self-efficacy beliefs have higher expectations to use technology in their future classrooms (Park & Ertmer, 2007/2008).

Enabler 6: Pre-service teachers' heightened perceptions of their value beliefs

In general, the pre-service teachers taking part in this investigation saw value in using technology for student learning. They also indicated a relatively strong desire towards using technology in their future teaching endeavors. Therefore, it may be suggested that these teachers will exert effort at the beginning of their careers to integrate the instructional tools they valued during the course. However, in order for them to continue using these tools, they must be able to measure and not only perceive the benefits of technology on student learning outcomes or other higher-order goals they may be pursuing. Research confirms that teachers are more motivated to use technology when they believe in the importance of technology in improving their teaching and students' learning (Albion & Ertmer, 2002; S. E. Anderson & Maninger, 2007; Chen, 2010; Park & Ertmer, 2007/2008). These strong value beliefs have also been directly associated with frequent technology use (Funkhouser & Mouza, 2013). Therefore, fostering these value beliefs during the educational technology course has the potential to encourage pre-service teachers' future engagement with educational technology.

Enabler 7: Pre-service teachers' heightened perceptions of their knowledge and skills

The pre-service teachers perceived their levels of knowledge and skills to be in the high range. With such increased levels of knowledge and skills, it may be concluded that pre-service teachers were aware of the technology, the pedagogy and the content involved in the use of digital tools for teaching specific subject matter. Furthermore, these perceived knowledge and skills are believed to be predictors of future technology use (Hew & Brush, 2007) and have the ability to change teachers' attitudes and beliefs (Ertmer et al., 2012). Therefore, these participants may just be the next generation of teachers who possess the necessary skills to improve student learning with technology.

5.9 Conclusion

Seven universities were visited and seven ICT lecturers participated enthusiastically in a semi-structured interview. Participants described the ICT courses they designed and taught with differing emphases on the strategies implemented, the approaches adopted, the technology content goals used and the objectives pursued. Further, several conditions for the effective preparation of pre-service teachers were in place. However, the common theme recurring in the data was that the preparation of pre-service teachers for the integration of technology took place through one or more isolated courses.

Pre-service teachers encountered ICTs through their participation in the courses described in this chapter. Fourteen pre-service teachers provided further data about the environmental and individual factors operating at these universities. In general, pre-service teachers were found to possess pedagogical beliefs that resonated with traditional teacher-directed methods. However, they exhibited positive value beliefs and self-efficacy in their abilities to integrate technology.

Finally, a number of extrinsic and intrinsic barriers and enablers were analyzed from both sets of data. Generally, several extrinsic barriers may quite easily be overcome if they are given careful consideration. Finally, building on and consolidating the enablers may further the progress achieved at the university level towards the creation of a comprehensive pre-service teacher preparation program.

Having presented a thorough description of the university context, the thesis now moves to providing an illustration of in-service teachers’ perceptions of the environmental and individual characteristics operating within the school context.

CHAPTER 6 Data Description and Analysis at the School Level

6.1 Introduction

The previous chapter presented the results of Study 2 which investigated ICT courses and pre-service teachers' perceptions of environmental and individual characteristics operating at the university context. This chapter now presents the results of Study 3: *Adoption of ICT in ELT: Tripoli English teachers speak up.* In-service teachers' description of the state of technology integration in their classrooms completed the story of technology integration in schools in Lebanon. Using quantitative and qualitative instruments, the study investigated in-service teachers' levels of educational technology use, and their perceptions of the environmental and individual characteristics operating at the school context. Since schools represent the final context where successful technology integration is measured, this investigation may inform decision-makers about the factors impacting technology integration in this context and therefore help them make better decisions in the future.

Reporting this study's use of quantitative data, this chapter presents the results of the questionnaire distributed to 26 English teachers working in Tripoli. Firstly, teachers' demographic data, including gender, age, educational background, and years of experience is presented. Secondly, their stages of technology integration are identified and accordingly teachers' educational uses of technology inside the classroom are described in some detail. Thirdly, teachers' administrative uses of technology are illustrated. Fourthly, the chapter provides a description of the types of technological resources available at the investigated schools. Finally, teachers' formal educational technology preparation is revealed. Then, the results obtained on the TBTUS instrument followed by the TPACK instrument are examined. In-service teachers' results on these two instruments are compared to pre-service teachers' results. Statistical analysis using t-tests reveals significant similarities and differences between the two groups of teachers. Further, emerging from the questionnaire data, two extrinsic barriers, three intrinsic barriers, and three intrinsic enablers are analyzed according to the

classification of barriers and enablers presented in Chapter 2. Several recommendations are presented simultaneously alongside the analysis of barriers and enablers.
Reporting this study's use of qualitative data, the chapter further includes the results obtained from the interview data with six participating teachers. The analysis has been organized into seven sections which represent the major questions directed at the teachers. Each section embeds several themes derived from the interview data. The seven sections introduce themes emerging from teachers' pedagogic beliefs, their background, training and experience, their self-efficacy beliefs for technology use, their instructional practices and technology use, their value beliefs in the effects of technology use, the administrative support targeting technology use, and finally, the availability of resources. The chapter ends with a conclusion that brings together the results obtained from the questionnaire triangulated with the interview data.

6.2 Results and analysis of the questionnaire data (RQ3a and b)

The third study began with a questionnaire filled in by 26 in-service English teachers in Tripoli. The two parts of the questionnaire investigated levels of ICT use as well as the environmental and individual factors operating at the school context. Part I of the questionnaire sought to obtain demographic data from the participants, identify the stage of technology integration they perceived themselves to be on, find out the number of times different technological applications were used in their teaching, describe the objectives they had for student technology use, illustrate how they used technology for preparing their lessons, specify the technological resources available at their schools, and finally inquire about their formal educational technology preparation. Part II consisted of two questionnaires, one which measured teachers' beliefs towards technology integration and the other which measured teachers' knowledge and skills.

6.2.1 Demographic data

Seventeen schools were identified to include an English section and provide middle school (cycle 3) education. Three of these schools were public schools, and the remaining fourteen were private schools. A representative number of 12 schools (2 public and 10 private) were contacted and the principal was asked to participate in the study. Nine principals accepted that their middle school English teachers fill out the questionnaire (2 public and 7 private). The questionnaire was distributed by the school principal and three teachers further declined to be involved in the study. Therefore, a total number of twenty-six middle school English teachers responded to the questionnaire.

Demographic data is presented in Tables 6.1 to 6.5. Most of the respondents were females (N=24), except for two male participants. They were mostly within the age range of 30-39 (61.5%). The majority of respondents (69%) had completed a Bachelor of Arts in English Language and Literature at the Lebanese University, whereas only one of the respondents had an Education degree. In addition, about half the respondents (42.3%) had been full time English teachers for 6-10 years. Further, 88.5% of the respondents taught at private schools and 11.5% taught at public schools.

Table 6.1: In-service teachers' gender (N=26)

Gender	**Total**	**Percentage**
Female	24	92.3%
Male	2	7.7%

Table 6.2: In-service teachers' age range (N=26)

Age Range	**Total**	**Percentage**
20-29 years	6	23%
30-39 years	16	61.5%
40-49 years	3	11.5%
50+ years	1	4%

Table 6.3: In-service teachers' educational background (N=26)

Educational Background	**Total**	**Percentage**
BA in English Language and Literature	18	69%
Bachelor of Education	1	4%
MEd or MA in English Language and Literature	7	27%
EdD/PhD	0	0%

Table 6.4: In-service teachers' experience as English teachers (N=26)

Teaching experience	**Total**	**Percentage**
< 5 years	4	15.3%
6-10 years	11	42.3%
11-15 years	7	27%
16-20 years	2	7.7%
21-25 years	2	7.7%

Table 6.5: Type of school where In-service teachers taught (N=26)

Type of School	**Total**	**Percentage**
at a public school	3	11.5%
at a private school	23	88.5%

6.2.2 Educational technology use

Using Newhouse, Clarkson, and Trinidad's (2005) framework, participants were asked to indicate the stage they perceived themselves to be at according to the degree of technology integration they had reached. The stages progress into more sophisticated and indispensable uses of technology. Starting at the inaction stage, teachers progress to the investigation, application, integration, and finally transformation stages. According to Table 6.6, 4% of respondents indicated being at the inaction stage, 38.5% were at the investigation stage, 50% were at the application stage, and 7.7% were at the integration stage. None of the respondents indicated being at the transformation stage.

Table 6.6: Stage of technology integration (N=26)

Stage of Use	Total	Percentage
Inaction	1	4%
Investigation	10	38.5%
Application	13	50%
Integration	2	7.7%
Transformation	0	0%

When asked whether they used technology (1) in their classes, (2) only to prepare for their classes, or (3) had never used technology in teaching or any other professional activities, the majority of respondents indicated using technology either in their classes (57.5%) or to prepare for their classes (31%). Three respondents stated never having used technology in their classes or to prepare for their classes. This data is presented in Table 6.7 below.

Table 6.7: In-service teachers' description of technology use (N=26)

Description of Use	Total	Percentage
I use technology in my classes	15	57.5%
I use technology only to prepare for classes	8	31%
I have never used technology	3	11.5%

The interpretation of the data presented in Tables 6.6 and 6.7 reveals a pattern among these participants derived from their indication of their stage of ICT use and their description of their classroom use. Three teachers were not using any form of technology inside and outside the classroom. One of these respondents indicated being at the inaction stage while the other two were at the investigation stage. At the inaction stage, this respondent had little knowledge of ICT and how it could be applied into the classroom and hence was not using technology either inside or outside the classroom context. At the investigation stage, the two respondents had developed interest in ICT and may have begun to act on this interest, but have yet to begin their use of technology. Furthermore, the eight teachers who used technology only to prepare for their lessons indicated being at the investigation stage. These teachers were acting on their interest in ICT by using technology as a managerial tool outside the classroom context. Finally, fifteen teachers were using some form of technology for instruction. Among these teachers, thirteen were at the application stage where technology was used inside the classroom but mostly to present lesson content and to provide learners with extra practice such as in skill development. Two technology-using teachers were at the integration stage and hence may have been using higher levels of technology such as in project-based tasks.

Only the fifteen respondents who indicated using technology inside their classes answered the next five questions. These respondents specified the number of years they had been using technology, how often and where they or their students used technology, and what their objectives were for technology use. Results are presented in Tables 6.8 to 6.11 below.

As revealed in Table 6.8, 73.4% of the respondents had less than five years of experience using technology in their classrooms and 26.6% of the respondents had been using technology for 6-8 years. None of the respondents had been using technology for over 9 years. Considering their years of teaching experience presented in Table 6.4, the majority of teachers began using technology for instruction after they had started teaching. This observation indicates a certain level of commitment and professional learning displayed by these teachers to be able to use technology after years of teaching. These teachers may continue to look for further opportunities to help their learners acquire English competencies using technology.

Table 6.8: In-service teachers' experience with technology for instruction (N=15)

Years of Use	**Total**	**Percentage**
0 - 2 years	6	40%
3 - 5 years	5	33.4%
6 - 8 years	4	26.6%

This use of technology, however, did not exceed 4-5 times a year for 60% of the respondents as presented in Table 6.9. A further 20% of the respondents used technology 2-3 times a month and only 20% of the respondents used technology on a weekly basis. None of the respondents used technology daily. This result indicates that technology was used sparingly and not integrated into instruction. Further, technology was not an essential component of the curriculum and most teachers used technology as an add-on to their lessons.

Table 6.9: How often teachers and students used technology for instruction (N=15)

Frequency of Use	**Total**	**Percentage**
Once a year	3	20%
4-5 times a year	6	40%
Once a month	0	0%
2-3 times a month	3	20%
Weekly	3	20%
Daily	0	0%

As shown in Table 6.10, 66.6% of teachers used technology inside the classroom whereas 33.3% of teachers used technology inside the computer lab. The significance of using technology in a classroom versus a computer lab lies in the locus of control. The teacher may be the only one using technology in the classroom whereas a computer lab allows for a larger number of learners to use technology at the same time. Unless classrooms are highly equipped with mobile devices, the computer lab remains to be more suitable for student engagement with technology. The disadvantage of the computer lab, however, was revealed in Table 6.9 with the infrequent number of times in which students were taken to the computer lab. It may have been more difficult for teachers to schedule time for lessons conducted in the computer lab. This is perhaps why only a small number of participants used the computer lab infrequently.

Table 6.10: Where technology was used during instruction (N=15)

Location of Use	Total	Percentage
Classroom	10	66.6%
Computer Lab	5	33.4%

The main objective for student use of technology was to present information to an audience reported by 80% of the respondents as presented in Table 6.11. Another two common objectives were to find out about ideas and information (66.6%) as well as to provide remediation of skills not learned well (53.3%). This result further elaborates the interpretation of the data presented in Table 6.9. All participating teachers indicated pursuing several objectives. However, their limited use of technology throughout the year may not have been sufficient for learners to achieve these objectives. Furthermore, both teachers and learners were using technology during the 4-5 times a year which would further minimize the number of times learners were using these tools.

Table 6.11: In-service teachers' objectives for student use of technology for instruction (N=15)

Objective of Use	Total	Percentage
1- Mastering skills just taught	7	46.6%
2- Remediation of skills not learned well	8	53.3%
3- Expressing themselves in writing	6	40%
4- Communicating electronically with other people	2	13.3%
5- Finding out about ideas and information	10	66.6%
6- Analyzing information	4	26.6%
7- Creating digital artifacts	2	13.3%
8- Presenting information to an audience	12	80%
9- Improving computer skills	1	6.66%
10- Learning to work collaboratively	3	20%
11- Learning to work independently	5	33.3%

The fifteen in-service teachers were then asked about the extent to which they used certain software applications in their teaching. Each item on this part of the questionnaire had the following response choices: (a) no lessons, (b) 1-2 lessons, (c) 3-9 lessons, and (d) 10+ lessons. Responses on each item were scored from 0-3 (0= no lesson; 3=10+ lessons) and then mean scores and standard deviations were calculated for each item. A low mean score represented a low frequency of use, whereas a high mean score indicated a high frequency of use. The median value was 1.5.

According to the results presented in Table 6.12, these technology-using teachers made limited use of various educational software programs. Only two software programs scored above the median value. In-service teachers used software for making presentations such as PowerPoint (M=2.0) and word processing software (M=1.6) most frequently. The two other technological tools used less frequently were a World Wide Web browser used for finding information and games for practicing skills (M=1.06). All other educational software was used infrequently if not at all. Further, most of the frequently cited tools in use may be more suitable for a traditional, teacher-centered pedagogy. Using presentation software places the teacher in front of a passive audience, while using games for practicing skills reinforces the notion of drilling bits and pieces of language, rather than the construction of authentic language.

Table 6.12: In-service teachers' frequency of educational software use on a scale of 0-3 (N=15)

Use of Software	**Mean**	**Standard deviation**
1- Games for practicing skills	1.06	1.33
2- Simulations or exploratory environments	0.53	0.83
3- Encyclopedias and other references on CD-ROM	0.66	0.72
4- Word processing	1.6	1.35
5- Software for making presentations	2.0	1.0
6- Desktop Publishing	0.2	0.41
7- Graphics creation and/or editing	0.2	0.41
8- Spreadsheets or database programs	0.4	0.82

9- Hyperstudio, HyperCard or multimedia authoring environment	0.06	0.25
10- Digital Video Editing	0.73	0.79
11- Visual Thinking Software	0.33	0.89
12- Web Page Development	0.06	0.25
13- Web 2.0 and Social Networking	0.4	0.63
14- Webquests	0.26	0.45
15- World Wide Web browser	1.06	1.22
16- Electronic mail	0.6	1.12

The results registered in Table 6.12 corroborated the results presented in Table 6.11. Among the most commonly cited objective was to involve students in presenting information to an audience. Using PowerPoint as a presentational tool, these teachers used technology in the same way they expected their students to use it. Additionally, another common objective cited by these respondents was for students to find out about ideas and information. Using the World Wide Web more frequently than other tools, these participants also reported using technology to find information with the most commonly used search tool for this task. Furthermore, teachers provided their students with remediation of skills not learned well using games for practicing skills. Consequently, the most frequently cited tools were compatible with the most frequently cited student objectives. Therefore, teachers not only used technology in ways they knew how, but also expected their students to use technology in these same ways. Both teacher and student use of technology may be described as complementing lesson activities, rather than being an integral part of the lesson.

6.2.3 Managerial use of technology

The next question asked the fifteen respondents as well as the eight in-service teachers who described their technology use as strictly managerial to specify the way they used technology in preparing for their classes or in other professional activities. Each item on this part of the questionnaire had the following response choices: (a) do not use, (b) occasionally, (c) weekly, and (d) very often. Responses on each item were scored from 0-3 (0= do not use; 3=very often) and then mean scores and standard deviations were calculated for each item. A low mean score represented a low frequency of use, whereas a high mean score indicated a high frequency of use. The median value was 1.5. Twenty-three responses were recorded for this question since the remaining three participants indicated having never used technology in the classroom or as a managerial tool. The majority of in-service teachers used technology as a managerial tool to prepare for their lessons.

As shown in Table 6.13, the results indicated that several managerial tasks were accomplished using technology. However, some uses were registered more frequently than others. The highest mean score obtained was for using technology to create tests or quizzes (M=2.73). Respondents also used technological software to get information or pictures from the Internet very often (M=2.69). In addition, several other managerial tasks were completed using technology very often. Examples included using technology to create paper and pencil assessments for their students (M=2.6), make handouts or assignments for their students (M=2.6), and write lesson plans (M=1.95). In-service teachers also recorded or calculated student grades, corresponded with other teachers at the school and exchanged computer files with other teachers on a weekly basis (M=1.86). By contrast, fewer respondents used technology only occasionally to correspond with parents or students (M=0.52), use camcorders, digital cameras, or scanners to prepare for class (M=0.52), and post student work, suggestions for resources, or ideas and opinions on the World Wide Web (M=0.13).

Table 6.13: In-service teachers' frequency of technology use as a managerial tool on a scale of 0-3 (N=23)

Using technology as a managerial tool to…	**Mean**	**Standard deviation**
1- Record or calculate student grades	1.86	1.32
2- Create a test or quiz	2.73	0.75
3- Make handouts or assignments for students	2.6	0.89
4- Correspond with parents or students	0.52	0.94
5- Correspond with other teachers at the school	1.86	1.28

6- Write lesson plans or related notes	1.95	1.06
7- Get information or pictures from the Internet	2.69	0.63
8- Use camcorders, digital cameras, or scanners	0.52	0.66
9- Exchange computer files with other teachers	1.86	1.21
10- Post student work, suggestions for resources, or ideas and opinions on the World Wide Web	0.13	0.34

6.2.4 Availability of technological resources

Also in part I, participants were asked to indicate the technological resources provided by the school for their use. All twenty-six respondents were asked to check the kinds of technological resources available at their schools from a list of ten technological devices. According to the results presented in Table 6.14, only three technological devices were found at more than half of the participating schools. Most commonly found technological devices were easy access to photocopying (80.7%), access to computers in the teachers' lounge (73%), and a computer printer in their room or nearby (57.6%). Less commonly found technological tools included access to the Internet from the teachers' lounge (42.3%), digital projectors (31%), and interactive whiteboards (23%). The least available technological device included access to the Internet from their classrooms (15.3%). Other technological resources were totally absent from these schools. These included laptop computers for their use while at school (0%), camcorders and digital cameras (0%) and handheld devices for student use (0%).

Interestingly, the Internet was claimed to be scantly available inside their classrooms, but available at the school. This finding indicates that these schools were connected to the Internet and that in-service teachers had access to it. However, their students were not given access to the Internet, which may help explain why teachers did not involve learners in Web 2.0 and Webquests as revealed in Table 6.12. Another important finding is related to the dearth of technological devices found at these schools. Interactive whiteboards, currently invading schools worldwide, were reported by only six teachers. Other devices such as camcorders, digital cameras, and other handheld devices were totally absent despite their compatibility with student-centered uses of technology.

Table: 6.14: Technological devices available at the schools investigated (N=26)

Technological Device	**Availability in schools**	**Percentage**
1- Easy access to photocopying	21	80.7%
2- A laptop computer for your own use while at school	0	0%
3- A computer printer in your room or nearby	15	57.6%
4- Access to computers in the teachers' lounge	19	73%
5- Access to the Internet from the teachers' lounge	11	42.3%
6- Access to the Internet from your classroom	4	15.3%
7- Digital projectors	8	31%
8- Interactive whiteboards	6	23%
9- Camcorders and digital cameras	0	0%
10- Handheld devices for student use	0	0%

The results presented in Tables 6.13 and 6.14 may help create a more comprehensive understanding of the way technology was being used (or not used) at the schools investigated. The easy access to printing and photocopying explains how teachers used technology as a managerial tool to create paper and pencil assessments and handouts. Also, having access to the Internet from the teachers' lounge, teachers were able to correspond with other teachers at the schools, share files and get information and pictures. Further, having access to computers in the teachers' lounge helped teachers record student grades and write lesson plans. Further, because camcorders and digital cameras were unavailable, teachers did not use them as a managerial tool to prepare for class. Lastly, as shown in Table 6.12, technology-using teachers (N=15) took advantage of the availability of digital projectors (N=8) and interactive whiteboards (N= 6) for presenting their lessons using software such as PowerPoint.

Furthermore, participants were asked to specify the adequacy of useful software for their needs at the schools. Each item on this part of the questionnaire had the following response choices: (a) poor, (b) fair, (c) good, (d) very good, and (e) excellent. Responses on each item were scored from 1-5 (1= poor; 5=excellent) and then mean scores and standard deviations were calculated for each item. A low mean score represented an inadequacy of software availability, whereas a high mean score indicated sufficient availability of software. The median value was 3.0.

As shown in Table 6.15, in-service teachers considered the availability of software to be inadequate. All four software programs scored lower than the median value. The only software availability nearing the median value and rated as being fair was the presence of computer-based tools (M=2.38). Since these tools were also among the most cited technologies used inside the classroom and as a managerial tool as presented in Tables 6.12 and 6.13 respectively, in-service teachers may have been obliged to provide the technology and software themselves. Further the inadequate availability of computer-based information sources helps explain why teachers did not use software such as Encyclopedias and other references on CD-ROM as shown in Table 6.12.

Table 6.15: Adequacy of software available at the schools investigated on a scale of 1-5 (N=26)

Available software	**Mean**	**Standard deviation**
1- Instructional drills, games, and tutorials	1.80	0.93
2- Computer-based information sources (e.g., CD-ROM encyclopedias and databases)	1.76	0.90
3- Computer-based tools (e.g., word processors, database, presentation software, spreadsheets, etc.)	2.38	1.26
4- The number of licensed copies of specific software titles	1.5	0.76

Lastly in this part of the questionnaire, participants were asked to rate the adequacy of available technical, instructional and supervisory support at the investigated schools. Each item on this part of the questionnaire had the following response choices: (a) not available, (b) sometimes,

(c) frequently, (d) mostly, and (e) almost always. Responses on each item were scored from 0-4 (0=not available; 4=almost always) and then mean scores and standard deviations were calculated for each item. A low mean score represented the absence of support, whereas a high mean score indicated the sufficiency of available support. The median value was 2.0. According to the results presented in Table 6.16, the scores of all three types of support were below the median value. Therefore, technical, instructional and supervisory support were lacking at the investigated schools with mean values of 1.92, 1.53, and 1.03 respectively.

Table 6.16: Adequacy of support available at the schools investigated on a scale of 0-4 (N=26)

Types of support	**Mean**	**Standard deviation**
1- Technical Support (e.g., computer and software fixes)	1.92	1.57
2- Instructional Support (e.g., incorporating technology into your lessons)	1.53	1.39
3- Help in Supervising Students (e.g., aides, volunteers)	1.03	1.11

The findings described in this section revealed a dearth in the availability of technological devices, accompanying software, and enabling support. It comes as no surprise, therefore that English teachers working at these schools made limited use of educational technology in their classrooms.

6.2.5 Formal educational technology preparation

In this part of the questionnaire, participants were asked about their formal educational technology preparation whether in the form of in-service professional development programs or pre-service educational technology courses. As shown in Table 6.17, more than half the participants had undertaken professional development regarding the integration of technology in education. This result may help explain how the majority of technology-using teachers were able to begin their technology use after they had begun their teaching careers as presented in Tables 6.4 and 6.8.

However, as revealed in Table 6.18 below, only 27% of the participants noted having completed a pre-service teacher preparation course at university. The results from the investigation into educational technology courses in Lebanon indicated that this course was non-existent in the English Language and Literature program, which 69% of the participants had undertaken as their undergraduate study. This fact explains why the majority of in-service teachers did not receive any form of technology preparation during their university studies.

Table 6.17: Teachers' involvement in professional development programs (N=26)

Professional Development	**Total**	**Percentage**
Yes	17	65%
No	9	35%

Table 6.18: Teachers' involvement in educational technology courses (N=26)

ICT course	**Total**	**Percentage**
Yes	7	27%
No	19	73%

6.2.6 Results obtained on the TBTUS questionnaire

In part II of the questionnaire, participants responded to two questionnaires: the TBTUS and the TPACK. In-service teachers were asked to indicate their agreement on the 48-item TBTUS questionnaire which measured participants' pedagogical, self-efficacy, and value beliefs. Participants' responses ranged on a Likert scale of 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree. The 22 statements supporting traditional beliefs were inverted, while the 7 remaining statements supporting constructivist learning were calculated unchanged. The result was an overall index of participants' perceived beliefs pertaining to constructivist or traditional theories and practices. Participants obtaining high mean scores on items 1-29 held constructivist beliefs. To obtain a high mean score, participants would have to strongly agree with the items pertaining to constructivist learning and strongly disagree with the items pertaining to traditional teaching. Items 30-36 measured respondents' perceived self-efficacy beliefs. Finally, items 37-48 measured respondents' perceived value beliefs towards technology integration in the classroom. The median value was 3.0.

The overall mean score for the 26 respondents on the TBTUS was 3.62 with a standard deviation of 0.57. This score indicated that participants had relatively positive beliefs towards technology. A closer examination of each of the three belief constructs showed that participants' perceived beliefs were not equally positive on all belief types. The average mean score for each belief construct is presented in Table 6.19.

Table 6.19: Mean scores recorded by in-service teachers for the three belief constructs on a Likert scale of 1-5 (N=26)

Belief Type	**Mean Score**	**Standard Deviation**
Pedagogical Beliefs	3.07	0.31
Self-Efficacy Beliefs	3.92	0.46
Value Beliefs	3.86	0.44
Total	3.62	0.57

As shown in Table 6.19, the majority of the participants' perceived pedagogical beliefs inclined towards a traditional nature with a mean score of 3.07. A possible explanation for this result could be attributed to the pressure imposed upon them from having to prepare learners for high-stakes examinations within their cycle. Further, teachers may be under pressure from parents who demand quick learning results (Chapter 1, 1.5). Additionally, their experiences as learners at the university level may have been behind their traditional beliefs. As mentioned earlier, only one of the participants had undertaken a Bachelor in Education where students learn about the different pedagogical methodologies and may even be encouraged to adopt the constructivist way of teaching and learning.

Moreover, in-service teachers' perceived self-efficacy beliefs were relatively high. The mean score on this construct as indicated in Table 6.19 was 3.92. Hence, in-service teachers believed in their ability to integrate technology in their classrooms. A possible source for such high perceptions of self-efficacy beliefs could be attributed to mastery experiences gained from successfully implementing technology in previous lessons. As described earlier, in-service teachers used common technologies in which they may have been quite competent. Because they did not venture into newer uses of technology, all their experiences may have been successfully accomplished and consequently these experiences led to heightened levels of self-efficacy beliefs.

Furthermore, the results presented in Table 6.19 indicated high levels of perceived value beliefs. The mean score for this subscale was a relatively high score of 3.86. This result indicates that in-service teachers believed in the value of technology for student learning. A possible explanation for such heightened perceptions of value beliefs may be attributed to the potential benefits these teachers have experienced from using technology on their student engagement levels and productivity. Other teachers may also value technology even if they have not used it in the classroom.

There existed a disparity between participants' lower perceptions of their pedagogical beliefs and higher perceptions of self-efficacy and value beliefs. Consequently, in-service teachers had the confidence to use technology and they valued such uses. However, due to their pedagogical beliefs, they used technology in traditional, teacher-centered ways. The results obtained on the pedagogical belief construct may help explain the results presented in Table 6.12. In-service teachers revealed their most frequent uses of educational software to include software for making presentations and word processing. These uses have been favored by a traditional teaching methodology. Consequently, these teachers have adjusted technological use to fit their pre-existing practices and this is a possible reason why they use technology in traditional, teacher-centered ways.

To further elaborate on these complex belief systems, a description of the three lowest mean scores recorded and the three highest scores registered is presented and discussed in some detail next.

6.2.6.1 The three lowest mean scores obtained on the TBTUS

The three lowest mean scores for the items on the TBTUS were identified. All three items belonged to the pedagogical beliefs construct. A description of these items is presented in Table 6.20.

Table 6.20: The three lowest mean scores obtained on the TBTUS on a Likert scale of 1-5 (N=26)

No.	Statement	Mean	Standard Deviation
3	If students are not doing well, they need to go back to the basics and do more drill and skill development.	2.0	0.8
8	My most important job as a teacher is to help students meet well-established standards of what it takes to succeed.	1.96	0.82
14	Students learn most effectively when lessons are broken down into sequential steps.	1.80	0.84

The lowest mean score was 1.80 indicating traditional beliefs manifested in the importance of breaking lessons down into sequential steps for students to learn most effectively. Furthermore, teachers believed that their role was to help students meet standards evidenced by their ability to obtain passing examination scores. Lastly, teachers believed that students need to go back to the basics and do more drill and skill development when they did not pass such examinations. In-service teachers' experiences in the classroom may be the trigger behind such pedagogical beliefs. Dealing with large curriculum requirements and meeting deadlines may be behind these beliefs. School administration may even reemphasize the need for discrete lessons in the form of daily or weekly lesson plans.

6.2.6.2 The three highest mean scores obtained on the TBTUS

The highest three scores obtained on the TBTUS also included items from the pedagogical beliefs construct. The three items and their mean scores are presented in Table 6.21.

Table 6.21: The three highest mean scores obtained on the TBTUS on a Likert scale of 1-5 (N=26)

No.	Statement	Mean	Standard Deviation
4	In order to maximize learning, I need to help students feel comfortable in discussing their feelings and beliefs.	4.46	0.58
6	Addressing students' social, emotional, and physical needs is just as important to learning as meeting their intellectual needs.	4.5	0.58
24	Cooperative group work is an effective way to help students learn.	4.30	0.61

These results indicate that in-service teachers believed in the importance of addressing learners' overall needs which go beyond meeting their intellectual needs. Further, they believed in the importance of establishing close relationships with students. These items do not necessarily pertain to any particular teacher practice that stresses constructivist learning per se. However, their belief in the importance of cooperative group work is at the heart of a constructivist methodology (Chapter 2, 2.6.1.3). This result indicates that these teachers' beliefs were not strictly traditional in nature and they held mixed pedagogical beliefs. However, teachers may not have made connections between their beliefs and the objectives they pursued from student technology use. As presented in Table 6.11, only three teachers pursued the objective of having their students learn how to work collaboratively using technology. This issue raises further investigation into the possible difference in teachers' practices with and without the use of technology.

6.2.7 Results obtained on the TPACK questionnaire

The adapted version of the TPACK questionnaire was administered to in-service teachers. The TPACK contained items which ranged on a Likert scale of 1-5, and included items which measured teachers' Technological Knowledge (TK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), and Technological Pedagogical Content knowledge (TPCK).

The average mean score registered on the TPACK questionnaire by the 26 participants was 3.63 with a standard deviation of 0.69. This score indicated slightly high perceptions of knowledge and skills in using technology. The mean scores and standard deviations obtained on each of the four knowledge types are presented in Table 6.22.

Table 6.22: Mean scores recorded by pre-service teachers for the four knowledge constructs on a Likert scale of 1-5 (N=26)

Knowledge type	**Mean**	**Standard Deviation**
TK	3.57	0.72
TCK	3.88	0.58
TPK	3.65	0.67
TPCK	3.42	0.72
Total	3.63	0.69

As revealed in Table 6.22, the scores obtained on the four knowledge domains were slightly above the median value. The interpretation of the data indicates that in-service teachers' perceptions of their knowledge and skills to use technology were sufficient enough to ensure technology use at the application stage but not beyond this stage. Interestingly, the highest score registered on the TPACK was 3.88 indicating teachers' perceptions of TCK. Since all the participants were English teachers, they were more informed about technologies that targeted English subject matter. This result reinforces the importance of specialized forms of knowledge for teachers teaching different subject domains.

Also surprisingly, in-service teachers' perceptions of their TPCK registered the lowest mean score. In-service teachers had lower confidence in their ability to integrate technology rather than simply use it occasionally. This result may help explain why these teachers used technology as an add-on to their lessons rather than intricately woven into the curriculum.

6.2.8 In-service and pre-service teachers' results compared on the TBTUS and TPACK

After obtaining the results of both in-service and pre-service teachers on the TBTUS and TPACK instruments, the two groups were compared on the composite variables: PB, SEB, VB and TK, TCK, TPK, TPCK. T-tests were performed to determine whether there were any significant differences between the two groups. Of the seven t-tests performed, two values were significant. As shown in Table 6.23, pre-service and in-service teachers' t-test values varied significantly on the TK and TPCK variables. This result indicates that pre-service teachers had significantly higher technological knowledge and felt more capable of integrating knowledge domains into their class activities. In-service teachers, by contrast, had considerably weaker technological knowledge and lower perceptions in their ability to integrate technology into the teaching of specific subject matter. Further, the t-tests found no significant difference between these two groups on the PB, SEB, or VB values, which are measures of teachers' pedagogic, self-efficacy and value beliefs.

Table 6.23: T-test results for In-service and pre-service teachers on the TBTUS and TPACK (N=40)

Group		N	Mean	Standard Deviation	t	df	Sig. (2-tailed)
PB	1	14	3.01	0.38	-0.500	38	0.620
	2	26	3.07	0.36			
SEB	1	14	4.11	0.47	1.191	38	0.241
	2	26	3.92	0.46			
VB	1	14	3.78	0.45	-0.534	38	0.597
	2	26	3.86	0.44			
TK	1	14	4.05	0.65	2.028	38	0.050

	2	26	3.57	0.72			
TCK	1	14	3.71	0.72	-0.804	38	0.426
	2	26	3.88	0.58			
TPK	1	14	3.97	0.70	1.391	38	0.172
	2	26	3.65	0.67			
TPCK	1	14	4.03	0.76	2.489	38	0.017
	2	26	3.42	0.72			

The interpretation of the data presented in Table 6.23 reveals a positive outlook for the future of technology integration in Lebanon. Most of the in-service teachers did not use technology beyond the application stage and may have been hindered due to intrinsic factors manifested in lower perceptions of their TK and TPCK as well as extrinsic difficulties existing in their contexts. The fact that pre-service teachers had significantly higher perceptions of both TK and TPCK indicates that a group of young teachers may be ready to go beyond their predecessors equipped with sufficient technical knowledge to operate technology and overcome technical problems as well as sufficient knowledge to integrate technology into the teaching of subject matter. The ICT courses appear to have been effective in improving more specifically pre-service teachers' knowledge in terms of TK and TPCK as these factors had higher mean values than TCK and TPK. Overall, the scores on all this dimension were positive and pre-service teachers were trying to effectively use the technology they had been taught.

Furthermore, having similar perceptions of pedagogical beliefs, which were in tune with traditional teacher-centered theories and practices, appears to be influenced by teachers' past experiences in teacher-centered classrooms. These experiences seem to have had enduring effects on their pedagogic beliefs. It is therefore recommended that teacher training institutions acknowledge these teacher beliefs and make certain modifications to the way they conduct their courses and programs to address student-centered theories, practices and beliefs. Additionally, high perceptions of self-efficacy and value beliefs may be a positive indication for persisting beliefs starting at the pre-service level and continuing into the in-service level. Taking advantage of these types of beliefs at the beginning of the integration process may contribute to the advancement of teachers through the stages of technology integration. It is therefore recommended that teacher training institutions employ these stable perceptions in order to advance teachers' knowledge and skills starting at the pre-service teacher level and henceforth.

6.3 Extrinsic and intrinsic barriers and enablers: Analysis and recommendations (RQ3a and b)

Similar to the analysis of Study 1 and 2, the analysis of Study 3 focuses on identifying the barriers and enablers operating at the school context. The analysis of the data obtained from the questionnaire administered to in-service teachers revealed several factors that explained why many teachers in Lebanon were not integrating, as opposed to simply using technology into their classroom practices. The data also revealed the possibility of transforming some of these barriers into enablers through the implementation of purposive actions taken by government officials, teacher educators, school administrators and English teachers. The barriers identified were divided into intrinsic and extrinsic barriers (Chapter 2, 2.5) depending upon whether they were directly related to teachers or not. Two extrinsic barriers and three intrinsic barriers were found to hinder technology integration in these English classrooms. By contrast, three intrinsic enablers were found to enhance or possibly lead to a brighter outlook if exploited appropriately. No extrinsic enablers were found to be particularly powerful, and these are not discussed in this section.

As noted in Chapters 4 and 5, each study is analyzed independently and the discussion of factors also includes recommendations for overcoming the barriers and consolidating the enablers.

6.3.1 Extrinsic barriers

Barrier 1: Lack of resources

A lack of resources has been a major impediment to technology integration worldwide (Deaney & Hennessy, 2007; Pelgrum, 2001). Without the necessary equipment in the school, there is no way that technology will become a teaching and learning tool used by both teachers and their students. The schools investigated registered a clear deficiency in technological resources. Several technological devices and software programs were totally absent, while other more commonly used devices, such as computers, were not present at all the schools. Further, Internet access was not available at all the schools and completely absent from the classrooms. A lack of resources has been found to impede technology adoption in several studies (e.g, Hew & Brush, 2007). Without access to the Internet and other technical devices and software programs, technology use became restricted to the low-level uses of presentation and word processing software accessed by both teachers and students using their personal computers. Such uses of technology fall short of the way technology can be used to leverage student learning (Ertmer & Ottenbreit-Leftwich, 2010). Having access to reliable and functioning resources is the first pillar informing technology use, leads to overcoming first-order barriers and helps advance some teachers from the inaction stage (Hixon & Buckenmeyer, 2009).

To reverse the adverse effects of insufficient technological equipment, school administrators should start by equipping their schools with the most essential resources. Such provision can help most teachers reach the application stage where technology is used to present content and provide practice. In this way, teachers who are at the investigation stage would typically find themselves gradually using this equipment, however infrequently. In time, most of the teachers at the school would reach the application stage. Further advancements towards the investigation stage require addressing intrinsic barriers.

Barrier 2: Lack of support

In addition to a deficiency in technological devices and software programs, the schools investigated registered meager technical, instructional and supervisory support. Though considered a resource-type barrier (Hew & Brush, 2007), lack of support is mentioned here separately because of the clear impact it has had on the advancement of technology integration at the schools investigated. Since many of these schools did not support their in-service teachers, they either did not use technology inside their classroom or used common technologies infrequently. While it is important to focus on the use of technology in the learning process, having functioning devices and supportive technology specialists who are ready for any breakdowns are essential for effective technology integration (Hayes, 2007).

Teacher participants, as change agents, should not be viewed as working autonomously without the direct influence of their school contexts. Research has illustrated the school as a unit of change and has given considerable attention to the internal school conditions as influencing the adoption of educational technology (Tondeur et al., 2009). Therefore, these teachers had to conform to the culture of their schools which had not “adopted a definition of effective teaching that includes the notion of technology as an important tool for facilitating student learning” (Ertmer & Ottenbreit-Leftwich, 2010, p. 264). Without adequate support, these schools have sent a negative message about the importance of using technology. When teachers have negative conceptions about the presence of constraints within their context, they may stop any further efforts targeted at ICT integration, as was the case with some of the teachers interviewed. Cuban, Kirkpatrick and Peck’s (2001) predications have come true for the Lebanese classroom. Without radical changes to the organization of schools, product reliability and cost, and increased technical support, “only modest, peripheral modifications” have occurred “in schooling, teaching and learning. Teachers” have adapted “innovations to the contours of the self-contained classroom. New technologies” have, “paradoxically, sustain[ed] old practices” (p. 830).

Other researchers articulate the necessity of school-level support in the form of a school policy that sets clear goals and defines the means to achieve them (Tondeur et al., 2009). The development of a shared vision and a clear definition of effective teaching with technology (Ertmer & Ottenbreit-Leftwich, 2010) is an essential prerequisite which can be translated into teacher practices in their classrooms. Therefore, to begin supporting in-service teachers, school administrators should initiate school-based policies which specify the goals and standards for the successful integration of technology, include funding schemes for buying and maintaining the necessary equipment, and prescribe the required technical, instructional and supervisory support. First, technical support requires an IT division working alongside subject teachers. The

IT division would be responsible for maintenance and just in-time repairs of breakdowns. They would also be responsible for connecting the school to the Internet and making sure teachers and even some students have the minimum troubleshooting knowledge of the equipment available at the school. Second, help in supervising students during a technology-mediated lesson can be provided without necessarily additional cost to the school. IT teachers can be scheduled to provide assistance in the computer lab. In this way, subject teachers and IT teachers can collaborate in creating interactive and engaging tasks for students. Third, instructional support can be provided systematically through the provision of professional development discussed below (Barrier 4).

6.3.2 Intrinsic barriers

Barrier 3: Low-level uses of technology for limited durations of time

The results of the questionnaire indicated that the majority of teachers identified the stage of technology integration at the application stage and below. Only two participants registered technology use at the integration stage. At the application stage, teachers begin to explore with digital technologies but their knowledge remains to be restricted within existing curriculum frameworks. Teachers at this stage tend to use technology to present lesson content and to provide learners with extra practice. Further, their technological pedagogical content knowledge is not fully developed or applied frequently in regular classroom practices (Finger & Jamieson-Proctor, 2010). The teachers in this study displayed technology use that employed software for making presentations and word processing most frequently. They also employed games for practicing skills and a World Wide Web browser for finding information and pictures less frequently. These uses of technology not only provide evidence for low-level uses of technology, but also confirm restricted technology use within the existing curriculum framework. Moreover, the way teachers expected their own students to use technology as expressed through their objectives indicated a mechanical level of knowledge. They expected their students to present information to an audience, find out about ideas and practice skills not learned well.

Furthermore, the frequency of technology use did not exceed 4 to 5 times a year for the majority of respondents who claimed to use technology in the classroom (N=15). This result indicates that technology was used as an add-on rather than integrated throughout the curriculum or not used at all. Previous studies in Lebanon have indicated similar results (Nasser, 2008; Yaghi, 1997). There has been no significant advancement towards technology integration since the latest Lebanese study which investigated the 2005/2006 academic year. During the 4-5 times of technology use per year, the majority of teachers targeted presentation, research and practice goals.

Comparing the results obtained from in-service English teachers in Tripoli with their counterparts in a recent study reveals a considerable disparity between the current use of technology in Lebanon and elsewhere (Hutchinson, 2012). 37% of literacy teachers reported using digital technology on a daily basis versus 0% in Tripoli. 3% of teachers indicated they did not use digital technology at all in their instruction versus 42.5% of teachers participating in this study. The results of this study were consistent with those in another study which found teachers to use computers more often for informative and expressive purposes (Wozney et al., 2006). Moving back in time, the integration of technology in Tripoli schools compares more or less to an earlier study conducted by Marcinkiewicz (1993/1994) where “almost half of this sample did not use computers for teaching. Nearly all of those who did used it at a level where the computers were expendable --not really necessary for the instruction to occur” (p. 9). Comparisons such as these help provide a clear picture of how far Lebanese teachers have come and how far they still need to go.

Barrier 4: Weak formal educational background

As “key determinants of implementation” (Judson, 2006), the teachers investigated in this study had not received the necessary training on how to use technology to facilitate meaningful learning. The majority of respondents lacked any formal teacher preparation at the pre-service teacher level. They were not given the opportunity to acquire the necessary knowledge and skills to implement technology in their classrooms. Since the questionnaire did not inquire into the effectiveness of these courses, further data was pursued during the interview.

In the current study, 17 participants reported undertaking a professional development program. However, the questionnaire did not inquire into the details of the professional development program. Therefore, further data was collected during the interview in the next section. In her national study of literacy teachers, Hutchinson (2012) found 81% of the participants discontent with the professional development they had received on how to integrate digital technology into their literacy instruction. Therefore, participant teachers may or may not have been content with the professional development even if their schools provided such training.

To transform students' learning opportunities, teachers' learning opportunities must be enhanced (Hayes, 2007). The only way to enhance teachers' knowledge and skill is through the on-going participation in professional development where teachers experience the integration of technology personally and/or vicariously (Mueller et al., 2008). On-site professional development may be more suitable in this situation and specifically targeting the topics of instruction they teach (Ertmer & Ottenbreit-Leftwich, 2010; Mueller et al., 2008). This idea is reinforced by the fact that the different schools investigated had different equipment. Therefore, these teachers need to be trained using the technologies made available by school leadership (Mueller et al., 2008).

Barrier 5: In-service teachers' perceptions of their pedagogical beliefs in tune with traditional teaching practices

According to questionnaire results, teachers' traditional uses of technology discussed above (Barrier 3) corroborated with their pedagogical beliefs. Teachers registered pedagogical beliefs which were mostly traditional in nature (Chapter 2, 2.6.1.3). The three lowest mean scores obtained on the TBTUS belonged to the pedagogical beliefs construct and specifically indicated deep understandings of teaching in tune with traditional methodology. These participants depended on the lower-level uses of technology such as presentation software and word processing. High-level uses of technology that support inquiry, collaboration and reformed practices have not been used (Harris et al., 2009). Similar results have been reached by several other research studies (Becker, 2000; Ertmer et al., 2012; Overbay et al., 2012; Tondeur, Hermans, Van Braak, & Valcke, 2008). The results of this study supported the notion that technology use is not necessarily associated with any instructional paradigm (Ertmer et al., 2012). Hence, a preliminary result obtained from the questionnaire data was an alignment between participants' practices and beliefs. However, it was determined that further investigation was required to understand these pedagogic beliefs more deeply during the interview, especially since the three highest mean scores on the TBTUS also belonged to the pedagogical beliefs construct.

Furthermore, the results obtained in this study do not support the claim made by several researchers that teachers with more constructivist beliefs use technology more often than teachers with traditional beliefs (Hermans et al., 2008; Overbay et al., 2012). Despite the several deep-rooted extrinsic barriers found within their school contexts, some teachers were capable of overcoming these barriers and had started using technology as a tool to enhance student learning. However, possessing traditional pedagogical beliefs channeled this use of technology into teacher-centered ways (Culp et al., 2005). Some of the other teachers, who did not use technology, did not do so for several different reasons beyond their espoused beliefs.

A possible explanation for low-level uses pertains to the fact that the majority of participating teachers had 3-5 years of experience using educational technology. Therefore, they had not accumulated enough expertise to use technology in constructivist ways. Researchers claim that it takes 5-6 years for teachers to do so (Ertmer, 2005; Mueller et al., 2008). If this claim holds to be true, then many of these technology-using teachers (N=15) still hold a chance to integrate technology in more constructivist ways if they acquire the necessary skills and positive beliefs that support them in transforming their teaching practices.

6.3.3 Intrinsic enablers

Enabler 1: In-service teachers' heightened perceptions of their self-efficacy beliefs

Teachers participating in this study were relatively confident about their abilities to use technology. The importance of self-efficacy beliefs lies in their ability to propel teacher uses of technology (Park & Ertmer, 2007/2008). Some researchers go as far as emphasizing the importance of self-efficacy beliefs over knowledge and skills among teachers who integrate technology in their classrooms (Ertmer & Ottenbreit-Leftwich, 2010).

Most of the in-service teachers have had the opportunity to trial technology use at their own pace and within their own classrooms. They were capable of using technology to enhance their lessons despite the first order barriers present in their schools. They may have gained mastery experiences from using technology in their lessons successfully which led to the development of high self-efficacy beliefs. With strong beliefs developed on the field, it may be possible for in-service teachers to sustain their use of technology.

Enabler 2: In-service teachers' heightened perceptions of their value beliefs

The results of the questionnaire also indicated that in-service teachers' perceptions on the value beliefs construct were also relatively high. Researchers explain that even if access and resources are low, teachers might be able to overcome these barriers if they undermine their strength in comparison to their strong beliefs about the role technology should play in the classroom (Ertmer et al., 2012). These teachers may have valued technology use on student learning to such an extent that the influence of extrinsic factors was minimized. Observing the positive changes brought about by their use of technology was perhaps the way they gained evidence about the value of technology on student engagement and productivity. With these value beliefs, in-service teachers moved beyond extrinsic barriers and used technology according to their knowledge levels. Therefore, school leaders need to build on the presence of such value beliefs and help teachers acquire further knowledge and skills to support constructivist pedagogy using technology.

Enabler 3: In-service teachers' heightened perceptions of their knowledge and skills

Given the fact that the majority of teachers had not taken training courses while at university and the fact that they were not supported at their schools, their levels of knowledge and skills seemed to be a motivating factor for using technology at the application stage. With both extrinsic and intrinsic barriers operating at the school level, these teachers may not have acquired significantly high levels of knowledge and skills to become integrators and transformers in the use of educational technology. Therefore, the most commonly cited uses of technology were compatible with the application stage.

To sum up, school administrators should start taking a more dynamic role in activating school wide support in the form of professional development programs, disseminated school level policy plans, and verbal encouragements. Most of their teachers had positive perceptions about their confidence and ability. Therefore, supporting teachers would forward the integration of technology at Lebanese schools. On a final note, school administrators must understand that the best way to encourage teachers to adopt technology is by increasing their knowledge and skills, which in turn, have the potential to change their beliefs (Ertmer et al., 2012).

6.4 Results and analysis of the interview data (RQ3a and b)

Because the research design draws upon both qualitative and quantitative methods, six teachers in a range of schools and with a range of beliefs, knowledge and skills were interviewed after the completion of the questionnaire. The purpose of including interview data was to capture in depth understandings that triangulate and extend the quantitative data (Chapter 3, 3.5). Six teachers were chosen to participate in an interview according to whether they used or did not use technology in their classrooms. Purposive sampling was used to select two pairs of cases with differences in teachers' reported use of technology during class time on the questionnaire. That is, three teachers at the investigation stage and three other teachers at the application stage were chosen to participate in the interview. Upon identifying the cases, teachers were contacted in person to invite them to continue their participation in the study. All six teachers voluntarily agreed to participate in the interview. Pseudonyms are used for teacher names.

The study conducted two iterations of interviews with these six teachers. The first interview iteration sought to collect data that directly aligned with the questionnaire, but in the individual verbal context. The second iteration sought to collect data investigating teachers' general pedagogic beliefs and practices, perspectives of other teachers, types of pressure present in their context, role played by ICT in education, and their perspectives on the reasons behind lack of provision and use of technology. The analysis below represents the two sets of interview data together. Several themes emerged from the interview data, which are presented in seven sections. These sections and their underlying themes are summarized in Table 6.24 below.

Table 6.24: Sections and themes emerging from the interview data (N=6)

Sections	**Themes**
1- Teachers' pedagogic beliefs	*Theme 1:* Teachers possessing mostly traditional beliefs *Theme 2:* Historical and cultural context promoting traditional pedagogies *Theme 3:* Transitional pedagogies creating tension for teachers
2- Teachers' background, training and experiences in technology	*Theme 1:* The effect of university courses *Theme 2:* The influence of training and workshops *Theme 3:* The impact of self-taught experiences
3- Self-efficacy beliefs for technology use	*Theme 1:* Lack of confidence in skills hindering technology use *Theme 2:* Barriers to technology use overcome by high levels of confidence *Theme 3:* Importance of vicarious experiences *Theme 4:* Importance of mastery experiences
4- Teachers' instructional practices and technology use	*Theme 1:* Technology use replicating existing traditional pedagogy *Theme 2:* Technology use prompting a shift to

	more constructivist pedagogy *Theme 3:* Tensions to modernize teaching methodologies using technology
5- Teachers' value beliefs in the effects of technology use	*Theme 1:* Technology use and teacher practice *Theme 2:* Technology use and student learning
6- Administrative support targeting technology use	*Theme 1:* Administrative support promoting the use of technology *Theme 2:* Administrative support hindering the use of technology *Theme 3:* Conflict among the different stakeholders involved in diffusing technology into the educational context
7- Resources and technology use	*Theme 1:* Lack of equipment as a barrier *Theme 2:* Lack of access as a barrier *Theme 3:* Lack of time as a barrier

6.4.1 Teachers' pedagogic beliefs

Participants were asked about their most fundamental responsibilities as teachers in the second set of interview questions. They were also asked about the way other teachers taught English in Tripoli and the historical and cultural background to the way they taught. A last question in this category inquired about participants' favorite activities which they believed promoted good learning of the English language in Tripoli. Three themes emerged from their responses as discussed below.

Theme 1: Teachers possessing mostly traditional beliefs

As noted in the literature synthesis (Chapter 2, 2.6.1.3), traditional teachers tend to promote teacher-directed learning. They use lectures, demonstrations and presentations for the purpose of information acquisition and dissemination of facts. Students partake in drill and practice activities and their acquisition of knowledge is commonly assessed through testing. Many of these indications of traditional teaching practices were noted in teachers' responses to the questions stated earlier.

In the comment below, Bassam (participant B) believed his most fundamental responsibilities as a teacher to be evaluative in nature. He also mentioned a teacher-directed methodology which involved “giving the idea or objective of the lesson”. His first responsibilities also revolved around checking students’ copybooks, homework, and low grades. He mentioned sending notes to parents when their child got three low grades.

> In the atmosphere that I am working now, the responsibilities are mainly educational which is giving the idea or objective of the lesson in general and checking his or her work plus the assessing of the students. (TB/31[57-59])

In the following comments, teachers described the way other teachers in Tripoli taught English. Five participants (83.3%) agreed that teachers in Tripoli taught in a traditional teacher-centered way. Bushra (participant C) described the way English teachers did not involve their learners in more student-centered learning. Instead, she described these teachers as presenting the lesson and their students as practicing grammatical rules and memorizing information.

> They don’t include the students in the making of the lesson, in discovering the rules. They just present the rules, present the examples and have them practice. It’s the traditional way. (TC/32[65-67])

Amani (participant A) also mentioned a dominant traditional methodology in Tripoli classrooms. Her illustration of this methodology included explaining and drilling grammar exercises.

> We put sentences on the board and we ask students to see the grammatical points, so the points we need to teach will have their exercises, so we don’t totally involve the students in the teaching process. (TA/32[68-70])

Additionally, reading and writing were also taught in a teacher-directed way. In the following comment, Yasmine (participant E) reinforced the notion of the student as a passive absorber of “the book”. Teacher directed instruction was also emphasized.

> Teachers in Tripoli love the book. They stick to it and try to cover it all. They think that they have to rush because then they won’t cover every page. Most teachers teach in a teacher-centered way. The students read in turns and then they answer comprehension questions. Some teachers even make their students memorize essays for writing. (TE/32[97-100])

Approving this last comment, Sarah (participant F) noted an emphasis on traditional teaching methods, memorization, correct answers and isolated bits of language. She also noted a lack of importance placed on differentiated learning, critical thinking skills, cooperative learning and challenging tasks.

> …They are still stuck in traditional ways of teaching English so the students are not really acquiring skills. They just memorize the meaning of vocabulary words which they forget right after the quiz or test and there's no focus on reading comprehension skills or writing skills as well. They focus more on vocabulary, spelling and grammar… They do not engage students in challenging tasks for them to motivate them more, they do not target their interests and use that as a starting point to engage them more into reading and analyzing… Nowadays students need a variety… there has to be something unexpected, something new to them, there has to be sometimes teamwork sometimes little games… and it should always target their interest as a springboard for them. (TF/32[77-87])

Not only did he possess traditional beliefs in regards to teaching methodology, Bassam also believed teachers in Lebanon to possess these same beliefs. In his description of the way teachers taught English, Bassam noted the importance of the students' textbooks and teacher's guide in directing many teachers' practices in the classroom. Consequently, having a lack of creativity was a result of teachers' traditional ways.

> I think they mostly follow the steps elaborated in the teacher's guide which is usually associated with a textbook. They follow the ideas as they are explained. So they don't have their own creativity or their own ways. (TB/32[64-66])

Theme 2: Historical and cultural context promoting traditional pedagogies

For these teachers, this question provided an opportunity to express their beliefs about the historical and cultural influences on teachers' pedagogies and practices. Three teachers (50%) mentioned a historical influence and three teachers (50%) noted a cultural influence. Another influence was attributed to the time factor. One teacher (16.6%) in particular mentioned all three influences; the historical, cultural and time factor, on the way teachers taught in Tripoli.

First, the influence of historical background was attributed to the way the teachers themselves were taught in the past. All three responses noted teachers' past experiences as the reason behind their teaching practices. Further, the influence of culture was manifested in the pressure that parents placed on teachers. Parents expected teachers to produce results both quickly and efficiently. This is why teachers resorted to traditional methods as a way to showcase student learning results in a timely fashion. Lastly, Amani believed the time factor to cause teachers to practice traditional teaching methods. With not enough time to learn about their students' learning styles and needs, teachers presented a one-size-fits-all method of teaching.

> Maybe because we were taught like this… Another thing teaching this way saves time… the other way of teaching requires time…we need to know our students' learning styles and needs, we need to see that individuality in each student which is a lot of work for us and we lack time. The parents want to see that their children can do their HW on their own, be able to read well and speak to some degree and they see that and they are happy with that. (TA/32[72-77])

Bushra highlighted the historical influence on teachers' pedagogies despite the pressure placed upon them to change their teaching practices by parents and school administration. Teachers' traditional methodologies were attributed to the way they were taught in those same ways.

> Historically they are taught in this way so they follow the same method. Now, these days teaching has to have a different perspective and everyone around like parents, school administration and so on, they expect the teachers to find other ways than the traditional one but since the teachers have this historical background, they are used to this and they know no other way. (TC/32[70-74])

By contrast, a cultural perspective relevant to the demands of the Lebanese examination system (Chapter 1, 1.5) was behind teachers' practices, according to Yasmine. The following comment justified traditional teaching pedagogies based on the pressure that parents exerted on teachers to produce quick results.

> I think this is what parents expect. They want their kids to come home and know how to read and answer the comprehension questions in the book. Parents put a lot of pressure on teachers because they want to see quick results. That's why teachers use memorization and traditional ways. (TE/32[100-103])

Finally, Sarah's comments pointed out both a historical and cultural effect. Memorization was highlighted as a fast and efficient way which led to student learning and parent satisfaction. Equally, teachers' past experiences as learners acted as influential factors on the way they taught.

> According to our cultural background, memorizing information is still very important. It is even when parents want their kids to study, they want them to memorize something as a proof that they are studying or evaluate what is really being given. So this affects the way. It's because of the historical background too. Because this is how we learned, we learned quite well this way. So it works and it should still work with students. Especially when some teachers try new ways and they do not do it as efficiently as they should and they think it's too much work. It's different and new to them so they stick to the traditional ways because it's easier. (TF/32[88-93])

Theme 3: Transitional pedagogies creating tension for teachers

The questions of responsibilities, other teachers' teaching practices and favorite activities led participating teachers to reveal an evident tension between what they believed to be educational and what they actually practiced on the ground. Unprompted responses emerged from these questions in the form of a transition between traditional practices which they acknowledged to be less effective and a newer pedagogy which they believed to be more engaging for learning. Four teachers (66.6%) noted this struggle to transform their teaching practices. Therefore, the aforementioned alignment between teachers' beliefs and practices may not have been strong for most of the participating teachers, perhaps especially for those who scored around the median value of 3.0.

Evident in Amani's response is a struggle to accommodate more constructivist learning opportunities. Her pedagogical beliefs were in clear transition as she compared her beliefs to her actual classroom practices.

> [My responsibilities include] knowing my students, their abilities, disabilities, learning styles and needs, knowing that and being able to manage their learning. Matching that with the learning they need in order to achieve and advance. (TA/31[64-65])

> Even though we are totally convinced as teachers with the new methodologies in teaching but we still go back to the conventional way of teaching. (TA/32[66-67])

The struggle to accommodate these new methodologies was further revealed in the description of her favorite activity below which she believed to enhance student learning. On face value, the use of cooperative learning catered to a constructivist pedagogy. However, by structuring the group work, indicating the correct answers and maintaining her control over the discussion, Amani transitioned "back into the conventional way of teaching".

> I sometimes use group work that involves students to investigate something specific. Like for example, in one of our stories, I asked my students to analyze the characters in the story and I gave them two or three traits to looks for in the character. I grouped them and then I started discussing things, this discussion led them to finding more traits than I personally found in the characters. (TA/33[81-84])

In Bushra's comment, a focus on both the "psychology of the students" and the motivational aspect of learning was evident. She too seemed to struggle to accommodate more constructivist practices that engaged her learners in open discussions before "explaining the lesson". Her teaching practices, therefore, began somewhat learner-centered as she began by activating students' background knowledge. However, teacher-directed presentation of material remained to be the dominant method of instruction.

> I need to know the psychology of the students. I need to learn why they react in some ways and others don't. You have to deal with them on the human level. So I will try to think of some ways to attract the student's attentions. I sometimes formulate a kind of situation; like for example I tell the students a story and I try to include the theme behind the lesson in this story or I might ask them questions which lead to the theme of the lesson like just activating their background knowledge through questions. So you have to find ways to attract the attention of the students before you start explaining the lesson. (TC/31[58-64])

Moreover, Yasmine's description of her responsibilities carried both traditional and constructivist notions. A clear focus on organization, sequential steps, and summative evaluation pertain to a traditionally condensed curriculum. By contrast, stressing the importance of individual differences and differentiating instruction accordingly pertain to a constructivist teaching methodology. Evident in her comment was a struggle to find a way to compromise her beliefs about effective learning with a condensed curriculum and pressure to constantly evaluate student learning through the traditional paper-and-pencil test.

> I have to teach my students what they need to learn at that particular grade level. I focus on the most important skills for a whole year because I can't teach them everything I want. Then I have to find a way to organize my yearly plan so that my students know what to expect. After that, I try to explain every language domain in a way that my students understand. I have to see what works for them and move on from there. I can't teach the same way every time because they will get bored, so I try to find new ways every time. Finally, I have to evaluate their learning. At my school, evaluation is very important and they request a lot of drop quizzes, mini-tests, tests and exams. They take so much time to make, I feel it's all I ever do. (TE/31[90-96])

Finding new ways to teach her learners, Yasmine described a clearly constructivist lesson where her learners were involved in discovery learning, cooperative learning, and presentation of findings.

> I love it when I give students strips of paper and they have to put together the small pieces to discover the grammar rule. They enjoy moving around and finding answers and then gluing their answers on posters then sharing these answers with the other groups. (TE/33[105-107])

Sarah, too, noted both traditional and constructivist practices among her favorite activities which she believed to promote good learning. Her comment included a preference for cooperative learning on one hand, and drill and practice on the other hand. These two practices are at the heart of constructivist and traditional practices respectively.

> I like group work especially when students don't get along and they decide they want to do their work on their own. You force them to work and you tell them that's because someday in the work place you're going to work with other people whether you like them or not. So this is a nice challenge sometimes. I do like every skill to be drilled for students, once and twice and over and over again until it sticks in their mind because they do not do enough practice. (TF/33[97-100])

6.4.2 Teachers' background, training and experiences in technology

Interview respondents reported different levels of technology preparation by their university coursework, targeted professional development workshops, and their self-initiated learning. Initially, interview questions targeted pre-service coursework and in-service workshops. However, a third theme emerged from the interview data indicating a tendency for some teachers to initiate personal learning experiences on their own. Table 6.25 provides frequency counts for responses on the interview questions related to where and how teachers were prepared to use technology.

Table 6.25: Background, training and experiences in technology

University coursework	Professional development workshop	Self-initiated learning
2	4	2

Theme 1: The effect of university courses

Only two teachers (33.3%) mentioned taking a university course which targeted the integration of technology into the curriculum. Both reported having completed a standalone computer and technology course as part of their Master's program. However, their experiences presented different viewpoints on the effects of the course on their abilities to use technology. To have positive effects, several conditions need to be in place in order to prepare pre-service teachers for technology integration when they graduate (Chapter 2, 2.7.2).

First, Bushra's experience with the pre-service preparatory course was not a rewarding one. She described the course as being "silly" and commented on several barriers which prevented the course from being more successful. Her comments indicated that the teacher educator had a pre-planned course outline which involved teaching the basics of certain computer programs. It seemed that the teacher educator did not assess the technology skills of the pre-service teachers to find out what they already knew before the course. One of the drawbacks of the standalone course has, in fact, been the mismatch between the technology requirements of the course and incoming student teachers' skills (Y. M. Wang, 2006). Consequently, Bushra commented on the little benefit which she gained from the course. Another barrier mentioned in her comment was the large class size compared to the number of computers available in the computer lab. Some of the computers were also described as not functioning. Therefore, the very first condition consisting of providing a rich technical infrastructure was not met. A further observation was the lack of authentic activities and field experiences. Pre-service teachers were requested to learn the technicalities of computer programs without necessarily applying their skills to prepare subject matter resources.

> The doctor taught us the basics which I already know. We learned Word and Excel and PowerPoint which I have mastered. Actually I gained nothing. He had in mind that we don't know anything about computers and he was the hero who was going to teach us the basics of using the computers. So it was at a level lower than our level. That's the main reason why we didn't learn anything new. (TC/28[45-47])

> We need to have serious courses and teachers and of course we need to have equipment at the university. We had few computers and two of them didn't work and we were 24 so it was crowded. (TC/30[52-54])

In contrast, Yasmine mentioned the availability of a computer lab with functioning computers. Her comment also included a wealth of tasks undertaken for a practical purpose. All the tasks were described as being hands-on, except for the presentations made for the prescribed book. Furthermore, the materials produced for the course were to be used by other university students taking English courses at the university. Yasmine noted the benefits she gained from the course. These benefits included increased levels of self-efficacy and technical knowledge. In fact, research conducted on the effects of the standalone course has revealed its benefits in improving self-efficacy, providing an overview of using technology in teaching, and developing a strong foundation of technology skills (Kay, 2006). Even though the strategy used was a standalone course, the availability of rich technical infrastructure and authentic activities made it a more successful learning experience for this teacher.

> We sat in the computer lab most of the time. But we also did presentation of the prescribed book. We learned how to make resources for the English books used at the university and how to choose the proper lessons from software called Clarity the university wanted to use. The doctor told us the other lecturers would use what we

> created for them. I remember doing a Webquest for an environmental lesson. And then I made a PowerPoint presentation and a Word document with links for a literature selection. (TE/26[70-74])
>
> It did have an effect. I learned to think about using technology in teaching so even if I don't know a lot but I can use what I know to teach my students. (TE/27[75-76]

Theme 2: The influence of training and workshops

Four teachers (66.6%) mentioned participating in professional development workshops which had varied effects on their technology proficiency. The training came in a similar form offered as an in-service teacher preparation workshop. Emerging from respondents' comments, both positive and negative effects were noted about the workshops. As discussed in the literature review, professional development workshops need to meet six conditions (Chapter 2, 2.3.3). When one of these conditions was absent, respondents' comments became negative towards the professional development workshop. In contrast, teachers commented positively when conditions were met.

Amani had taken part in 20 days of professional development during the summer break. One of the conditions not in place was a longer time frame. Amani's comments revealed dissatisfaction with the limited time that was available to learn many different skills. Further, the trainers were another reason why the professional development did not fulfill the necessary conditions to be considered successful. The mode of delivery did not cater to this teacher's needs.

> It wasn't beneficial because it only took a limited time and it really needs a lot of time especially the concepts and the new ideas presented. (TA/21[50-51])
>
> Time requirement; it needed more time and even the teachers, they weren't qualified…They went too fast because they had a lot to show us and they didn't wait for us to apply before moving on to something new. (TA/24[53-55])

From another teacher's point of view, a professional development workshop must meet the condition of providing feedback. In the following comment, Bushra described the 10-day workshop as involving several different tasks. Her response pointed out the benefits which she gained from her participation. These benefits included learning how to organize her work using technology and emphasizing the use of technology as it leads to profits in student learning. However, the workshop trainers failed to provide any sort of feedback. Consequently, it was not considered very successful.

> We learned to prepare briefcases. Each briefcase included different material, such as lesson plans, pictures, assessments, sounds, and links to a blog and wiki. (TC/22[36-37])
>
> I learned how to stress on using technology which I didn't stress before because I didn't think they affect the learning process. I also learned to organize my work. (TC/23[38-39])
>
> It wasn't that successful because we didn't get feedback. They said that we would get to present and professional people would come to see our work but no one came. There was no follow up. (TC/24[40-41])

Yasmine described a professional development workshop which met several important conditions. First, the mode of delivery seemed to be sympathetic to the teachers' needs since the workshop was conducted at the beginning of the school year. Second, the time frame seemed to be appropriate for the teachers to learn how to make several tools using the interactive white board. The teachers even received feedback on their work. Third, since the professional development was conducted by the IT teacher at the school, it may be inferred that the objectives of the professional development were compatible with what the school expected and supported. Lacking, however, was an essential condition in the form of integrating the technical knowledge presented with the subject discipline and pedagogy; a fact which rendered the professional development only partially successful.

> It was just before the beginning of the year and the school did it for us because a lot of the teachers are new and they don't know how to use the IWB so it was only how to use the IWB and the lady who presented was the IT teacher so she taught us how to make containers, how to make exercises, how to use magic ink and the other tools. (TE/22[59-62])
>
> …it was successful because I know a lot of the teachers knew nothing about using an IWB and they now use it. But, I think we needed more show and tell. Like more example flipcharts because it was mostly do this and this is what happens. The teacher taught us

> about all the tools but we had to find a way to create a flipchart for our lessons. She could not help us in that because she didn't know any subject except IT. (TE/24[65-68])

Also mentioned in Sarah's description was the availability of several important conditions for successful professional development. Sarah's description included an appropriate delivery mode since the workshop was conducted at the beginning of the school year. The form of delivery seemed to be suitable with the availability of a helpful trainer and the ability to apply acquired skills. However, the time frame was considered to be insufficient. The availability of certain conditions and unavailability of others caused uncertainty towards the success of the workshop.

> At the beginning of the school year, we took training sessions, which included all the teachers, the old ones and the new ones. And which taught us everything about the Activinspire lessons from scratch starting from the tools and step-by-step we took lessons how to apply, where to find readymade lessons, how to use all the tools. (TF/22[53-56])

> Yes and no. It was successful because the IT teacher was very helpful and she was ready to repeat a lot and she let us apply in class. It was not that successful in a way because there was too much information at the same time… We had to apply one lesson at a time to be applied as one full classroom lesson… so it was a bit confusing so you had to overcome obstacles on your own. (TF/24[61-66])

To sum up, the interview with in-service teachers revealed (a) time, (b) knowledgeable presenters, (c) supportive administration (d) feedback and follow up, (e) a focus on pure technical skills, and (f) modeling as major factors in the success of the professional development experience. Similarly, the teachers in another study mentioned barriers grouped into four factors: (a) time: time to explore, practice, and prepare for literacy instruction into which they integrate technology; (b) access: access to equipment during and after professional development; (c) knowledge: access to higher level knowledge, knowledgeable presenters, and relevant background knowledge; and (d) support: ongoing, follow-up, and small group support (Hutchinson, 2012). Finding common themes between this study and the Hutchinson study confirms commonality in the way teachers face similar difficulties worldwide.

According to Guskey (2002), any evaluation of professional development workshops must encompass five levels. When applied to the information provided by participants, the evaluation of the professional development revealed unmet teacher needs. On level one, respondents' reactions were obtained and a clear dissatisfaction was revealed towards the professional development experience. On level two, participants' learning was not formally evaluated and participants were not given feedback. Furthermore, on level three, Guskey stressed the importance of organizational support and change. Clearly, the professional development program experienced by two participating teachers was hindered by a school unsupportive of change empowered by technology. The last two levels discussed by Guskey; participants' use of new knowledge and skills and student learning outcomes, were not evaluated in the current study. The professional development workshops can therefore be considered ineffective to a certain degree.

There was general consensus about the importance of providing teachers with the proper training that would enable them to become efficient technology users. This training should be followed by a step-by-step follow-up procedure which would ensure that teachers became comfortable using the technology the way it should be used.

> The human factor here is important even if we have the supplies and everything, we need the people who can use them also so it's costly on every level. (TA/20[47-48])

> The administration should find the right people to do the right amount of training and to follow up because training is not enough they need to follow up with them one step at a time until teachers can comfortably use technology the way it should be used. (TF/37[122-125])

In conclusion, participating teachers needed time to learn skills, watch someone model them in a real classroom and then apply them in their classrooms systematically. Additionally, teachers needed follow-up and feedback from the trainers. With lack of time, modeling and feedback, participating teachers did not benefit from the professional development programs which they participated in. A suggested model, therefore, for professional development which would cater to the needs of Tripoli English teachers would be a cyclical process of (1) learning IT skills, (2) viewing model TPACK lessons, (3) applying newly taught skills in small steps and then (4) receiving feedback.

Theme 3: The impact of self-taught experiences

Two teachers who had not taken part in any form of pre-service course or in-service training relied on self-initiated learning. They were self-taught to use technology whether as a pure preparation tool or inside the classroom. Their comments indicated that they were frequent users of technology outside the classroom context, and they kept learning as technology progressed. Also evident in their comments were high levels of self-reliance and confidence. This theme is further discussed in the next section.

Bassam's comments abound with his confidence to operate any kind of technological tool which becomes available at his school. He revealed high levels of confidence in thinking his skills were "beyond" what the school expected of him. The only kind of support which he needed to integrate technology in his classroom was simply its availability. Further, Bassam noted the importance of teachers' knowledge as a fundamental enabler encouraging classroom use of technology. Finally, his self-reliance was evident in the comment about his willingness to dedicate his time to learn and use educational technologies.

> Just the availability of this technology is important to me. I have the knowledge to operate any kind of technology that will be available if it is available. (TB/29[44-45])

> The teachers' knowledge of this technology [is the most important factor]. If the teacher doesn't know how to use technology in the first place, how can we expect this teacher to teach his lesson through technology to his students. (TB/20[40-42])

> Not having the time is not an excuse. It comes with the job as they say. When I work as a teacher I should know that part of the package is that I need to dedicate part of my time even at home for preparation, for correction, for acquiring new skills and resources that are important for my work. So when the idea of change to ICT is provided at the school, I should be able to provide the necessary time for learning and using this ICT. (TB/37[87-91])

Rayan (participant D) noted a similar attitude towards her knowledge and skills to integrate technology in her classroom. Her comment indicated the ability and confidence to learn and use technological devices not required by her school administration.

> I know how to use technology in my classes. I've used different technology for a long time and I always try to find out new technology like the iPhone, iPad. My school doesn't expect more. If they did, they would buy the computers and put them in the classes or they would make us use them more. (TD/9[19-21])

6.4.3 Self-efficacy beliefs for technology use

According to interview data, not all teachers possessed high levels of confidence to overcome the intrinsic and/or extrinsic barriers that they faced and consequently use technology efficiently. Some teachers felt confident about their ability to overcome any barriers imposed upon them by the school context, even if it were a lack of technological resources. Others lacked sufficient confidence levels to help them overcome low levels of knowledge. Participating teachers felt a need for assistance and guidance to become capable technology-using teachers. Therefore, the importance of mastery and vicarious experiences were proposed as a way to overcome such lack of confidence. Research has stressed the importance of positive experiences with technology on raising teachers' confidence to use it inside the classroom as an instructional tool (Mueller et al., 2008). Furthermore, when teachers observe the way technology can be used to facilitate student learning, their confidence levels also increase (Ertmer & Ottenbreit-Leftwich, 2010).

Theme 1: Lack of confidence in skills hindering technology use

It was clear that some participants indicated a lack of confidence in using technology as a major barrier. For example, Amani noted a lack of confidence in her ability to use advanced technologies in her teaching. In the following comment, she perceived herself to possess only a basic level of knowledge. However, the school where she worked did not expect any higher levels of knowledge.

> I don't know what the school expects of me. I'm not highly knowledgeable, but I'm trying. I'm at the very beginning, only the basic level when I use technology. I'm not a professional but the school doesn't expect more. (TA/9[22-24])

The school where Yasmine worked, however, had high expectations for their teachers. Though a technology-using teacher, Yasmine lacked the confidence in her ability to use advanced skills to make her use of technology more interactive the way it was expected at the school.

> In some areas I have the skills they want. And in other areas I don't have the skills. I don't think I can make my flipcharts always very interactive the way they should be. (TE/9[22-23])

Apparent in her response, Yasmine had insufficient knowledge and skills to complete certain tasks which caused the low confidence levels she mentioned. In effect, research has supported the importance of first increasing teachers' knowledge and skills, which in turn can help increase their confidence in using technology for student learning (Ertmer et al., 2012).

Theme 2: Barriers to technology use overcome by high levels of confidence

A contrary perception was expressed in one participant's high confidence levels. Rayan's confidence was revealed in the comment about initiating the change process at her school rather than waiting for the decision to come from the administrators. It is interesting to note that Rayan's confidence levels enabled her to use technology, though in teacher-centered ways, at a school which provided a projector only.

> Actually I take the decision myself. I change first then I tell them. For example when I started teaching I used the computer before asking anyone… I don't know if they would accept it or not. This year I started using my phone in the class which is something they don't know about… I change first then I tell them… they never expected me to change. (TD/36[79-84])

It seems possible to conclude that even if access and resources were low, teachers might have strong beliefs about the role technology should play in the classroom and therefore assign little weight to these barriers (Ertmer et al., 2012).

Theme 3: Importance of vicarious experiences

To overcome the lack of confidence in their abilities, the same two participants (Amani and Yasmine) hinted to the importance of providing teachers with vicarious experiences. They believed it was beneficial to have proficient technology-using teachers showing them how to integrate technology into English language lessons. They requested assistance in lesson preparation as well as modeling of real lessons.

> Mostly I need people to guide me in the way I should use this new technology and help me prepare my lessons, I need someone I can refer to. (TA/29[56-57])
>
> I need someone to show me how to use technology in specific lessons that I feel can work better with technology. I know that we don't have anyone at the school who can do both the technology and the English… I always look for examples and lesson plans but it's not the same if I can see the lesson in front of me. (TE/29[79-82])

Therefore, professional development programs should include information and models about how teachers can use technological tools in very specific content domains (Ertmer & Ottenbreit-Leftwich, 2010). Further, the presence of a "key" teacher on staff that other teachers can refer to for their instructional queries related to technology use has been identified as an important factor especially supporting less experienced teachers (Mueller et al., 2008).

Theme 4: Importance of mastery experiences

By contrast, Rayan's high self-confidence was reinforced by mastery experiences. The success she felt resulting from the reactions of her students motivated her to continue using technology the way that she did. In addition to vicarious experiences noted above, Bushra also commented on the importance of mastery experiences in motivating her to continue her effort to integrate technology in an unwelcoming environment. She, too, felt satisfied by students' increased interest levels, attention and enjoyment. Adding to these, she believed technology was behind an increase in her students' grades.

> I think when I see my students enjoying the lessons that I present, that will be a reason for me to use more technology. Also, I like to see their reactions during the lesson and that motivates me too. (TD/20[40-41])
>
> Of course when I see my students who are interested in the lesson. When I see my students' attention is drawn more to the lesson and more to the idea of studying through technology I would be encouraged to use it. Add to these the results I can see their results are really fascinating after using the technology. (TC/20[32-34])

This observation has implications on practice especially related to the professional development of teachers. Professional development programs must be designed in a way that leads to the enhancement of teachers' expectations of success (Wozney et al., 2006). Similar to these two respondents, teachers need to believe in their abilities to integrate technology within their own contexts. If this is not the case, they will not take the initiative to begin the integration process or they will not persist in the face of barriers.

6.4.4 Teachers' instructional practices and technology use

One of the questions during the interview asked technology-using teachers to describe their most memorable classroom practice integrating technology in which they thought students were actively engaged and motivated to learn. Interestingly, all three illustrations replicated existing traditional pedagogies. Similar results have been detected in other studies around the world. Teachers have been found to use technology in ways that enhanced their existing learning designs and in ways which replicated similar tasks completed without technology (Hayes, 2007).

However, when participating teachers were asked about the changes to teachers' roles induced by technology use, two respondents believed technology use prompted a shift to more constructivist pedagogy, while the other four respondents reinforced teachers' traditional roles. Teachers further believed there was pressure on teachers to modernize their teaching practices using technology.

Theme 1: Technology use replicating existing traditional pedagogy

Three teachers described their most memorable lessons integrating technology. In all three descriptions, teachers emphasized a traditional use of technology where they used it as a tool to enhance presentations and teacher-led explanations. Clearly, the presentation goal drove the use of technology whether in the form of a PowerPoint presentation projected with a digital projector or a flipchart displayed on the interactive white board. These low-level uses of technology have been described as inadequate in meeting the needs of the 21st-century learner

(Ertmer & Ottenbreit-Leftwich, 2010). Though respondents spoke of student-centered learning and the educational benefits of using technology, their enacted beliefs pointed towards a teacher-centered pedagogy. The descriptions provided did not illustrate a different role for the teacher. The teacher was still presenting the information and the students were still receiving the information transmitted through the teacher and the technology.

For example, Bushra’s comment noted the use of technology to explain a grammar lesson using a PowerPoint presentation which included exercises for drilling purposes.

> It was a few weeks ago when I explained the passive voice through a PowerPoint presentation and we solved exercises… the questions were on the screen and they tried to apply the rules so it was very memorable. (TC/6[10-12])

Rayan’s comment also illustrated a traditional lesson presented through a PowerPoint presentation. However, it is interesting to note the way her learners were active technology users outside the classroom context.

> In our book, there is a unit about art and painters. For this lesson, I integrate a slideshow and explanation showing the different methods of artists and showing the most important paintings and analyzing them. The analysis encourages students to speak out and changes their views about the boring art lesson. Each year I'm surprised by what they see and how they start to search for paintings and how they start analyzing them on their own and posting them on their Facebook pages or talking about them in the classroom. (TD/6[10-14])

Rayan further reinforced the way she used technology for the presentation of new topics and for the purpose of creating “a new atmosphere” in the classroom.

> I use them in explaining different skills like reading, grammar, listening, writing, in presenting new topics and ideas. I also use them to create a new atmosphere away from the dull setting that students find themselves trapped in most of their day. (TD/8[16-18])

The third technology-using teacher had greater access to technological devices such as an IWB and Internet connection. Despite the availability of equipment, Yasmine also illustrated a grammar lesson prepared in Activinspire and presented through a teacher-led demonstration. The advantage of using this technology was in organizing her work and displaying all the material in one place. Similar to Rayan, Yasmine also targeted higher levels of critical thinking skills as she required her learners to deduce the grammatical rules from the examples instead of explaining them directly. In the end, Yasmine created assessment exercises to check her students' understanding. The IWB did not fundamentally change Yasmine's teaching approach.

> I use the IWB mostly for my grammar lessons. I like the way it organizes my work and so I don't forget any rule. I created a flipchart for the tenses and it shows the form of each tense as well as the meanings they express. The students can deduce the rules from the examples. So I used a lot of examples and pictures. I even had an exercise at the end where the students could check their understanding. (TE/6[14-17])

A significant observation to be made here is the fact that Yasmine who worked at the affluent, well-equipped school used technology in much the same way as the other two teachers who did not have sufficient equipment. Two conclusions may be drawn from this observation. First, many teachers use technology even without the provision of sufficient and high-tech technology. This means, the provision of technology should not be considered an end in itself, rather a means to an essentially important end. Second, teachers use technology in ways that are not compatible with their existing beliefs. A similar result was found in other studies in which participants espoused beliefs about technology use were dissimilar to their enacted beliefs (Judson, 2006).

By contrast, the three teachers who did not incorporate technology also worked with varying degrees of technology provision. Two of these teachers (participant A and B) blamed the lack of provision to be the reason why they were incapable of moving forward in their integration efforts. However, the technological equipment was more or less similar to that at the schools where two of the technology-using teachers (participant C and D) worked. Therefore, lack of provision was the excuse these teachers used for not integrating technology. In contrast, the third non-using technology teacher (participant F) who worked at a well-equipped school did not use technology for several different reasons not related to provision.

When asked whether the use of technology changed teachers' role, four teachers believed in an unchanged role for the teacher with or without the use of technology. These teachers illustrated technology as assisting the natural role of a teacher as someone who is responsible for presenting information and engaging learners. Furthermore, their responses did not point out an integral role played by technology. Instead, technology in all four cases was simply an add-on to the lesson and consequently did not affect teacher or student roles to any significant degree.

> [A teacher's role is] not completely changed, but it [technology] helps the role of the teacher in the classroom. Instead of being the lecturer all the time, he could be the person who explains or demonstrates the ideas that are being presented by the technology. (TB/5[11-13])
>
> The teacher's role is the same. Teachers have to be active and engage their learners if they use technology or not. I use technology and I don't; it doesn't change my way. (TD/5[8-9])
>
> I feel I go back to the normal way of teaching even with technology. I use the interactive white board and I put so many pictures and examples, but I don't feel the students are doing anything different. (TE/5[11-13]
>
> Kind of, your role is still to guide and support. ICT emphasizes this role in guiding students not just pouring all the information. (TF/5[6-7])

Finally, the following comments provided an explanation of issues behind the lack of technology use in Tripoli schools. The four responses pointed towards a common trend among teachers in Tripoli. They were described as being lazy, traditional, resistant to the changes prompted by technology, and unwilling to learn new technologies. Many teachers in Tripoli were accused of holding on to their traditional ways of teaching and refusing to come out of their comfort zone. Therefore, teachers did not want to learn how to integrate technology nor use it. One of the impressions, which emerged from these responses, was that all except one of the participants did not consider themselves to be a part of this wider trend.

> The lack of use because they can't be bothered to learn. Maybe some teachers don't like the idea of changing their method to a different style of teaching. Maybe it contradicts their way, or maybe they are just too lazy to do it. (TB/37[85-87])
>
> It's easier for the teachers, we try to do it in the communicative way but then we turn back to the old traditional way… Actually when we do use ICT in our programs, we do it

> for show off just to show the parents that we are doing something new, but deep inside we go back to the traditional way of teaching. (TA/32[77-80])
> Other teachers just don't know how to use the technology and they complain that it is too hard for them to learn now… Maybe some teachers think that the technology isn't important and they can teach the same way without it anyway. (TE/37[126-129])
>
> Lack of use because they have not prepared the teachers enough or because the teachers don't want to go out of their way of teaching… they have to get out of their comfortable zone… and they try to avoid doing that and that's why they don't use it. (TF/37[119-122])

Theme 2: Technology use prompting a shift to more constructivist pedagogy

Two responses suggested that participants held a view of technology as being capable of transforming teacher practices from teacher-centered teaching into student-centered learning. The following comments suggested learners taking an active role in searching for information, presenting their findings and taking control of their learning. They are also provided with the opportunity to learn regardless of time and place constraints. The teacher does not lecture and ceases to be the only source of information. Consequently, learners become involved in the learning process and "consume" knowledge more effectively. However, teachers' espoused beliefs about the role of technology were not enacted in their actual uses of technology in the classroom as discussed above.

> It won't be a teacher classroom it will be a student-centered classroom. The information will be consumed better by the students. (TA/5[9-10])
>
> Instead of being the sole source of information in the classroom, technology can help you search for information. Instead of feeding the students every piece of information, you can direct them into searching for the information and present it in the classroom. So they become the source of information instead of the teacher. (TA/35[100-103])
>
> Your role is not the typical lecturing way anymore. Students are engaged in student-centered learning instead of teacher-centered teaching. (TC/5[8-9])
>
> It's a matter of involvement; the student… can learn by himself and this makes the new information stick in his mind instead of just memorizing the information. When you make some pages on the Internet, the student can communicate with the teacher and

> ask for guidance. They become interested in learning because it involves technology so basically it attracts the students not only in the class use but also at home. So the students will be learning at school and at home and anytime. (TC/35[92-97])

Theme 3: Tensions to modernize teaching methodologies using technology

Five teachers (83.3%) believed that teachers were under pressure to modernize their teaching methodologies using technology. Participants expressed concern about the tension generated by this necessity to modernize.

In the following comment, Bushra gave an accurate definition of what it means to modernize. Then, using this definition, she differentiated between the older and younger teachers. She believed that the older generation of teachers was resilient to change. By contrast, the younger generation, being used to new technologies, were more accepting and welcoming of the changes initiated by these same technologies. Bushra further explained the way the older generation had to overcome many obstacles before they could become capable technology users. They had to learn many skills which the younger generation of teachers took for granted.

> To modernize is to introduce new methods based on new research and ideas… I think the young teachers do accept because they are more used to it now. But the old ones who hardly type on the computer they find it difficult to use a slide show or video to attract their students' attention… it may be hard for the old teachers to cope with these modern activities, but the young teachers don't find this very difficult. (TC/34[82-87])

Rayan, by contrast, tended to focus on the pressure exerted by the newer generation of learners. She described these learners as a "modernized generation" dependent on commonly used technologies which their teachers did not know how to use. Therefore, teachers were under pressure to modernize their teaching methodologies to keep up with a generation that no longer responded to paper-based teaching. Therefore, teachers must speak the language of this newer generation if they expect them to listen and learn.

> The generations that we are teaching its modernized generation, ipads, iphone, tablets, Internet and a lot of teachers don't know how to use these things. They are under pressure to use this because the generation is no longer attached to the paper… they will

> see that you are speaking their language. You can deal with them in a better way when they see that you are using their ways. (TD/34[71-76])

Though the following two teachers believed in the importance of modernizing teaching methods, they tended to focus more on the barriers that prevented teachers from developing their teaching practices. They attributed this inability of teachers to modernize their ways to being uncomfortable with the technology, not having enough time to learn and spending too much time on daily duties. Moreover, modernizing their teaching would require extra work and more time, which they simply did not have.

> Using technology as much as they can in their classrooms and some teachers are still not that comfortable using technology... Maybe because they don't have enough time at home… they need a lot of time for correcting exams and preparing weekly and daily preparations. So using the technology needs more time preparing even if it's easier in the class even though they are enthusiastic about using it but it's the time efficiency. (TF/34[102-106])

> They don't like to do it, they think it requires more work and more preparation and surfing the Internet always takes more time so it's a burden for them and some of the teachers don't have Internet or they don't know where to find what they need. (TA/34[91-93)

This final comment noted an agreement with the other responses in regard to the presence of pressure on teachers to modernize their teaching practices. However, Bassam did not believe the source of this pressure to be from the school or students. Bassam's comment indicated the source of the pressure to rise from the teachers themselves. Teachers were under pressure to change what they were comfortable doing and learn how to do things differently.

> … it contradicts with what they know or with what they have got used to. Maybe most of them don't have the skills necessary for operating new technology… I don't think that the school or the students put any pressure on the teachers (TB/34[71-74])

6.4.5 Teachers' value beliefs in the effects of technology use

Respondents were asked about whether ICT makes a difference to the way teachers teach and learners learn. They were also asked whether ICT changes learners' role in the classroom. In answering these questions, respondents tended to focus on the capacity of technology to make teaching more effective and practical and make learning more engaging and relevant. Two major themes emerged from the data as discussed below.

Theme 1: Technology use and teacher practice

According to research, technology affects teacher practice in two main ways: "Technology can make it quicker or easier to teach the same things in routine ways, or it can make it possible to adopt new and arguably better approaches to instruction and/or change the content or context of learning." (Lawless & Pellegrino, 2007, p. 581). In answering interview questions related to teachers' roles and practices, respondents noted using technology to make their unchanged teaching practices "easier". Participants believed in the capacity of technology to make teaching more practical, organized, beneficial and creative. Teacher comments noted the way technology facilitated a teacher's work inside the classroom. A teacher did not need to spend too much time preparing textbook material, while at the same time; a teacher's preparation became more organized and creative. All these differences to the way a teacher teaches lead to greater benefits on student acquisition of knowledge and interest in the lesson presented. They also lead to a teacher's understanding of learners' abilities and consequently to catering to their needs.

> It will be… more practical and… the outcomes will be more measurable… it will make our work easier; it will facilitate the things we do in class for us and for them too. (TA/4[5-8])
>
> It may help in reducing the amount of time spent on preparation of books… It will give greater support for the comprehension of the information presented. (TB/4[8-10])
>
> It helps teachers become more organized and they can make their lessons more interesting for their students. (TD/4[5-6])
>
> It can help you control your classroom. It can help you explain your idea better… It facilitates your teaching. (TD/35[77-78])
>
> It helps the teachers be creative and to introduce topics in different ways… you will understand your students better and their level will be easily assessed. (TF/4[3-4])

A dual viewpoint was expressed by one of the respondents about the way technology made a difference to teaching. The following comment indicated the way technology made teaching easier and harder at the same time. Because technology-enhanced lessons take more time to prepare, teaching was thus made more difficult. By contrast, teaching is facilitated inside the classroom after the preparation of the material.

> It makes teaching easier and very hard. So when I want to make a flipchart to use on the interactive white board, it takes me a lot of time to prepare it. So when I have the time and I prepare all the lesson as a flipchart, I feel the implementation is so easy. (TE/4[7-9])

The multi-modal affordances of technology in particular were attractive to participants. Teachers became capable of introducing content in different forms, including visual and auditory modalities. It is interesting to note, however, that the kinesthetic modality was not mentioned during the interview. A possible explanation for this observation is the fact that technology was integrated in teacher-directed ways and learners did not have access to technological equipment during English periods. Therefore, learners could only be exposed to pictures, sounds, and videos on a projector or IWB.

> It helps a lot when you include images and different tools in your teaching. You can use pictures and sounds and help your students see things differently. (TC/4[5-6])

> …they can use different ways that help students understand the lesson better like using pictures and videos. (TD/4[6])

Although teachers might believe in the value of technology in helping them accomplish their teaching tasks more efficiently, they do not integrate technology for several reasons beyond these value beliefs. These factors may have included the lack of relevant knowledge, low self-efficacy beliefs and the context in which they worked.

Theme 2: Technology use and student learning

When asked about whether technology made a difference to the way learners learn and their role in the classroom, respondents tended to focus on six subthemes: four positive subthemes (enhanced engagement, increased motivation, wider attention and different learning styles) and two controversial subthemes (learners' role and behavioral problems). Value beliefs have been shown to influence a teacher's decision to incorporate new technologies. The more value teachers assign to the ability of technology in helping them achieve content-specific instructional objectives, the more likely they will use it (Hughes, 2005). In general, respondents saw value in technology, which may have been one of the reasons why some of these teachers used it.

There was a generally accepted view that technology use leads to student engagement through the transformation of the classroom towards a learner-centered environment. It was believed that learners become more engaged with the material when they were no longer receivers of the information and they participated actively with interesting and authentic resources. Learners also become engaged in the learning opportunities afforded by the ability to connect with native English speakers around the world. As a result, technology became a learning resource instead of simply an entertainment tool.

> It changes the role from the point of view of just being the receiver of the information. Technology can make him or her more interactive joining the effort of the teacher. (TB/13[23-24])
>
> They become more active instead of just watching me all the time…. They can see and hear more information in an interesting way. (TD/13[25-26])
>
> It can help students be exposed to authentic resources like native speakers… It can also motivate and engage students and then they can at least start using technology for learning instead of using it for chatting and playing games. (TE/35[115-118])

Participants linked this heightened level of engagement to increased levels of motivation and enjoyment. Technology-enhanced lessons were believed to motivate learners and this led to further involvement with the content of the lesson. Learners became more autonomous if they worked individually and interdependent if they worked in groups. They also preferred this method of teaching over note-taking and listening to presentations which bored them. Generally, the use of technology was more relevant for learners than it was for teachers. Therefore, teachers might feel burdened by the extra work they must put into preparing their lessons, however, the outcome would be catering to a generation that thinks fast and depends on technology on a daily basis.

> It would add some enthusiasm into the atmosphere of the classroom and the students would depend more on themselves or in groups… Since the students are using the computer and technology in their daily lives so what we give them traditionally bores them… I would describe it as doing it their way… They think fast they want something quick, not books and worksheets. (TA/13[36-42])
>
> They become more interested in the lesson and they participate more too. It helps in the understanding of the lesson, and in the way students interact with the new explained lesson. (TD/12[22-24])
>
> They really enjoy it and they grab the idea of the lesson more… on the second time when I didn't use it they said why didn't you bring us the laptop to see the lesson instead of just taking notes. (TC/13[20-23])

For one of the participants who had access to an IWB, this technology was responsible for a strong and direct increase in student motivation.

> It has a big effect. Even before you start when they know there's an interactive white board lesson they are already motivated to learn. (TF/14[24-25])

Another participant, however, disagreed. Yasmine described the presence of the IWB as a recent addition to the school and increases in student motivation were attributed to a novelty effect which wore off after using the IWB for a couple of years. Therefore, this participant felt a need to keep updated with the different activities and tasks that can be done on an IWB.

> Now that our students have seen the technology regularly I don't think they are motivated the way when they first saw it two years ago… Now they are used to it so I have to come up with new ideas. (TE/14[38-40])

Even though there was general agreement around the motivational aspects of technology, participants were cautious not to claim increased levels of acquisition and higher grades. There was a sense that technology could be considered one of the many tools available which led to positive results on learning. However, technology was the preferred choice of learners and the way they wanted to learn.

> When I use technology in one of my lessons, I notice that my students learn the material better… Even if they only do a little better on their tests, this makes me feel satisfied. (TD/15[30-322])

> … if you want to go with the trend and what the students want then we have to use the technology because it is the way they want to learn. (TE/15[44-45])

The interview data further suggested that participants held strong beliefs about the capacity of technology to grasp learners' attention. There was a general view that any material presented through technology would expand learners' attention as they became interested in the lesson. With a greater variety of activities, learners better and quicker understood the concepts and ideas presented. Organizing student competitions using technology was also believed to expand their attention span.

> When it comes to technology, students tend to be more attentive to the lesson than when following the traditional method of the board and the pen. (TB/14[26-27])

> Mainly attracting the students' attention which is essential because when the students are involved in what you are teaching the idea gets easier to them. (TC/35[89-90])

> The students, especially nowadays their attention span is becoming shorter so the ICT helps them focus more… you can make them focus on certain skills for a longer period of time. (TF/12[16-18])

It is interesting that participants only mentioned presentation programs, such as PowerPoint and Activinspire, to teach pre-defined knowledge and facts. Lacking were more complex projects and activities that involved high levels of learner creativity and communication. Despite this lack in learner-centered tasks and projects, teachers felt responsible for taking advantage of the affordances of technology that supported visual and auditory learning styles.

> It enhances language acquisition by varying the way to which a student is in direct contact with the language. Instead of reading traditionally, I listen, I hear, I see, I watch these are also different but important ways in acquiring the language. (TB/35[79-80])

> It can change the way they learn. But it has already changed since they are using the technology in their daily life… and that affects the way they like to learn in school. They

> can learn by watching a video from YouTube or they can understand better when they see pictures... (TE/12[31-34])

Contrary to the belief in the benefits of technology in increasing student engagement, motivation and attention, two participants held a skeptical view in the ability of technology to change learners' roles. One participant believed that any change in learners' roles must be accompanied by a prior change in the teacher's role. Therefore, learners must be in a position where they are in charge of the technological tools and consequently their learning. Another participant reinforced the idea of a learner-centered classroom with or without the use of technology. She believed that learners should not be passive absorbers of knowledge, but should be challenged to complete tasks actively. A teacher's role, therefore, became that of a guide as learners completed challenging tasks with or without technology.

> Learners like the technology. But the difference is relative. When my role changes then their role will change too. (TE/13[35])

> They are not supposed to be passive…. before the ICT, the teacher is able to use differentiated learning, give challenging things to do in class, so the learner is still an active learner even without ICT. (TF/13[19-23])

Contradictory results emerged from the data in regards to the effects of technology use on learners' behavior. While one participant believed that technology could practically solve some of the problems she faced in a teacher-centered classroom, another participant indicated increased behavior problems to be a main barrier preventing her from using the available technology at her school.

> I think it would make a difference and it could solve some of the problems with student behavior we face in traditional classrooms the way we have here. (TA/12[33-34])

> Number one is student behavior because sometimes when you have too many ICT lessons given in school, the students get used to the idea of moving around a lot… if they had an ICT lesson before the English period…instead of having students prepared, you waste 5 minutes to ask them to put away their material and have their books ready and to be organized. (TF/19[37-42])

6.4.6 Administrative support targeting technology use

In the literature synthesis (Chapter 2, 2.3.3), a supportive school administration was deemed important for technology integration to take place. Having a committed and involved school administration can greatly contribute to successful integration of technology, especially when this support is coupled with a clear school policy plan (Hayes, 2007). Therefore, participants were asked about the support they received from the school administration. Participants' responses fell into two categories: those who believed the school to support their integration efforts and those who disagreed. A third theme emerged from the interview data. Teachers believed in the presence of a conflict among the different stakeholders involved in integrating technology into the educational context. These three themes are discussed below.

Theme 1: Administrative support promoting the use of technology

Two participants believed the school supported their technology use. The schools were described as being sufficiently equipped with technology. The presence of an IT department was also considered important, especially since technology has a propensity to break down frequently. Administrative support was also manifested in verbal encouragements. The principal was described as setting high expectations for all teachers to use the technology provided for them. The principal made it clear that using technology was a priority at the school.

> The school is quite supportive. We have the technology at the school and we have IT personnel who are mostly supportive. (TE/3[4-5])
>
> At the schools where I teach, everyone is expected to use the IWB. The more the teachers use it, the more the administration praises them. (TE/34[111-112])
>
> I was given the training sessions, the smart boards are there, so the rest is up to me. (TF/29[67])

Theme 2: Administrative support hindering the use of technology

At the other schools, respondents conveyed a clear lack of administrative support hindering their uses of technology. These teachers described the low levels of support that they received in the scarce provision of technological equipment. Verbal encouragement was totally absent from these schools.

For example, Bushra's comment indicated a clear discouragement to use technology in her teaching. Her response also included a deficiency in the school's administration to provide the necessary devices and endorse a working policy. Therefore, the school administration was urged to provide its teachers with the necessary support to help them integrate technology. Bilal, too, believed in the "political will of the school" as being responsible for and capable of initiating this change. Such political will is considered one of the essential prerequisites for meaningful integration of ICT (Fluck, 2001).

> … we may have the necessary help if we want to use the projection room but in applying other types of technology like the computer… we still don't have this type of help. (TB/3[6-7])
>
> The shortage and also the school policy. If I bring in the projector frequently they would ask me why are wasting your time instead of appreciating the matter. (TC/19[29-30])
>
> The political will of the school can make a change. (TB/19[39])

Furthermore, four respondents believed their school administrations to exclude them from the change process. These teachers perceived themselves as implementers of whatever decisions their administrators made. Some of these decisions were also considered to take place at a very slow pace, whereas other decisions were not even made to date.

> … when they put a stable IWB none of the teachers were asked and we found them the following year and we had to use them. (TE/36[119-121])
>
> … maybe because the idea of changing the way I teach using technology has not yet been integrated into the curriculum or in the policies of the school. (TB/36[81-82])
>
> They're changing slightly… it is a very slow and weak change. (TC/36[99])

Theme 3: Conflict among the different stakeholders involved in diffusing technology into the educational context

A third theme which emerged from the interview data described a conflict among the different stakeholders involved in technology integration. School administrators were described as being old-fashioned, traditional, and unable to see the benefits of technology use. These administrators did not trust technology the way other teachers did. Therefore, a conflict arose among administrators and some teachers who did not endorse technology use, other teachers who wanted to change their ways of teaching, and students who wanted to learn through technology.

> Another problem is the difference in generation… You have three different generations and each one wants something different from the other. The old generation which is mainly the administrators and some of the teachers. They lack the perception of seeing how technology can help in the classroom (TD/37[87-90])

> I can't say that they don't have the money to bring technology because they got money from outside donors… they themselves are the traditional people because they fear technology… Administrators don't trust it. The teachers don't use it because it's not the way of the school. (TC/37[106-109])

> Maybe it's a financial reason [or] maybe it's the old-fashioned mentalities still governing the places of decision taking. (TB/37[84-85])

6.4.7 Resources and technology use

Respondents were asked about whether there were restraints in the physical environment at the schools where they worked. Responses centered on the themes of equipment, access and time. All the restraints mentioned in this section were in fact extrinsic barriers. Without the removal of these barriers, technology integration cannot advance further than the application stage. Because the technology itself was unavailable or unreliable, some teachers were unable to surpass this stage.

As noted in the interview responses, not only was there a clear deficiency in technological devices, but also teachers did not have easy access to these resources. The presence of the computers in a laboratory has put teachers of non-technological subjects at a disadvantage (Hew & Brush, 2007). Another type of meager resource was a lack of time. Hew and Brush (2007) found a lack of time as a resource-type barrier which may lead to teacher "burn out" and eventual departure from the school. The three themes which emerged from the data are described below.

Theme 1: Lack of equipment as a barrier

Four teachers offered their views about the lack of provision at their schools. These teachers claimed that the only available equipment was a projector and speakers. Consequently, "I bring my laptop with me" (TC/16[28]). Even desktop computers and laptops were totally absent or they could not use them. The teachers relied on their personal laptops for preparation or lesson presentation. Without the proper equipment, two teachers did not begin to use technology despite their positive value beliefs. These teachers felt this obstacle to be insurmountable. Such barriers in equipment, electricity and Internet connection are extrinsic barriers which prevented technology-using teachers from maximizing the things they could do with technology and prevented other teachers from using technology all together.

> Because of the lack of provision then there will be a lack of use. (TA/37[111])

Another major problem was in the availability of electricity and Internet connection. Electricity would get cut off at unpredictable times. Two teachers felt the need for electric power as a condition for them to integrate technology in their classroom. A further need was for quick Internet connection. It seemed that the Internet available at the school or in homes was not fast enough to create a web source for students to use it as a communication tool. It also appeared evident from respondents that Tripoli did not enjoy some of the same advantages in electricity and Internet connection which other Lebanese cities did. Consequently, respondents believed that money was a huge issue in Tripoli which caused many schools in the city to be poorly equipped. In fact, availability of power was considered as important as the availability of technological equipment; "we need access for the students and the teachers and 24 hour electricity" (TA/29[58]).

> … we are living in Tripoli where everything is poor. Electricity goes off you don't know when… Add to this the Internet accessibility is very slow. (TC/37[102-104])

> …in Tripoli you can say we are one of the poorest cities in Lebanon and even in the Middle East. And not all the schools have the money to get new technology devices. (TD/37[84-86])

Another respondent focused on both the quality and quantity of the technological equipment. Therefore, some schools may own sufficient technological tools in terms of quantity, but these tools may break down too often for teachers to rely on them. In either case, schools try to avoid spending too much money on technology.

> Either the school doesn't provide enough technological equipment or they're not good enough. Because they want to save money financially it's always the case. (TF/37[118-119])

Theme 2: Lack of access as a barrier

Another major theme emerging from the data was an evident lack of access to technological equipment. Bassam explained that his school owned a computer lab which was accessed only by the IT instructor and students taking IT classes once a week. Subject teachers, however, were restricted from using the computer lab for their lessons. Another access barrier noted by Bushra was in getting permission to use whatever the school administration made available for subject teachers. She indicated the presence of a wealth of complications before access was granted. It is interesting to note here that the only technological tool mentioned by this respondent was a projector. Still, having access to this tool was problematic. Furthermore, even when the technology was available, respondents believed that the access barrier hindered their technology use. Sarah found it difficult to bring in a mobile IWB because she believed it wasted her time and caused behavioral issues. She also believed that technical problems were unpredictable and consequently would waste even more time to request help from the IT department. Such time was considered an essential reason for Yasmine not to take her students to the computer lab. Agreeing with the existence of a maintenance problem, Amani believed that technological equipment was limited at her school due to the cost of maintenance; not only because of the cost of the equipment itself. Therefore, the access barrier was manifested in the presence of (1) computer labs dedicated to the IT subject, (2) complications before being granted permission to use available technologies, (3) technology available only outside the classroom context, and (4) the necessity to continuously fix technological equipment and keep them up-to-date. In all cases, when teachers questioned the reliability of access, this constituted a barrier preventing them from moving forward in their integration efforts.

Theme 3: Lack of time as a barrier

A final barrier in this category was time. Teachers were overwhelmed by a condensed curriculum and excessive duties. Rayan noted the constraints of time on completing curriculum requirements. Teachers also tended to focus on the excessive time it took them to prepare technology-enhanced lessons compared to their other lessons. For example, preparing flipcharts and searching the Internet for resources took more time than to prepare a lesson without the integration of technology. For these reasons, teachers did not have time to waste inside the classroom or time to use outside the classroom.

> We have to prepare so many materials and grade students work and keep track of their copybooks and textbooks and then we are with the students for long hours including recesses and proctoring. So that's why I think the teachers become too exhausted (TE/37[123-125]).

Similarly in the study conducted by Kopcha (2012), teachers stated that time was their biggest challenge when using technology in their instruction. Time was a challenge in three different ways: (1) time to plan for activities that integrated technology, (2) spending too much time on technology issues, and (3) finding time to learn new skills needed to teach with technology. All three time issues were noted by participating teachers as discussed throughout the identified themes.

6.5 Conclusion

The analysis of questionnaire data and interview responses highlighted the issues facing participating teachers in their efforts to integrate technology in their teaching. Researchers have emphasized the importance of broader issues required to successfully integrate technology, such as environmental and teacher characteristics (Ertmer & Ottenbreit-Leftwich, 2010; Mueller et al., 2008; Wozney et al., 2006).

First, environmental characteristics were not always supportive of teachers' efforts to integrate technology. According to both sets of data, participating teachers noted limited resources, access and support. Questionnaire data revealed that several technological devices and software programs were deficient, while others were available at some but not all schools. Triangulating this result, interviewed teachers noted a clear lack of tools, but also a problem with electricity and Internet connection.

Furthermore, interviewed teachers explained the lack of access revealed through questionnaire data. These teachers noted that the problem with access was manifested in the presence of computer labs dedicated to the IT subject, the difficulty in obtaining permission to use available technology, the availability of technology only outside the classroom context, and the necessity of continuously maintaining technological equipment. Though a clear lack of support was derived from questionnaire data, interview results revealed a dualistic perspective in this regard. Interviewed teachers disagreed in the quality of support they received from their administrators. While most interviewed teachers believed their schools to be unsupportive and discouraging of technology use, other teachers praised the kind of support they received and considered themselves responsible for putting their training into action.

The three factors of resources, access, and support create an ambivalent situation when considered alongside participating teachers' ICT uses. On one hand, it is commendable to have found a large number (N=15) of teachers who had already started using some form of technology. These teachers were trying to innovate with ICT, slowly change their practices, and move education and student learning into the 21st century with whatever technological devices and software available. On the other hand, the unavailability of these factors helps explain why the majority of teachers were using technology sparingly, but not necessarily integrating technology and why they were using technology more frequently for managerial tasks.

Research has found that the difference between low and high level uses of technology is not necessarily attributed to the barriers themselves, but to the relative importance that teachers assign to first order barriers. Therefore, teachers should be encouraged to assign little weight to these first-order barriers, and at the same time, rely on their strong beliefs about the role that technology should play in the classroom (Ertmer et al., 2012). Though some teachers were unable to surpass these barriers, others were capable of using technology inside the classroom for presentation, searching the web, and drill and practice exercises. This result was triangulated with interview data. The three teachers who were interviewed for their use of technology described lessons that were in tune with traditional, teacher-directed practices. All three teachers emphasized the role played by technology in presenting lesson content. In this way, teachers' objectives from using technology were corroborated with the technological tools they used most frequently. Outside the classroom context, questionnaire data revealed that teachers used technology mostly for creating paper-and-pencil assessment, getting information and pictures, making handouts and writing lesson plans.

Second, teacher characteristics were found to either hinder or support technology use. Although these educators were familiar with common technologies, they were not fully prepared to integrate technology through formal preparation. Questionnaire data indicated that the majority of teachers had not undertaken a pre-service teacher preparation course in technology use. This result was further elaborated during the interview in which two teachers disagreed about the quality of this preparation. While one teacher described an evident dissatisfaction with the training she received, another teacher thought her training to be quite sufficient. Questionnaire data also revealed that the majority of participating teachers had undertaken professional development in technology use. Interview data helped formulate a clearer picture of the quality of this professional development.

Teachers noted facing six obstacles, which led to their belief in the failure of the professional development in meeting their needs. These six barriers were represented in insufficient (1) time to apply acquired skills, (2) knowledgeable presenters, (3) supportive administration, (4) feedback and follow up, (5) focus on integrated technical skills and (6) modeling.

Interview data also helped indicate a further source of teacher training, which was teachers' self-initiated learning experiences. Two teachers, in particular, who had not received pre-service preparation or in-service professional development, relied on their personal abilities to learn new technical skills. Considering the quality of teacher preparation, it becomes clear why most teachers had insufficient knowledge and skills to integrate technology beyond low-level uses. Since higher-level uses of technology tend to take more time to emerge (Ertmer, 2005), perhaps not enough time had elapsed for these educators to become comfortable using technology at such levels. Another reason could be that more professional training in how to integrate technology in a subject-specific discipline was needed to help these teachers integrate higher-level uses of technology (Mueller et al., 2008). Despite insufficient and sporadic formal preparation, many teachers were applying basic technological knowledge and skills to improve student learning. With sufficient and effective formal preparation, it may be concluded that these teachers will continue their progress along the stages of technology integration.

Another teacher characteristic examined through both the quantitative questionnaire and qualitative interview was teachers' pedagogic beliefs. From the questionnaire data, teachers' results on the TBTUS indicated average to low scores. Therefore, teachers were found to hold pedagogic beliefs which were in tune with traditional, teacher-centered methods. The description of their technology use from the questionnaire revealed an alignment between these beliefs and their classroom practices. However, interview data revealed a dissonance in this alignment. The results of the interview further elaborated participants' pedagogical beliefs, thus demonstrating that some teachers' pedagogic beliefs were in transition, while others were more traditional in nature. Teachers indicated holding fluctuating pedagogic beliefs. Thus, inconsistencies in their responses about their pedagogic beliefs were evident. Though they articulated the benefits of using technology to support constructivist learning methods, their own practices were not aligned with these methods. Therefore, it may be concluded that technology did not guide teachers to more constructivist learning nor did their technology use align with their beliefs, which were a mixture of traditional and constructivist beliefs.

Adding to these internal tensions to change their pedagogic practices in general, they were also under external pressure to modernize their teaching practices to include technology. Consequently, their uses of technology reflected these tensions. The three technology-using teachers reported implementing cooperative learning, encouraging deduction and activating background knowledge, but indicated using technology in “transmission-oriented” ways in the form of “teaching machines to present information, give reinforcement and track student progress” (Mueller et al., 2008, p. 1525). Research suggests that teachers use technology in student-centered ways only rarely, even among those who work in technology-rich classrooms and possess student-centered beliefs (Palak & Walls, 2009). Researchers have also long stressed that when teachers hold changing pedagogic beliefs, the way these participating teachers did, first-order barriers may more easily hinder the enactment of these new beliefs (Ertmer et al., 2012; Kagan, 1992; Pajares, 1992). Therefore, participating teachers may reach higher levels of technology use when they are provided with sufficient technological devices and receive efficient technology training that will also help stabilize their fluctuating pedagogic beliefs.

Third, teachers’ value beliefs were relatively high on the questionnaire. This result was further corroborated during interviews during which teachers pointed out advantages to technology integration on both teacher practices and student learning. By contrast, teachers’ self-efficacy beliefs were found to both support and hinder technology use. According to questionnaire results, teachers noted high levels of self-efficacy beliefs, which may have enabled them to overcome the environmental challenges noted by interviewed teachers. However, some teachers revealed low levels of confidence hindering their higher-level uses of technology. These teachers’ self-efficacy beliefs were only high enough to use technology for low-level uses of technology. To change teachers’ pedagogic beliefs and increase their self-efficacy beliefs, respondents reflected their need for mastery and vicarious experiences as well as verbal persuasion.

Finally, participants described several enablers which they believed promoted their technology use. Five enablers, in particular, were echoed in the interview responses and can be summarized as constituting the following: (1) teachers' beliefs, knowledge and skills enabled use, (2) students' motivational increases encouraged further technology use, (3) resolving issues of computer availability and access would lead to increased use, (4) providing adequate resources and assistance in good planning are essential for subject specific technology use and (5) receiving government support in the form of a curriculum that integrates technology would help teachers understand the expectations for their technology use.

This chapter has presented the results of Study 3 which involved the administration of a questionnaire to 26 English teachers and an interview with 6 of these teachers. The thesis now moves to presenting the final thoughts of the research study as a whole and attempts to understand the results of the study by applying the Diffusion of Innovations Theory.

Chapter 7 Discussion

7.1 Introduction

The targeted context of this research study is the English classroom located specifically in Tripoli, Lebanon. A personal and professional desire to understand the status of educational technology more deeply within this context motivated the study. The broader desired contribution and influence of the study is to enhance equitable student access to improved English education in Lebanon. To contribute to this goal, the study thus aimed to provide a possible “blueprint” for the future development of ICTs in the wider context of the English classrooms across Lebanon. This chapter therefore seeks to present elements of this "blueprint" in the form of recommendations for policy makers, ICT lecturers, school leaders and professional development providers.

The purpose of this chapter is to synthesize core themes which emerged from the results of the multi-level studies conducted, relate them to the theoretical framework guiding this project, and offer recommendations arising from these context-bound results. This chapter further describes how the findings were used to develop a representation of factors operating at the three study contexts. The study was driven by four research questions which guided data collection and analysis procedures. The last question (RQ4) probed into the factors which affected educational technology integration in classrooms across Lebanon. By addressing this question: *What inferences can be made for the future uptake of ICT in the Lebanese English classroom?*, this chapter attempts to establish specific future directions for the status of educational technology in Lebanon and concludes with actions for future research in the field.

A summary of the key findings from the three levels of policy, university, and school is provided first in an attempt to answer the broad question guiding the research study: *What factors enhance or inhibit the integration of ICT in the Lebanese English classroom?*

7.2 Summary of key findings

The study has been successful in detecting both barriers and enablers to technology integration at the national, university and English teacher level. In total, fifty participants took part in the study. Three of the participants were leading policy-makers, seven were university ICT lecturers, fourteen were pre-service teachers, and twenty-six were in-service English teachers. Participants took part in an interview, a questionnaire or both. A summary of the research findings is discussed next.

7.2.1 Answering research question 1

RQ1: What are the national policies that support, fund and monitor the implementation of ICT in ELT and what barriers/enablers can be identified in the implementation of the policies?

First, the study examined the Lebanese government's role in the integration of technology process. An interview was scheduled with three leading policy-makers responsible for the diffusion of ICTs into the Lebanese educational system and more specifically, as it was revealed, in Lebanese public schools. The interview data was substantiated with data from a national conference and published documents. Every piece of information gathered helped create a timeline for the process of technology integration as it dated back to the late 1990's. Another significant data source came from the publication of the first national strategic plan which was the official document targeting the issue of technology integration in Lebanon. This document was published in 2012, more than a year after this study had begun. The information gathered from these different sources was instrumental in answering research question 1. The result of this qualitative investigation revealed the levels at which technology was being supported, funded, and monitored by the Lebanese government. It also revealed the barriers hindering technology integration at the government level, which is an important step towards finding solutions based on evidence from the field.

Findings indicated that the Lebanese government had begun the process of educational technology integration by completing the very first step of issuing a national strategic plan. The strategic plan has highlighted the importance of supporting the integration of technology in Lebanese schools as well as the mechanics of achieving this goal. However, funding and monitoring schemes are only mentioned as recommendations within the document. According to interview participants, funding is to be obtained from an outside donor and is not exclusively directed at the implementation of the strategic plan. Interview participants also noted difficulties in monitoring the implementation of the plan due to a limited number of inspectors per teachers. Therefore, at the time of the study, the nation's efforts to integrate technology are at the emerging stage and have not reached an established position like other developed and developing countries. Though Lebanon seemed to lag behind other nations in this field, acknowledging the importance of educational technology within the national strategic plan provides a positive outlook for the future. Once this document is approved by the Council of Ministers, the integration of technology will begin to appear more tangibly in Lebanese schools.

Study results also indicated that before this national initiative, governmental effort was channeled towards teaching students pure technical skills in cycles 3 and 4. Though other initiatives attempted the integration of technology into the teaching and learning process, their scope was too limited and their funds were too small to have any impact on the entire educational system as a whole. They simply began and ended at the pilot stage. Therefore, some of the major impediments to technology integration were in the follow-up, ongoing support, technology provision, Internet connectivity, research and evaluation. Further impeding the complete integration of technology into the Lebanese educational system was the absence of a formal and well-established ICT curriculum that specifies the adoption of ICT in schools. Participating policy makers also tended to disagree in terms of whether technological competencies were going to be integrated within subject matter areas in the new curriculum which will be launched in 2017. Such absence of specific ICT competencies within the current national curriculum created an ambiguous situation for school leaders and teachers who became individually responsible for the integration process. Therefore, integrating these competencies within the new curriculum will dictate a new status for ICT in education in Lebanon.

Despite the fact that the latest national strategic plan held great hopes for the future integration of technology into the Lebanese educational system, several barriers emerged from the different sources of the data, and most prominently from the interview data with the three leading policy makers. Most of the barriers identified at this level were common among countries which now enjoy a more stable ICT status. Therefore, taking these barriers into careful consideration may help advance the integration of technology into the Lebanese educational system. A summary of these barriers is presented in Table 7.1.

7.2.2 Answering research question 2a and 2b

RQ2a: How do Lebanese universities prepare pre-service teachers to integrate ICT into the English classroom and what barriers/enablers can be identified in the shaping of the pre-service teachers' preparation?

RQ2b: What are the environmental and individual characteristics influencing pre-service teachers' future integration of technology inside their classrooms?

Next, the study examined seven university educational technology courses by interviewing the ICT lecturer who was responsible for developing and teaching this course. An interview instrument was used to provide an in-depth description of these courses. Using this interview instrument, the study examined the strategies, approaches, technology content goals and the broader context of the ICT course. Further, the interview instrument was also used to analyze the conditions met (or not met) by these ICT courses in relation to the relevant literature reviewed in Chapter 2.

Among the most compelling findings in this study is the fact that none of these universities provided an educational technology course within the English Language and Literature program, even though the majority of in-service English teachers participating in Study 3 had obtained this degree and consequently were working as English teachers.

The broader context of technology integration for all seven courses was the standalone educational technology course. The course was one of many other courses, which formed the program of study. The strategies used within these standalone courses differed to some extent. The following strategies were used within the seven courses:

- All seven universities used the single course strategy
- Two universities used the educational faculty strategy
- One university used the multimedia strategy
- Two universities placed emphasis on the access strategy
- None of the universities used a field-based, mentor teacher or collaboration strategy
- None of the universities used the integrated or workshop strategy

The approaches to technology integration included several ways through which pre-service teachers were trained to use technology within the standalone technology course. These approaches can be summarized as follows:

- Five universities adopted the authentic experiences approach
- Four universities adopted the information delivery approach
- Three universities adopted the hands-on skill building approach
- Only one university adopted the observations and models approach

The university courses pursued a variety of technology content goals. Among the most common content goals were PowerPoint and other Microsoft Office programs such as Word and Excel. Other technology content goals were also pursued at either one or two of the courses. Perhaps such variation in the number and variety of technology content goals was limited in terms of the time available in a single course.

Furthermore, these universities met several important conditions for the creation of a university environment conducive to technology integration. However, none of the universities met all ten conditions (Chapter 2, 2.7.2). In general, the commitment of the university towards technology integration was more at the course-level than the university level. All seven university lecturers displayed a strong commitment and enthusiasm towards educational technology. This attitude was perhaps behind their extensive efforts to develop and administer a technology preparation course that catered to the needs of their 21^{st} century pre-service teachers, who, in turn, also believed their trainers to be competent in modeling effective technology integration. However, the restriction imposed upon them by the broader context of the university limited the time available for the course and the strategies which could be adopted. Other limitations were imposed upon them from the schools in which their pre-service teachers conducted practicum courses. With limited resources and technology-using teachers outside the ICT course, teacher trainers could not always create university-school partnerships which would ensure the presence of two important innovation diffusion characteristics: trialability and observability.

After the interview with the ICT lecturers, the research aimed to gather data from the pre-service teachers who had undertaken the course. An e-questionnaire was used to determine the demographic data of the participants and obtain their perceptions of the technologies used during the course and their confidence levels in using such tools in their future teaching. The e-questionnaire was then used to determine pre-service teachers' perceptions of their beliefs, knowledge and skills after having completed the course.

Among the most commonly available technological tools noted were personal computers, projection systems, and audio equipment. These same technological tools were the only ones which all seven ICT lecturers also mentioned. Using these technological tools, pre-service teachers' results indicated focused instruction on organizing their work, keeping records, and preparing lessons. By contrast, pre-service teachers believed the course to provide little focus on using technology to facilitate teaching pupils with disabilities and using technology as an assessment tool. This result triangulated the results obtained from the interview data. ICT lecturers specifically mentioned a lack of focus on the objective of preparing pre-service teachers to facilitate teaching pupils with disabilities. Additionally, pre-service teachers in many of the courses took traditional written assessments of their knowledge and skills, a fact which may have provided little focus on how technology could be used as an assessment tool.

Furthermore, there was an evident focus on the objective of using technology for preparing lessons and the objective of organizing work and keeping records in both sets of data.

In terms of their confidence levels, student teachers recorded higher confidence levels on the questionnaire for the uses of technology receiving the most emphasis and lower levels of confidence for the uses of technology which did not receive enough focus. Consequently, though not assuming a causal relationship, teacher educators may need to add emphasis on the uses of technology that prepare pre-service teachers to become capable of fostering their own students' abilities to use technology, supporting activities that facilitate higher-order thinking, and using technology as a communication and/or networking tool. If confidence in using technology for specific purposes increases when the educational technology course emphasizes these uses, then a logical conclusion would be to prioritize these uses in order of importance and time required to achieve them. These heightened confidence levels in operating technological tools for certain purposes may be a necessary first condition for predicting pre-service teachers' future uptake of technology. However, their confidence in using technology for preparing lessons and then organizing their work and keeping records may also indicate that their future uptake of technology will also be to use technology in these same ways.

The results of the e-questionnaire also revealed pre-service teachers' perceptions of their beliefs, knowledge and skills. Participants had reasonably positive beliefs towards technology integration after taking the course. Their perceptions of their self-efficacy and value beliefs were within the high range. However, their perceptions of their pedagogical beliefs were in tune with traditional beliefs. Considering the relationships among their pedagogical, self-efficacy, and value beliefs, these pre-service teachers may use technology confidently in their future classrooms. However, such uses may be in traditional ways and specifically in ways they were found to be mostly confident, such as preparing for their lessons, and organizing their work and keeping records.

Participating pre-service teachers also perceived their knowledge and skills in using technology to be high. The lowest score on the TPACK, however, was for the knowledge of technologies that can be used for English subject matter (TCK). The standalone technology course was successful in promoting pre-service teachers' perceptions of their levels of knowledge and skills and providing them with an overview of using technology in teaching. A last concern in this regard is the fact that participants were not presented with the opportunity to test out their knowledge and skills in real classroom settings. Therefore, they may face difficulties translating these skills once they begin teaching. Adding to this difficulty, many school contexts, as revealed in Study 3, may pose further constraints on their efforts to integrate technology in their classrooms.

Lastly in Chapter 5, the barriers and enablers which emerged from the interview data and questionnaire results were analyzed. A summary of the barriers and enablers identified at the university context is presented in Table 7.1 below.

7.2.3 Answering research question 3a and 3b

RQ3a: What are the levels of ICT integration already reached by English teachers in Tripoli?
RQ3b: What are the environmental and individual characteristics influencing in-service teachers' integration of technology inside their classrooms?

Finally, the study used a questionnaire and interview instrument to examine several factors pertaining to teachers' use and nonuse of technology to teach English subject matter in Tripoli schools. Quantitative findings revealed the levels at which technology was being used in the schools and the ways participants were integrating technology in instruction. A little over half of the respondents to the questionnaire reported using technology at the application stage. However, a closer scrutiny of the quantity and quality of this use revealed low level uses of technology for a limited time during the academic year. The majority of respondents reported their main objective in using technology was to present information to an audience. More than half of the respondents also reported using technology to find out about ideas and information as well as for the remediation of skills not learned well. To achieve these objectives, respondents reported using technological tools which corroborated with their pursued objectives. They used presentation software, word processing, World Wide Web browsers, and games for practicing skills most frequently. Not only was there a direct link between the technological tool used and the objective pursued, but also many aspects of traditional teaching methods using these tools were revealed. As a managerial tool, respondents used technology to create tests and quizzes most frequently. Getting information or pictures from the Internet was also quite frequently used, followed by making handouts or assignments for students.

Another important finding of this study was the dearth of technological devices, software programs and support available at most participating schools. Many teachers lacked adequate access to technological devices and educational software, which created the presence of extrinsic barriers hindering technology integration. Adding to this lack of equipment, these teachers did not feel supported by their school administration to integrate technology in their classrooms.

Furthermore, intrinsic barriers may have developed due to the fact that the majority of participants were not formally prepared for the integration process while at university. An ICT course was totally absent from the English Language and Literature program, which many of the participating in-service English teachers had undertaken. Therefore, they did not have the opportunity to learn how to use educational technologies while at university. However, most of the respondents took professional development workshops as in-service teachers. Perhaps this lack of teacher preparation at a time when teachers develop new understandings of what it means to be an educator in the 21st century resulted in only moderate positive beliefs and insufficient knowledge and skills to operate technologies beyond low level uses. Professional development workshops, undertaken after graduation, may not have been sufficient to make up for years of teacher preparation. In fact, the qualitative data confirmed this conclusion. A synthesis of interview data led to the development of a model for professional development which would cater to the needs of Tripoli English teachers. This model would be a cyclical process of (1) learning IT skills, (2) viewing model TPACK lessons, (3) applying newly taught skills in small steps and then (4) receiving feedback. Without adequate training, teachers' use of technology to support student learning will be hindered, whatever their pedagogical orientations may be.

Further, the questionnaire data revealed in-service teachers' perception of their self-efficacy and value beliefs to be reasonably positive. In addition, their pedagogic beliefs were in tune with traditional, teacher-centered methods. Considering teachers' pedagogical beliefs, it may be concluded that among the participants who were using technology in their classroom, these teachers employed the tools they were comfortable using in mostly teacher-directed ways and only occasionally throughout the academic year. This finding was further elaborated and discussed during the interview conducted with a smaller sample of English teachers.

For technology integration to occur more smoothly inside the classroom context, teachers need to broaden their perspectives about the value of technology in the enhancement of the learning process. Even though teachers had positive value beliefs, there was a widespread view of technology as being limited to presentation software, word processing, and the World Wide Web. Therefore, technology was used (if used) in fairly routine ways. More specifically, technology was integrated within the daily practices of teachers without disturbing their priorities to teach a set amount of material, manage their classrooms, and assess student learning. Teachers' self-efficacy beliefs, by contrast, perhaps enabled some of these respondents to use technology despite the presence of several extrinsic and intrinsic barriers. The finding from the questionnaire data revealed that there were many complex barriers to overcome before technology could truly be integrated within the Lebanese context. These barriers are not unique to Tripoli classrooms nor are they confined to developing countries. Therefore, they should be examined and addressed within the larger context of the Lebanese educational system.

Furthermore, questionnaire results indicated reasonably high levels of knowledge and skills. Participating teachers believed they had sufficient knowledge to use technology to teach English subject matter. However, this technology use was hindered at the application stage. At this stage, teachers' knowledge was restricted within the existing curriculum and they used technology confidently though not regularly. Due to external constraints beyond teachers' levels of knowledge and skills, teachers were unable to progress towards higher levels of technology integration. The result obtained on the questionnaire was clarified by interview data, which revealed teachers' knowledge and skills as a facilitating factor for some teachers and a barrier for others. Interview data also revealed teachers' acquisition of knowledge and skills from three different sources: professional development, university course, and self-initiated.

The interview with six in-service teachers was informed by findings from the questionnaire. The results of the interview clarified and triangulated the data from the questionnaire. Interviewed teachers noted both constructivist and traditional beliefs. However, their practices were in tune with the latter belief system. Interview findings suggested that, in general, these teachers enacted technology integration that did not closely align with their beliefs. Additionally, research results supported the notion that technology-using teachers did not move towards student-centered practices. Though they believed in the potential of technology in creating a shift towards more constructivist practices, interviewed teachers tended to use technology in ways that did not disturb the order they have imposed in their classrooms. Similar to previous studies, teachers were found to use technology in ways that supported their already existing teaching practices. Teachers' technology-integrated lessons may have been similar to their non-technology-integrated lessons.

Several reasons, noted in earlier chapters, may well be behind teachers' use of technology in teacher-directed ways. These teachers were under pressure to cover textbook content in order to prepare learners for high-stake examinations (Chapter 1, 1.5). They also lacked models of technology used to facilitate student-centered learning and their past experiences as students in teacher-centered classrooms may have shaped their own practices. Another possible explanation for the low level uses of technology was also revealed in the results of the qualitative data. Participants noted that the greatest barrier to technology integration was the lack of reliable infrastructure and support. The qualitative data showed that many schools lacked even the presence of basic technologies such as computers and projectors inside the classrooms.

It must be noted that many in-service teachers, especially those teaching at private schools, were working under stressful circumstances in which both teaching and nonteaching duties exceeded the time available to complete them. Teachers mentioned a particular emphasis on these external constraints, which either limited their use of technology or prevented it altogether. Issues such as completing curriculum requirements, managing student behavior, lesson planning and testing were time consuming. Therefore, when technology was used, it was integrated into their routine classroom practices without necessarily disrupting their other duties. For this reason, technology integration did not go beyond low level uses with teacher-led presentations being the main way in which technology was used. Largely absent were technology uses that required learners to collectively construct knowledge, communicate findings to their classmates, and receive constructive feedback either synchronously or asynchronously.

Although these teachers expressed their concern about what they named the “traditional” practices of teachers in Tripoli, they were unaware of the way they used technology in their own classrooms. Participants perceived themselves as different from other teachers in relation to the way they taught English. It may be rare for teachers to have the ability to critically reflect on their practices and consequently diagnose whether their espoused beliefs matched their enacted ones and whether there existed other intrinsic barriers which prevented them from using technology in more constructivist ways instead of blaming those existing extrinsically. Some of these teachers expressed a certain level of confusion over which beliefs to enact. When teachers achieve a better level of understanding of their own beliefs, they will be able to align these beliefs with the types of practices that exploit ICT in ways that lead to enhanced student learning. Holding onto these beliefs of constructivist learning, though not enacted, carries hope for implementation at some undetermined time in the future.

It appears from the analysis of both the questionnaire and interview data that true integration of technology in these schools has yet to be accomplished. Some teachers may be using technology sparingly, but not integrating technology as the latter prescribes consistent operation within lessons on a daily basis (Chapter 1, 1.3.1). Though a good start, random and occasional use of educational technology will continue to cause schools to lag behind other sectors in society. Both sets of data, the quantitative followed by the qualitative were instrumental in answering research questions 3a and 3b. Up until the time of the study, teachers were responsible for understanding, adjusting, and struggling with the integration of technology without external support from policy makers or school administrators. For this reason, different levels of technology integration were noted. Some pioneer teachers used technology despite the presence of extrinsic barriers, other teachers could be described as laggards who resisted it and blamed their lack of use on a number of external factors such as availability, access, and time. A summary of the barriers and enablers which were identified to be operating within the school context is presented in Table 7.1.

Table 7.1: Summary of barriers and enablers identified from the finding of the three studies

Factors	Policy Development	University ICT Training	Teacher Use of ICT
Barriers	1- Lack of government funding 2- Shortage in technological equipment and other resources 3- Little follow up and support 4- Incomplete integration of ICT within the existing curriculum 5- Exclusion of ICTs from the formal assessment of learners 6- Inconsistencies among policy makers 7- Exclusion of the private sector from the plan 8- Problems with professional development 9- Problems with teacher preparation 10- Inconclusive language throughout the strategic plan 11- Other barriers listed in the strategic plan	1- Insufficient exposure to technology training 2- Failure to provide comprehensive combined strategies 3- Lack of a shared vision and compartmentalization of educational technology courses 4- Lack of mastery experiences through trialability on the field 5- Lack of observability provided through vicarious experiences 6- Lack of pre-service teacher reflection 7- Insufficient professional development for teacher educators 8- Differences in the availability of technology resources 9- Lack of clear focus on one subject matter and/or grade level 10- Limited scope in the assessment of	1- Lack of resources 2- Lack of support 3- Low-level uses of technology for limited durations of time 4- Weak formal educational background 5- In-service teachers' perceptions of their pedagogical beliefs in tune with traditional teaching practices

	ICT skills 11- Pre-service teachers' perceptions of their pedagogical beliefs in tune with traditional teaching practices	
Enablers	1- Presence of technology training at Lebanese universities 2- Exposure to a variety of technology content goals 3- Presence of sufficient technical support 4- Provision of authentic activities and student-centered learning 5- Pre-service teachers' heightened perceptions of their self-efficacy beliefs 6- Pre-service teachers' heightened perceptions of their value beliefs 7- Pre-service teachers' heightened perceptions of their knowledge and skills	1- In-service teachers' heightened perceptions of their self-efficacy beliefs 2- In-service teachers' heightened perceptions of their value beliefs 3- In-service teachers' heightened perceptions of their knowledge and skills

7.3 A representation of factors operating in the three study contexts

The relationship between the three study contexts as well as the factors impacting technology integration at each level are represented in Figure 7.1 below. The wider cultural, economic, and political context was not investigated in this study, but clearly plays a role in shaping education in Lebanon and influences the success of technology integration (Tondeur et al., 2007). The upside-down triangle is a representation of a top-down approach to technology integration. The top-down approach may be the only way the Ministry of Education can ensure system-wide adoption of technology. Within the government context, the Ministry of Education and the CERD are responsible for formulating an ICT policy that has clearly distinguishable ICT rationales. The ICT policy should also specify several factors that are directly fed into the university context and/or the school context. For the university context, an ICT policy should consider the provision of funding and nationwide assessment of graduating teachers' ICT competencies. For the school context, an ICT policy should include careful consideration for professional development, resources, national curriculum, and again funding. Between the university context and the school context, pre-service teachers can benefit from the application of their newly acquired knowledge and skills in real classrooms. In-service teachers may also benefit from the support provided to their school from a cooperating university. Within the university context, ICT lecturers and other teacher trainers are responsible for preparing pre-service teachers efficiently for technology integration by providing the necessary resources, using a variety of strategies and approaches, targeting several content goals and ensuring their own ICT skills remain up-to date. Finally and within the school context, several factors were found to influence technology integration. These factors included teachers' beliefs, teachers' knowledge and skills, teachers' levels of ICT integration, school leadership and the school culture. The arrows in the representation indicate the flow of factors placed on the common lines between the different contexts.

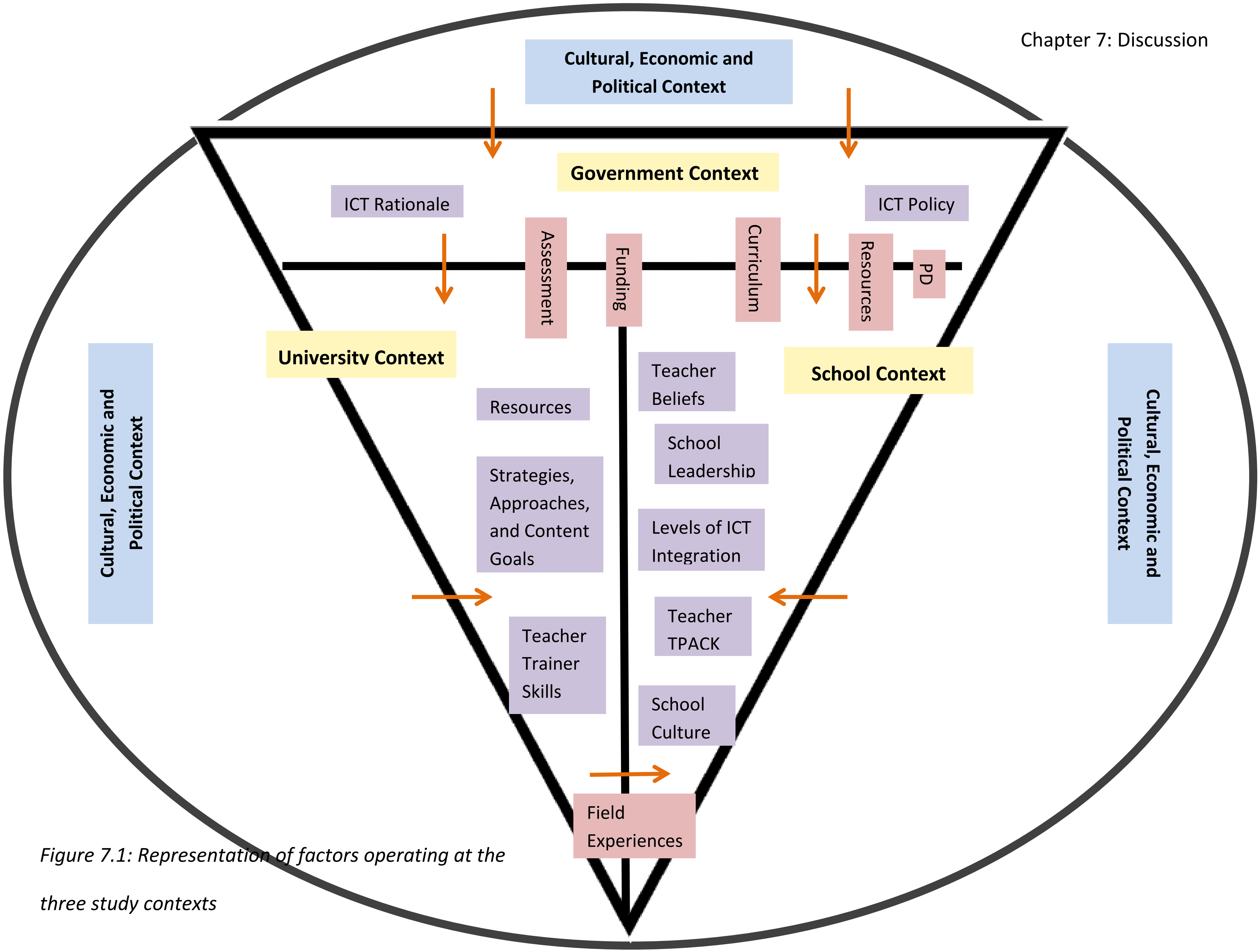

Figure 7.1: Representation of factors operating at the three study contexts

7.4 Usefulness of the theoretical framework: The Diffusion of Innovations Theory

The literature on the integration of technology into the educational arena provides a comprehensive foundation illustrating the factors that have been found to inhibit and support the use of technology in classrooms. Research studies have emerged rather rapidly to bring the issues confronting the integration of technology into perspective. However, researchers tend to focus on the integration of technology either within one context or in terms of a limited set of factors (Palak & Walls, 2009). This study, therefore, differs in the relative breadth of factors identified within three different contexts which create heavy influence on the diffusion of technology at the classroom level. As mentioned in Chapter 1, in order “to understand the process of technology adoption, we need one framework that allows us to talk about these factors in similar terms” (Zhao & Frank, 2003, p. 810). Therefore, in order to bring the three research contexts under a single perspective and to further understand the relationships in Figure 7.1, the Diffusion of Innovation Theory was proposed as a theoretical foundation for the study as a whole. The Diffusion of Innovations Theory deepened the conceptual understanding of this three level study and strengthened the “blueprint” for the future development of ICTs in English education in Lebanon.

As discussed in Chapter 1, the theory consists of four elements: (1) the inherent characteristics of the innovation, (2) the channels through which it is communicated, (3) time, and (4) the social structure of the system.

Before discussing these elements in relation to the research studies, an important element derived from the results of this study ought to be given precedence. Though widely accepted as a basis for the diffusion of any innovation, the theory must first accommodate a very important issue in the diffusion of educational technologies. When applied to the diffusion of ICT in education, the theory may be extended to include a fifth element of “ownership” (Robertson et al., 2007). Perhaps this element is exclusive to the diffusion of technology into an educational context, especially when efforts are being made to integrate these tools into contexts that lack them. Though widespread in all aspects of society such as businesses, hospitals and homes in Lebanon, technology does not seem to enjoy the same status within many of the investigated schools. For this reason and before any discussion about the diffusion of an innovation, the element of "ownership" will have the greatest influence over its adoption. Therefore, the ownership of the equipment and control over its characteristics will determine whether ICT stands a chance within the theory of the diffusion of innovation discussed next. Evidence of the importance of this factor in the integration of technology into an educational context is abundant in the literature (Chapter 2, 2.7) and was confirmed by the results obtained in this study. Researchers have long discussed both success stories and unsuccessful ones attributed to the presence or absence of functioning and easily accessible equipment in schools (Chapter 2, 2.7). It was also found that for the participating schools to even begin the process of the diffusion of technology, they must address this issue by equipping their school with the necessary resources and support as echoed by the voices of in-service teachers.

7.4.1 Characteristics of the innovation

The discussion now turns to the Diffusion of Innovation Theory and the way it was used to bring the three different research contexts into a single perspective. The first element in the theory discusses the inherent characteristics of the innovation as perceived by potential adopters. The potential adopters participating in this study constituted of policy-makers, university lecturers, pre-service teachers and in-service teachers. According to the theory, five characteristics affect the uptake of an innovation. They are (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability. These are discussed in relation to the conclusions of this study.

Relative advantage: According to research findings, the national strategic plan document contained a positive outlook for technology integration. Technology was considered an essential component for overall curriculum reform. The document emphasized the economic and social rationales. Therefore, the relative advantage of technology was viewed in terms of preparing highly skilled workers, learners and citizens of a knowledge-based society. However, interviewed policy makers expressed concern about several inherent characteristics of technology which made its integration hindered at the government level. Cost was a major concern hindering the development of a national policy for the integration of technology. The Lebanese government lacked sufficient planning resources and adequate funding while schools lacked ample ICTs. Another factor discussed in the document and during the interview pertained to evidence for the effectiveness of technology in education. The national strategic plan document specifically stated, “our belief [is] that technology alone will not promote improvements in educational quality or student achievement. Rather,…technology should intersect reforms in curriculum, instruction, and assessment” (MEHE, 2012, p. 26). Policy makers also required further evidence of the advantages of technology in improving student learning. Research studies have still not reached solid evidence about the benefits of technology on student learning (Liao et al., 2007). Consequently, a cost benefit analysis would place policy makers in a stronger position to defend their demand for funding and approval from the Council of Minsters.

University lecturers, by contrast, may be considered a biased group of participants who were inherently in favor of technology, since each had a position of responsibility to manage, introduce, and encourage the use of educational technologies at the university context. The diffusion of technology within the university context was at least achieved within the educational technology course at the majority of Departments of Education across Lebanon. Therefore, the relative advantage of educational technology was an augmenting factor, which ICT lecturers sought to transfer to their students. In this sense, these lecturers were responsible for revealing the relative advantage of technology to their student teachers so that they may, in the future, reflect such values in their classrooms. However, teacher educators were not always successful achieving this goal. It may be argued that teacher educators used a limited number of combined strategies, which failed to show pre-service teachers ways of integrating technology in real classrooms. Specifically lacking from the ICT courses was the presence of the collaboration, field-based, and mentor teacher strategies. Pre-service teachers need to experience the relative advantage of technology diffusion in real classrooms before they graduate and become in-service teachers bombarded with several other hindering factors. By contrast, teacher educators were, in several instances, successful in achieving this goal. First, using a variety of student-centered hands-on and authentic approaches to teach several content goals may have played a vital role in showing pre-service teachers the relative advantage of technology in the accomplishment of a range of different objectives. Further, teacher educators revealed a strong commitment and enthusiasm towards educational technology which led to great efforts on their behalf to reveal the relative advantages of using technology to their students in the form of a carefully structured technology course. Another intriguing observation may be noted about the corroboration between the technology uses cited the most by both teacher educators and pre-service teachers. When teacher educators used technology mostly as a management tool, pre-service teachers were able to confirm the relative advantage of technology for this purpose and their confidence levels increased as a result.

Similarly, in-service teachers, and specifically technology using teachers, experienced the relative advantage of technology as a presentation tool, as well as a way to find out about ideas and information and provide remediation of skills not learned well. For this reason, the diffusion of technology into their classrooms was associated with the affordances provided by certain technologies. Other in-service teachers were not given the opportunity to experience the relative advantage of technology because their schools were insufficiently equipped. Due to the absence of these technological devices, their diffusion into the educational context was hindered. Aside from the provision of equipment, in-service teachers need to be exposed to exemplary models of technology infusion in real classroom settings. In this way, they experience the relative advantage of technology in creating a positive classroom environment where students are actively engaged in the learning process.

Compatibility: The diffusion of technology at the national level has met with the values, needs and social norms of the Lebanese society according to the national strategic plan. The Minister of Education explicitly stated, “Our vision is that Lebanon’s young people will be able to adapt smoothly to the digital age and maximize the benefits from it” (MEHE, 2012, p. 1). The President of the CERD also articulated the way technology diffusion meets with the needs of both teachers and students. She stated, "Teachers and students need just-in-time and just-as-needed access to computers in their classrooms to support content-based instruction" (MEHE, 2012, p. 2). Thus, the diffusion of technology within the Lebanese educational system can be facilitated when policy makers take the characteristic of compatibility of the technology with the beliefs and values of school leaders and teachers into consideration. Policy makers should assess school leaders' and in-service teachers' beliefs and values to make sure they are compatible with the integration of technology into the school context. Though beliefs and values have been found to hinder technology integration, just-in-time and ongoing professional development can change them, thus, this project's attention to teacher beliefs and values.

Pre-service teachers' beliefs were found to be compatible with the diffusion of technology. Their value beliefs were high and hence it may be deduced that these pre-service teachers were motivated to use technology in their future professions. However, these pre-service teachers possessed traditional pedagogic beliefs, which may jeopardize their future teaching practices using technology in student-centered ways. Similarly, technology diffusion within the school context was in alignment with in-service teachers' existing values, though not completely compatible with their practices and past experiences. From the questionnaire data, in-service teachers were found to value technology to a relatively high degree. This result was triangulated with the results obtained during the interview. In-service teachers expressed their belief in the value of technology in making teaching more effective and practical and making learning more engaging and relevant. Thus, the value of technology was seen in its ability to positively enhance teachers' and learners' roles. Contrary to these value beliefs, teachers' practices and past experiences as learners may have adversely affected the diffusion of technology, sometimes even entirely. It has been strongly argued that effective technology integration must be compatible with constructivist learning theories and practices (Chapter 2, 2.6.1.3). In this way, the diffusion of technology into an educational system necessarily transforms teachers' and learners' roles, not merely enhances them. According to the results of the questionnaire, most teachers were found to hold traditional pedagogic beliefs. This result was elaborated with interview data as in-service teachers' practices were described as being more traditionally oriented and teacher-centered, even though they possessed fluctuating pedagogic beliefs. In-service teachers further expressed a general trend among other teachers to teach English in traditional ways. Both historical and cultural reasons were provided to explain such tendencies in the Lebanese context.

Complexity: According to the questionnaire results, both pre-service and in-service teachers perceived their knowledge and skills to be relatively high. Pre-service teachers' participation in the educational technology course appears to have contributed to their increased confidence in using certain technological tools. Hence, this cohort of participants may not consider these tools as complex. Further, pre-service teachers may have been quite familiar with many technological tools existing outside the university. Their knowledge and skills may have been further developed during the IT classes they had taken during their school years. The majority of in-service teachers, however, had not participated in an educational technology course while at university. However, technology was already diffused into the Lebanese society, and this is perhaps why these teachers did not view technology as a complex tool. Instead, teachers were familiar with many of the common technologies and used them comfortably mostly outside the classroom context. Perhaps this familiarity with every day uses of technology would in the long run assist in the diffusion of technology into the educational system. By contrast, the data from the interview clarified this aspect of complexity in more detail. Though some teachers indicated a deficiency in their knowledge and skills, they also revealed willingness and enthusiasm to overcome this barrier with further professional development. Therefore, technology was not perceived as being complicated by the participants in this study.

Trialability: Evidently, the notion of trialability in the Diffusion of Innovation Theory is connected with the concept of mastery experiences in the field of self-efficacy beliefs. When participating teachers are presented with the opportunity to trial technology with other teachers, they gain mastery experiences in a non-threatening environment and consequently gain more self-efficacy beliefs to integrate technology alone.

Not only is this concept of trialability related to mastery experiences, but it is also related to the importance of establishing university-school partnerships in order to provide pre-service teachers with opportunities to apply what they learn in educational technology courses. It has been argued that when pre-service and in-service teachers experience success in trialing technology in real classroom, their self-efficacy beliefs increase and they become more confident to integrate technology in their future practices.

However, among the barriers identified at the university context, a lack of trialability of technology in real classrooms was evident. None of the university lecturers required their pre-service teachers to integrate technology during their practicum courses. Due to the compartmentalization of the education program, every course undertaken within the pre-service preparation program was independent and isolated. ICT lecturers, for the most part, were unaware of the requirements, technology or otherwise, of other courses in the program. Another issue rising from the ability to trial technology integration at the university level was related to the cooperating schools. ICT lecturers noted their inability to ensure technology integration at these schools. The ICT lecturers felt grateful for finding cooperating schools that allowed their pre-service teachers to attend and complete their practicums. They could not impose further conditions upon them. Considering this situation, pre-service teachers at all but one university were deprived of the ability to trial technology use and transfer their acquired knowledge and skills into the classroom context. Therefore, pre-service teachers may find technology integration a complex endeavor once they graduate since they were not given the opportunity to trial its use, reflect, and receive feedback.

Similarly, in-service teachers were on their own to trial technology inside their classrooms. The professional development, which these teachers received, was in the form of workshops conducted in a computer lab. Because technology led the professional development, teachers lost the opportunity to trial newly acquired skills in their classrooms and then receive feedback. In-service teachers indicated a number of barriers that prevented the transfer of the skills they acquired at these workshops from becoming engrained within their practices. Among these barriers, the time frame was too limited to allow in-service teachers to acquire a large number of skills and consolidate this acquisition by practicing what they learned. Other barriers that may have also prevented the trialability of technology pertained to the mode of delivery of the workshops as well as the disintegration of technology knowledge with pedagogical content knowledge. Therefore, teachers had to find ways to trial the technological skills they acquired from the professional development workshops into their existing practices. Perhaps one of the main reasons why this is the case is the fact that these workshops were conducted by technology experts who lacked knowledge of any particular subject domain.

Observability: One of the most important themes identified in the literature and confirmed in this study was the importance of assisting teachers to become comfortable using technology by using the modeling strategy. At the school context, in-service teachers indicated their need to observe technology integration modeled in their schools. Though it may be more difficult to provide these in-service teachers with effective models of technology integration, exposing pre-service teachers to such models should not have been as problematic. Even so, there was an evident lack of the modeling strategy within the educational technology courses. This notion of observability in the Diffusion of Innovation Theory is similar to an essential source of self-efficacy beliefs termed vicarious experiences. It may be concluded that without the observability of technology integration in real classrooms, teachers' self-efficacy beliefs may not be high enough to use technology in their own classrooms. Furthermore, those teachers who acquire high self-efficacy beliefs from other sources can benefit from vicarious experiences and observe technology being modeled in student-centered ways (Mueller et al., 2008; Overbay et al., 2012).

In sum, not all potential adopters perceived the characteristics of technology adoption in positive lens. Some characteristics of technology diffusion were perceived to be inherently present, while others required further consideration and dedication. For example, potential adopters perceived the relative advantage of technology positively. There was general agreement about the positive impact of technology in education. These value beliefs may be the gateway for technology integration in the near future. The complexity of technology diffusion was also minimized due to the participation of pre-service teachers in an educational technology course and the widespread dissemination of technology in the Lebanese society. Furthermore, the integration of technology was compatible with participants' value beliefs, needs and social norms. By contrast, technology integration was incompatible with their practices and past experiences. Therefore, technology integration was restricted to traditional, teacher-centered methods. In addition, both the trialability and observability of the innovation were lacking, which may have led to the incompatibility of technology integration with teachers' practices. Consequently, the two most important sources of self-efficacy beliefs, mastery and vicarious experiences, were wanting. A summary of the characteristics of the innovation mapped against their presence or absence at the three levels of the educational system investigated in this study is presented in Table 7.2. Because some characteristics were believed to be available while others absent, technology integration in all three contexts was patchy, inconsistent and unstable. Targeting these specific characteristics of technology integration has been pursued extensively by many research studies, including this study.

Table 7.2: Summary of the presence or absence of the characteristics of the innovation at the three contexts

Characteristics	**Levels**	**+ve/-ve identification**
Relative advantage	Policy	Viewed through the lens of a social and economic rationale
		Issues arising due to the need for cost benefit analysis
	University	Largely acknowledged by teacher educators
		Instances of positive transfer to pre-service teachers
	School	Experienced within a limited set of uses; specifically those aligned with teacher-centered methods
		Not acknowledged by some due to insufficient equipment, training as well as current and past experiences
Compatibility	Policy	Compatible with values, needs and social norms of Lebanese society
	University	Compatible with pre-service teacher value beliefs, though not their pedagogical beliefs
	School	Compatible with in-service teacher value beliefs, though not their pedagogical beliefs, existing practices or past experiences
Complexity	University	Pre-service teachers comfortable using common technological tools
	School	In-service teachers comfortable using common technological tools mainly outside the classroom context
		Enthusiasm for learning and overcoming deficiencies in knowledge and skills
Trialability	University	No opportunities to trail technology due the absence of university-school partnership and compartmentalization of university courses
	School	No opportunities to trial technology due to ineffective professional development that leads with technology not pedagogy and content
Observability	University	Absence of the modeling strategy led to lack of observability
	School	Difficulties finding effective models of technology integration in real classroom settings

7.4.2 Communication channels

A significant finding in this study was the way each research context played out the diffusion of technology without strong communication channels among them. From a top-down hierarchical perspective, policy-makers failed to disseminate policy plans and make known the Ministry's expectations through careful policy planning. For research purposes, the search for a policy plan required maintaining contact via email with the interviewed policy-makers who did not disseminate the plan before the mentioned date. It was not until March 2013 that the researcher obtained a link to the document of the national strategic plan from one of the interviewed policy makers.

The results of the study further indicated weak communication channels between the government and university contexts. Even though one of the interviewed policy makers noted the involvement of universities in the planning for the national strategic plan, ICT lecturers negated the presence of national accreditation requirements executed by the Ministry of Education and Higher Education. Therefore, universities were relatively free to design and implement the educational course in ways they deemed most appropriate from their perspective. This situation created a large variation in the way pre-service teachers were prepared to integrate technology in their future classrooms.

At the university context, ICT lecturers had not established university-school partnerships. For this reason, there was a clear lack of communication among universities and schools regarding the effective diffusion of technology in both contexts. The necessity for school partnerships lies in their ability to facilitate both the trialability and observability of technology integration. Through these partnerships, universities can also communicate effective ways that technology be used in the classroom by offering in-service teachers professional development that models student-centered technology use. Consequently, teacher educators will ensure a classroom context that models student-centered technology use for their students. Such communication channels further reinforce a high level of collaboration and commitment towards technology diffusion for the ultimate sake of enhanced student learning.

Also lacking from within the school context were strong communication channels among in-service teachers at the same school as well as among different schools. In-service teachers worked in isolated classroom settings and were not involved in communities of practice where they could share resources, lesson ideas, and even equipment.

This situation calls for a revision of the communication channels already established at the government, university and school contexts as well as work on creating new and well-founded connections among the three contexts. The Ministry of Education must plan for such an initiative and drive communication channels among the different stakeholders in one direction, that of the diffusion of technology into an entire educational system. In their turn, ICT lecturers should establish strong communication channels among other teacher trainers within their departments as well as among certain schools where their pre-service teachers conduct practicum courses. In this way, ICT lecturers would ensure university wide diffusion of technology, which is modeled by most, if not all, teacher trainers. They would also ensure that their pre-service teachers observe and trial technology integration at the cooperating schools. Finally, individual teachers who participate in professional development together can further continue their collaboration through online communities of practice which have been found to offer teachers much needed collegial support.

7.4.3 The time factor

When compared to worldwide adoption rates, Lebanon may be considered among the late majority since a national strategic plan was only recently developed, though not yet implemented. Before this initiative, Lebanese policy makers were among the laggards who had not formally considered the diffusion of technology into the Lebanese educational system in its entirety. By contrast, some university lecturers were among the early majority, having established the ICT course 10-12 years ago while the others were among the late majority having established it 2-5 years ago. Additionally, some in-service teachers were among the laggards who had never used technology in their classrooms, others were among the late majority who were using technology in teacher-centered ways or only to prepare for their lessons.

Well acknowledged by the national strategic plan is that technology integration must be comprehensive in the way that it targets curriculum, instruction and assessment reform. For this reason, the strategic plan lays out a period of five years for the attainment of the major goals of the plan. However, it seems that the implementation of the plan may still be hindered since the plan was still not approved by the Council of Ministers. Beyond this approval, the timeline specified in the plan seems to be progressing slower than indicated. Because innovations need time before they are fully integrated, Lebanon's national strategic plan has a long way to go before it becomes a national policy and progressively transformed into practice. Rogers (2003) has cautioned against placing a time frame for the diffusion process, especially when the innovation requires the consensus of many individuals before it may be diffused. Such was the case of the Lebanese strategic plan.

At the university level, time was an issue since pre-service teachers were bombarded with everything they needed to know within the duration of a standalone educational technology course. Though ICT lecturers did not discuss the issue of time, it appears that had they more time, they could have served the purpose of preparing pre-service teachers for technology integration more effectively. Also at the university level, it may not be enough for some pre-service teachers to learn several technical skills especially if they were unfamiliar with them. Therefore, the time factor plays out in this context in the necessity of integrating technology across the teacher preparation program instead of addressing it within a single course.

On an individual teacher level, in-service teachers expressed their need for more time in order to become more frequent and proficient technology users. Research on the integration of technology for instructional purposes stresses the time teachers need to use technology in their instruction. The time factor in this study has been found to take shape in four ways: (1) time to plan for activities that integrate technology, (2) time spent on resolving technical issues, (3) time spent on resolving student behavioral issues and (4) time to learn new skills needed to teach with technology. The process of technology adoption in Tripoli schools seemed to be progressing slowly within the school context with only some teachers using technology. According to Rogers' theory, it may be expected that more and more teachers join the diffusion process once the five characteristics of technology (relative advantage, compatibility, complexity, trialability, and observability) are addressed and consequently support their efforts.

The theory also outlines the decision-making process individuals go through from the initial introduction of the innovation until the final stage where it is either adopted or rejected. The steps include knowledge, persuasion, decision, implementation and confirmation. According to the innovation-decision process, the Lebanese Ministry of Education has finally made it to the decision stage. The implementation stage awaited the approval of the Council of Ministers even though small increment steps were made in that direction. At the university level, pre-service teachers were found to possess high value beliefs, which may be an indication that they were at the decision stage. Therefore, pre-service teachers valued technology and had the intention to begin the implementation stage once they graduated.

In-service teachers, by contrast, indicated their levels of technology use across the first four stages. The majority indicated their presence at the implementation stage since they were using technology inside the classroom and had relatively high-perceived knowledge and skills (Chapter 2, 2.4). However, further investigation using in depth interview questions helped explain that these teachers may in fact be considered at the decision stage since their espoused beliefs were incompatible with their enacted beliefs and their levels of knowledge and skills were only sufficient for teacher-directed uses of technology. Though many of them were using technology in their classrooms, this use was contrary to the way technology should be used. Research acknowledges that the mere use of technology is no longer a critical issue in classrooms today; rather the issue of utmost importance is using this technology to develop learners' thinking and problem solving skills (Chapter 2, 2.2). In this regard, it becomes necessary to equip both teachers and learners with the technology that enables them to utilize it in the ways that are harmonious with real-world purposes; that is to communicate, collaborate, and solve problems. To do so, teachers need to enact their beliefs more tangibly in their lessons by first gaining the necessary knowledge and skills that will channel their practices and then their beliefs in one direction. In this way, in-service teachers may progress forward to the implementation and then confirmation stages with a solid knowledge base of effective technology integration.

7.4.4 Structure of the social system

As yet, the different Lebanese stakeholders have not engaged in joint problem solving to accomplish the common goal of technology diffusion for enhanced learning and teaching. They all seem to be working towards the achievement of their own contextual goals. In this way, the Ministry has yet to connect the different stakeholders around this common goal. The type of decision-making apparent at the government level was different for public schools and private schools. Though private schools may adopt the strategic plan “if implemented”, these schools were not obligated to integrate technology in any form since they were only held accountable for high-stakes examinations that did not assess learners’ IT competence. Thus, the optional innovation-decision (Chapter 1, 1.4.4) played out in private schools. The Ministry of Education, by contrast, governed public schools, and therefore, the type of decision-making was the authority type. However, the Ministry’s plans were still at the emerging stage and no authority innovation-decisions were made as yet.

The type of decision making apparent in most schools was the optional innovation-decision as teachers in both public and private schools were free to adopt technology or not. Teachers within the same school were also found to differ on the levels of technology integration. Lacking from the government context and the majority of school contexts was the authority innovation-decision (Chapter 1, 1.4.4). Consequently, technology was being used sporadically to achieve low-level goals, such as presentation of content, finding information on the web, and remediation of skills. When policy-makers and school leaders work towards shaping teachers’ technology uses to include the pursuit of higher-level goals, teachers can be considered integrators of technology, not simply users, and student learning will benefit.

7.4.5 Implication of using the theory on the future uptake of technology in Lebanon

In sum, the Diffusion of Innovation Theory was a suitable theoretical foundation to understand the present and future uptake of technology in Lebanese schools. The theory proved to be useful in locating the factors which either hindered or promoted the adoption of educational technology. It also provided a consistent process through which innovations are usually diffused in social contexts. This consistency made it possible to predict the future of educational technology diffusion in Lebanon. Finally, the theory was also useful in providing a common framework to the study, which stakeholders can build upon for the future uptake of educational technology in Lebanon.

This study has found that the diffusion of technology into the Lebanese educational system had just begun. Several elements were found to promote the diffusion of technology into the three research contexts. These elements included the ownership of technology at the university level. Further, the characteristics that supported the diffusion process included the acknowledgment of the relative advantage of technology, the compatibility of technology with adopters' values, and the familiarity with technologies as opposed to the perception of complexity. All other elements of the theory were found to hinder technology integration. Among the elements which hindered technology integration was a lack of ownership at the government level and at many schools. Also, the characteristics that hindered the adoption of technology included the incompatibility of the technology with teachers' practices and past experiences, and a lack of trialability and observability. Furthermore, communication channels were intermittent between the different stakeholders as well as among themselves. Additionally, the diffusion of technology had begun late compared with other countries around the world. Lastly, the type of decision-making currently adopted included the optional innovation-decision, which by nature does not enforce the diffusion of technology, but rather potential adopters are free to adopt technology or not.

The analysis of the results in terms of the Diffusion of Innovation Theory made it possible to indicate the status of educational technology in the Lebanese educational system. As discussed in this section, the availability of certain elements signifies the positive presence of a foundational basis from whence to accelerate the diffusion process. However, the absence of other elements indicates the need for deliberation targeting these elements specifically. A possible “blueprint” for future development in the field was developed in the form of recommendations for policy makers, ICT lectures, school leaders and professional development providers. These recommendations, which were derived from the research results, are presented next.

7.5 Recommendations for the future uptake of ICT in Lebanon (RQ4)

The study has provided an accurate description of the status of educational technology in three interrelated contexts. The findings of the study will serve as a “blueprint” for different stakeholders as they seek to facilitate the diffusion process for enhanced student learning. They may also promote the diffusion of technology into other educational systems with similar demographics. The study has several implications for the present and future uptake of technology in classrooms. These implications are discussed in the form of recommendations. It is hoped that these recommendations will be taken seriously by all stakeholders who aim to succeed at achieving this fundamental educational goal. To effectively address the barriers identified in the study contexts, policymakers, teacher educators, and teachers are all responsible for making the necessary contributions towards technology integration in Lebanese schools. It is proposed, then, that the following recommendations be taken into careful consideration:

7.5.1 Recommendations for policy makers

Since the policy environment was still in its early days, policy makers may need to accelerate their efforts in order to move ahead and become aligned with developments in other countries. Since the study has indicated the barriers currently found at the government level, policy makers are advised to consider ways of transforming these barriers into enablers. Thus, eleven recommendations are summarized below:

- Allocate the necessary funding from multiple sources for technology integration: The Lebanese government should call on national and international private businesses and organizations that may be willing to contribute to the further funding of the national strategic plan. This would lift a heavy financial burden off the public sector. Careful attention should also be given to the equal distribution of the available funding to all urban and rural cities, according to a nationwide evaluation of their needs and situations.

- Improve access, Internet connectivity and necessary infrastructure: The Ministry of Education should further collaborate with the Ministry of Telecommunications and the Ministry of Energy in order to ensure the availability of high speed Internet access and 24/7 electricity across the Lebanese borders.

- Follow up and evaluate ICT plans during the implementation stage: Once the plan becomes implemented, ongoing research, evaluation and assessment become imperative. In this regard, the Ministry of Education should establish partnerships with the university sector where research and evaluation of the implemented plan can take place. Strong communication channels need to be in place among the various stakeholders who take on different responsibilities and produce coordinated results.

- Integrate technology literacy skills into curriculum documents and even textbooks: To ensure a clear and encompassing role for ICTs in schools, curriculum documents must integrate well-defined and explicit technological standards or competencies which learners need to acquire through the different subject matter areas. In this way, curriculum developers can create a certain level of collective understanding once the policy is translated into practice.

- Incorporate ICTs within the formal assessment of students, specifically in grade 9 and 12 by including critical thinking and information literacy skills: Following from the development of specific technological competencies within the different subject matter areas, evaluation bodies must ensure that learners are assessed on these skills especially during high-stake examinations.

- Define the roles of different policy makers and create robust communication channels among them: The importance of establishing strong communication channels cannot be overstated. Both within and among the different levels investigated in this study, policy makers can unify the language used to speak about educational technology in the different contexts. The inconsistencies found at the policy level can be readily resolved when policy makers at the CERD and those at the MEHE combine their efforts through effective communication channels.

- Include the private sector in the planning, implementation and monitoring of the policy plan: This recommendation reiterates the importance of establishing communication channels with the private sector in much the same way as the public sector. Further, private schools must be held accountable for learners' acquisition of technological competencies put forward by curriculum developers.

- Provide high quality and just-in-time professional development for teachers: Government bodies responsible for teacher training need to develop their programs in accordance to several important conditions for effective professional development (Chapter 2, 2.3.3). They also need to develop their own understanding of what works in the Lebanese context based on similar research in the field.

- Formulate assessment strategies requiring pre-service teachers to demonstrate their pedagogical competence related to ICT: There is a need for a national accreditation body that oversees the skills of graduating teachers. This body would then become responsible for establishing its own set of standards or adapting international standards to the needs of Lebanese learners.

- Review and update the national strategic plan to infuse language that is more decisive and influential: The national strategic document requires a preliminary evaluation in order to include more assertive language. Further, like any policy plan, the document requires revisions and adjustments in light of changes that are expected to occur in this field.

- Increase and expand research studies and evaluation reports that help create a clear understanding of the status of ICT integration across Lebanon: This recommendation was derived from the presence of other barriers acknowledged by the national strategic plan. Quite apparent is the fact that the educational system faces several other barriers that do not directly link to the integration of educational technology. By diversifying research studies and evaluation reports, policy makers will make better-informed decisions of ways to overcome them.

7.5.2 Recommendations for ICT lecturers

A number of recommendations are suggested to make the most of pre-service teachers' university experience. At university, ICT lecturers can take several actions, which enhance their already existing courses and consequently create a truly productive learning environment for their student teachers. These recommendations are presented below:

- There is an urgent necessity to revise the English Language and Literature program to include the preparation of teachers in using educational technologies. If all graduates from this program end up teaching English, then the entire program in its current form does not serve the professional needs of its graduates. Further, there is an urgent need for the current ICT course, offered by the Departments of Education to focus on using ICTs in the teaching of specific subject matter and for a specific age group. ICT lecturers should survey pre-service teachers before they administer a standard course to all incoming student teachers. In this way, they will tailor the course requirements according to their students' professional needs.

- Though criticized for a number of deficiencies, the standalone ICT course at these Lebanese universities should not be totally eliminated from the program of study. Instead, other faculty should work alongside the ICT lecturer to benefit from their pre-service teachers' newly acquired skills. In this respect, all faculty members at the Department of Education should undergo extensive professional development programs, ideally conducted by the ICT lecturer, in order to promote university wide integration of technology in student-centered ways. Therefore, the university should have a well-established plan that allows for such systemic and systematic change efforts to take place.

- ICT lecturers should incorporate several other strategies in which different approaches may be used and a larger amount of technology content goals may be pursued. Squeezing a limited amount of technology content goals and approaches within the single course strategy may have limited benefits on the effective preparation of future teachers. For example, the modeling strategy can be directly implemented by providing student teachers with real examples of how technology is being used in the classroom.

- Given the fact that the ICT course is a general requisite for all pre-service teachers despite grade level and subject specialty, the sequence of the ICT course should follow rather than precede methods courses. A logical alternative to the way technology is currently taught at Lebanese universities, would be to divide the actual ICT course into modules spanning the entire three-year program. The first module would target foundational technological skills. Later, pre-service teachers may take their methods courses followed by a second ICT module. In this way, pre-service teachers can use the pedagogical content knowledge they acquire from the methods courses during the educational technology course. Finally, in order to ensure the smooth translation of teachers' knowledge and skills into practice, a third module is proposed during pre-service teachers' practicum courses.

- The previous recommendation calls attention to two other requisites for the ICT course. First, the teacher preparation program cannot be considered complete without a field-based component. For the field experience component, universities should seek schools that are interested in participating in a collaborative program. Professional development would then be provided through the university to the in-service teachers working at these schools. Second, the teacher preparation program should last long enough to lead to well-established changes in beliefs, knowledge and skills. As suggested through the results of the study, teacher training institutions should employ pre-service teachers' high levels of self-efficacy and value beliefs in order to advance their knowledge and skills starting at the pre-service teacher level and henceforth.

- Since pre-service teachers enter the teacher education program with mostly traditional pedagogic beliefs, teacher educators have an additional mission to accomplish by transforming them into constructivist, learner-centered beliefs. One of the ways teacher educators may do so is by modeling both teacher-centered and student-centered uses of technology. Then student teachers may reflect on the advantages and disadvantages of both methods. Teacher educators may also point out the way their student teachers prepare lesson plans, learning objects and assessments for the course in relation to the beliefs and practices of traditional and constructivist learning theories.

- ICT lecturers can also take advantage of the way their students are already using technology in their daily lives and channel this use into an educational direction. For example, a possible way to create a comprehensive course which provides enough emphasis on technology uses for educational purposes is by first identifying all the uses of technology which ICT lecturers believe are important for preparing the 21st century teacher. Then, they should weigh the time available during the course against the variety of uses they are capable of achieving. Lastly, they should acknowledge the fact that many uses of technology can be achieved in unison through one strategy, approach and/or technology content goal.

7.5.3- Recommendations for school leaders and professional development providers

School leaders and professional development providers must also take responsibility for increasing in-service teachers' prospects of integrating technology in the English classroom. Professional development providers are also responsible for assisting teachers to become competent technology users. A number of recommendations are presented below:

- Teachers should be encouraged to form communities of practice where they can discuss the strengths and weaknesses of various teaching practices in relation to ICT enhancing student learning. They can also draw on each other's expertise, provide encouragement as well as share resources and ideas. School leaders should also hold open discussion sessions where teachers in the same cycle or department consider what is being done and what needs to be done for the integration of technology in a non-threatening environment.

- Teachers should be provided with exemplary models of good practice in integrating technology into instruction. Teachers will benefit from observing the ways that technology should be applied in real classrooms. Teacher trainers who use technology in constructivist ways provide their trainees with models in which technology is used to construct knowledge. Role model teachers within a school may also be identified and their "smart" strategies and perseverance may be shared among their colleagues. A reward system may also be established recognizing these exemplary teachers.

- School leaders should show their commitment to technology integration by equipping classrooms and computer labs with the relevant tools, developing a robust support system, providing professional development to their teachers, encouraging teachers with monetary incentives, and praising teachers' technology integration efforts.

- School leaders are also responsible for ensuring a school culture that is supportive of technology integration. The first step is to develop a school policy or plan that specifies the ways technology should be used. The school plan should involve teachers in the decision-making and include a set budget for buying and maintaining technological tools. Finally, school leaders need to become familiar with the wide range of technological innovations and their applications in education.

- Professional development providers should assess teachers' espoused beliefs and work on providing the necessary training that would aid teachers in enacting these beliefs. Professional development should be aligned with their beliefs, even if these beliefs were not in favor of student-centered uses of technology. Once teachers become comfortable and competent using technology in these ways, professional development can then move on to building their pedagogical beliefs and practices to include more student-centered practices. Consequently, these increases in knowledge and skills will be followed by increases in their confidence and value for technology uses in such ways.

- Professional development providers should consider the conditions for effective teacher training. Offering in-classroom training and follow up support should be considered as part of their efforts. They should further identify successful integrators of technology and launch mentor programs that expose other teachers to practical examples of technology-integrated lessons within their subject matter area and their schools.

7.6 Suggestions for future research

Based on the results of the three studies, the following suggestions for further study are offered for consideration. Although this study revealed several important findings, additional studies should build on the results of this study and provide further evidence and knowledge in this ever-changing educational technology field. A list of suggestions for future research in the Lebanese context follows:

- At all levels of the educational system, a larger sample size should be targeted. A larger sample size of teachers can produce more reliable results concerning the individual and environmental factors impacting their technology use. Any future study of these factors should identify ways to eliminate the barriers and build on the enablers. A mix of qualitative and quantitative data is also required in order to enhance the generalizability of the results.

The voices of policy makers, teacher educators, teachers and students all have a place in leading to a better understanding of the study context.

- At the policy level, future research is needed when the national strategic plan is implemented. Research studies and evaluation reports can provide information on the successful implementation of the plan.

- At the university level, teacher educators should conduct evidence-based research to identify the weaknesses and strengths in their courses. This research should accompany an investigation of the effects of their courses on student teacher learning. Teacher educators may study which strategies, approaches and content goals correlate with higher levels of technology use for instructional purposes by their student teachers.

- At the school level, future research is needed to identify the role of school leadership in the enhancement of technology use and provide evidence for the way administrators should be trained to fulfill their new role.

- At the classroom level, future research is needed in order to examine and evaluate the effects of educational technology use on student learning outcomes and achievement scores. Researchers need to find ways of optimizing the use of technology for student learning while at the same time minimizing the risks. Future research should also identify the types of technology uses that lead to higher levels of student learning and achievement. Another research agenda pertains to the ubiquitous use of mobile devices in providing students with meaningful learning opportunities and their actual benefits. Any study on the relationship between technology use and student achievement should include a description of the context and the conditions which were or were not met by the implementation.

- At the individual teacher level, future research should include classroom observations of teachers implementing technology-mediated instruction in order to decipher the ways technology is truly being used instead of basing these judgments on self-report data. In view of the hurdles faced by these innovating teachers, an analysis of their efforts and achievements in the context needs to be featured. Also in this context, a need arises for research on professional development which caters to the needs of Lebanese teachers. A possible new research agenda could be in online professional development programs provided by subject specialist teachers who are competent technology users in their own classrooms. In addition, the issue of why teachers' espoused beliefs were found to be incompatible with their enacted beliefs raises further questions about the range of contexts in which education takes shape and how these contexts influence teacher beliefs and practice. Finally, research into exemplary practice which successfully combines technological, pedagogical and content knowledge could provide models for teachers to enhance their own use of technology for instructional purposes.

7.7 Limitations of the research design

The research design, which included the combination of both qualitative and quantitative methods of data collection, aimed to develop a comprehensive picture of the status of educational technology in English education in Lebanon. Therefore, participants from across three different, yet interrelating, contexts were required to participate in this study. However, several factors imposed limitations on the implementation of the study.

First, the number of participants at the university and school levels did not reach the amount anticipated at the beginning of the study. For example, only fourteen pre-service teachers responded to the e-questionnaire and twenty-six English teachers responded to the questionnaire. These numbers limited the analysis of the data and resulted in the inability to generalize from the research results.

Second, the descriptive nature of the study portrayed schools as either users or non-users of educational technology in the English classroom. However, the study does not indicate the quality of technology integration and its effect on student learning.

Third, participant bias may have limited the results of the study. Participants may have estimated their level of technology use and described the factors operating within their contexts in a subjective way. However, the research results were not used to draw unreasonable conclusions or far-reaching recommendations.

Fourth, researcher bias may have imposed a further limitation on data collection and analysis. Educated in Australia, I have been influenced by western educational beliefs which foster a constructivist learning environment. Furthermore, I became an adopter of educational technology as an English teacher working in Tripoli schools. Thus, my perception of the way technology should be integrated into the classroom constitutes a personal perspective.

Lastly, the political and military upheavals which continuously erupted during the entire duration of the study may have affected the efforts exerted at the policy level to implement the strategic plan. However, this situation is indicative of the Lebanese context and further investigation of the political barriers is a potential research study in itself.

Several of these limitations were carefully taken into consideration. As a result, the study provided a comprehensive description of the status of educational technology at the three levels of policy, university and school. The study resulted in the development of a ”blueprint” in the form of recommendations for the further improvement of educational technology in Lebanon.

7.8 Final note

This chapter has provided a conclusion to the study by summarizing the key findings in relation to the four research questions guiding its course. A representation of factors operating at the three study contexts was developed and discussed. Further, the theoretical framework was applied to the findings of the research and evidence was provided for its usefulness on describing the current and future uptake of ICT in education. Several recommendations were made for policy makers, universities and schools. Some suggestions were also made for future research. The limitations of the study were further revisited in order to acknowledge the implications of low response rate to the questionnaires and the consequent weak generalizability of the quantitative findings.

The study grew out of a perceived need for a comprehensive knowledge base about the situation of ICT in English language teaching in the Lebanese context. It was developed from one English teacher's motivation to understand the status of educational technology in the context of the English classroom and provide a possible "blueprint" for the future development of ICTs in English education in Lebanon. Several important findings have been to identify the magnitude of the problem of technology integration in the English classroom in Lebanon. Other important findings have been to identify the foundational basis consisting of enabling factors that can be considered the starting point for future endeavors. The findings of the study will have relevance for the national efforts currently in progress in schools to integrate technology. These efforts, which were initiated only recently are commendable, however, a closer examination should be paid to several other factors that are hindering technology diffusion. Further, these factors are so intricately linked that they must be addressed simultaneously. Although there are individual teachers making positive progress, the conditions for successful and broad technology integration do not appear to be in place, including ready access to technology, increased training for teachers, and a favorable policy environment. Therefore, it appears as no surprise, in the absence of such conditions, that some teachers participating in this study made no formal use of technology inside the classroom. These disparate barriers facing English teachers in Lebanon require immediate attention by policy makers, school administrators, and teachers.

On a final note, the research context was set in a small Arab country like no other country in the region in terms of its demographic characteristics, political upheavals, economic constraints and social interactions. These factors created a challenging context within which the three studies were carried out. Culturally, participants may have been reluctant to participate in the study because they were either unaccustomed to being involved in research studies or because they were afraid of disseminating information about their classroom practices. Economically, participants, and more specifically, in-service teachers staged open-ended strikes to demand salary increase. Politically, many conflicts in Tripoli forced schools to close. These factors made it impossible to contact potential participants and consequently the number of participants did not reach the amount required for inferential statistical analysis. Though the number of participants was small given their distribution across three contexts, they provided insights into their contexts and individual characteristics that created a general understanding of the ICT status in Lebanon. The complexity of integrating technology into the Lebanese educational system proved to be more problematic than first imagined by the researcher.

The research concludes with the acknowledgement of the long road facing technology integration in the Lebanese educational system. However, the participants in this study valued technology enough to continue their positive progress on this road towards the enhancement of English teaching and learning in Lebanon.

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Appendix A

Interview questions for policy makers

1- Does the Ministry have a national policy for ICT in English Education? ☐ Yes ☐ No

If NO, why?

Not a priority ☐

Insufficient planning resources ☐

Limited availability of ICTs in schools ☐

Limited budget ☐

Skepticism about benefits of ICTs in education ☐

[Others (please specify)

Skip to question 12

If YES, continue with the following questions:

2- Is there an official document that I may obtain? ☐ Yes ☐ No

3- Is there a website where the policy has been published and is accessible to English teachers?

☐ Yes ☐ No If YES, what is the URL?

4-What is the rationale for integrating ICT in the national curriculum?

☐ Economic: ICT skills are necessary to meet the need for a skilled work force

☐ Social: ICT skills help learners become responsible and well-informed citizens

☐ Educational: ICT is a supportive tool that improves teaching and learning of other subjects

☐ Catalytic: ICT has the potential to help learners become autonomous, cooperative and problem-solvers

5- Does the policy indicate the presence of the following?

A- Master plan ☐ Yes ☐ No

If YES, please explain what it includes.

B- Timeframe ☐ Yes ☐ No

If YES, what is the duration specified for its implementation and evaluation?

C- Budget plan ☐ Yes ☐ No

Further clarification in question 7, 8, 9 and 10

D- Monitoring or evaluation scheme ☐ Yes ☐ No

If YES, who is responsible for monitoring the integration of ICT and how is it evaluated?

E- Separate organization responsible for overseeing the implementation of ICT ☐ Yes ☐ No

If YES, what is the name and role of the organization?

If NO, ask question 6

F- Separate organization responsible for policy development ☐ Yes ☐ No

If YES, what is the name and role of the organization?

If NO, ask question 6

G- Separate organization responsible for pre-service teacher training ☐ Yes ☐ No

If YES, what is the name and role of the organization?

If NO, ask question 6

H- Separate organization responsible for in-service teacher professional development,

☐ Yes ☐ No

If YES, what is the name and role of the organization?

If NO, ask question

I- Separate organization for curriculum development ☐ Yes ☐ No

If YES, what is the name and role of the organization?

If NO, ask question 6

6- If there are no separate organizations, how is implementation of ICT in education and curriculum in schools coordinated, monitored and evaluated? Please describe with some detail.

7- Is there a separate budget appropriated for the implementation of the national policy on ICT?

If YES, what is the approximate amount per year in US $?

If NO, where does funding come from?

Included in the national budget for education ☐

Provided from the budget of other Ministries (Ministry of Telecommunications, etc.) ☐

Provided by other private companies ☐

Provided by other donor/funding agencies ☐

Provided by NGOs and other associations ☐

Others (please specify)

8- What percentage of the national budget for education is allocated for ICT across the curriculum?

9- Is there a specific amount of the national budget allocated for ICT in ELT?

If YES, approximately how much in US $?

10- Of the allocated budget for ICT, please indicate percentage allotted for the following:

A- Hardware and software (procurement and installation)

B- Connectivity (Internet installation, telephone lines, etc.)

C- Training for pre-service teachers

D- Training for in-service teachers

E- Development of education and software applications

F - Software licenses

G- Maintenance and repair

H- Others, please specify

11- Please provide the title, scope (grade level) and duration for all the projects/programmes that the ministry is currently undertaking and/or has undertaken in the past in connection with the implementation of ICT policy in English Education.

Title	Scope (grade level)	Duration

Skip to question 14

12- Does the ministry have any future plans currently underway for a national policy that specifically addresses the implementation of ICT in education? And more specifically in English education?

If YES, please describe with some detail (master plan, timeframe, budget plan, and organizations for coordinating, monitoring and evaluating the implementation of ICT)

13- If Lebanon has no national policy on ICT for English education, how does the ministry implement ICT in education?

As part of the regular programme of the ministry ☐

As a project of the ministry ☐

Under an ad hoc committee ☐

Others (please specify)

14- At the national level, is there a prescribed curriculum on ICT by the Ministry of Education?

If YES, how is ICT taught in the classroom

As a separate subject (No. of hours) ☐

Integrated in all subjects (No. of minutes of integration/subject) ☐

Integrated in some subjects (No. of minutes of integration/subject) ☐

As an elective (No. of hours) ☐

Others (please specify)

15- At the national level, are there any published or unpublished sources of data that target the integration of ICT in education and more specifically in English education?

Unpublished research papers ☐

National research reports ☐

Department of Education publications ☐

Curriculum guidelines ☐

Conference papers ☐

Education statistics ☐

Others (please specify)

16- Are the resources you need for ICT in education policy-making easily accessible?

17- Are the resources sufficient for your policy-making needs?

18- Are available resources of good quality?

19- What additional informational resources would be useful?

Scientific evidence on the effectiveness of ICT in education, cost benefit analysis ☐

Sample ICT Policy of a country with similar characteristics ☐

Policies (guide for vision and strategy development) ☐

Teacher training policies and strategies (examples, criteria, strategies) ☐

Content development principles (when to buy, adapt, develop) ☐

Technology (hardware, software) ☐

Fundraising, private-public partnership scenarios ☐

Examples of good classroom practice (video), quality software etc. ☐

Others (please specify)

20- Who do you suggest I talk to next to find out more about national policies that target the integration of technology in English education?

Appendix B

Interview questions for university ICT lecturers

Questions about the university:

1. What school level does your program cover?

Preschool / Primary school / Lower secondary/ Upper secondary /Other (please specify)

2. What type of degree does the university offer? B.A in Education/B.A in English Language and Literature/B.A in English Language Teaching/Other

Questions about the educational technology course:

3. What is the name of the educational technology course offered at the university?

4. How many years has the course been offered at the university?

5. Does the course have any prerequisites? Which course(s)?

6. How many student teachers are there currently enrolled (this semester) in the educational technology course?

7. What are the course objectives?

8. What are the course requirements/activities that student teachers take part in?

9. How are student teachers assessed upon completion of the course?

10. What is the passing grade for the course?

Questions about the technology equipment available:

11. What kind of technological equipment is available in the classrooms you use?

	In no classroom I use	In some classrooms	In all classrooms	Upon request
Personal computers				
Interactive whiteboards				
Video conferencing systems				
Audio equipment (including software)				
Digital photo cameras				

(including editing software)				
Digital video cameras (including editing software)				
Projection system				
Other (please specify)				

12. What type of software is provided for the educational technology course?

13. Is there technical support available for teacher trainers at your institution? YES/NO/Other

14. How would you rate the quality of the technical support? Poor/Mediocre/Good/Very good

Questions about the technological skills targeted:

15. Has the institution had a major training program in technology for all teacher trainers?
YES/NO

If YES, indicate in which year the latest took place.

16. To what extent are workshops or other learning activities about technological skills provided to all teacher trainers?

- Not provided
- Optional courses or activities are provided
- Mandatory courses or activities are provided
- Optional or mandatory courses or activities depending on program
- Other (please specify)

17. To what extent are courses in pure technological skills provided to student teachers?

- Not provided
- Optional courses or activities are provided
- Mandatory courses or activities are provided
- Optional or mandatory courses or activities depending on program
- Other (please specify)

Questions about the pedagogical skills related to ICT:

18. Does the university have a policy to promote or support ICT-based innovations by teacher trainers in their teaching? YES/NO-If YES, describe this policy in some detail.

19. Are there formal requirements for all teacher trainers to integrate technology into their education courses? YES/NO/Other

20. Is there a special academic department dedicated to the pedagogical use of ICT at the university? YES/NO

If YES, describe the role of the academic department and its activities.

21. To what extent are workshops or other learning activities about pedagogical uses of ICT provided to teacher trainers?

- Not provided
- Optional courses or activities are provided
- Mandatory courses or activities are provided
- Optional or mandatory courses or activities depending on program
- Other (please specify)

22. To what extent are the objectives for the student teachers' pedagogical competence related to ICT clearly stated in course plans?

- Not at all
- In less than half of them
- In half of them
- In more than half of them
- In all of them

23. Are there formal requirements for student teachers to integrate technology during their field placements? YES/NO/Other

24. Are there formal requirements for mentor teachers to integrate technology during student teachers' field placements? YES/NO/Other

25. To which degree are student teachers' pedagogical competences related to ICT formally assessed?

- No other courses assess the student teachers' pedagogical competence related to ICT

- Some courses assess the student teachers' pedagogical competences related to ICT
- To complete the program a final assessment is required regarding the student teachers' pedagogical competences related to ICT
- To become teachers, national accreditation requires student teachers to demonstrate their pedagogical competence related to ICT

Questions about the teacher trainers:

26. Gender: Female/Male
27. Age:
28. For how many years have you been a lecturer in teacher training programs?
29. For how many years have you been teaching in the educational technology course?
30. What best describes your level of technology expertise in your classroom? Please indicate according to the technological tools available in your classroom and mentioned in question 1 earlier.

- I'm very uncomfortable using technology in my classroom
- I'm fairly uncomfortable using technology in my classroom
- I'm fairly comfortable using technology in my classroom
- I'm very comfortable using technology in my classroom

Questions about the pedagogical use of ICT by teacher trainers:

31. Do you prepare student teachers to use the technology described below:

a) Use of technology for communicating and/or networking
b) Use of technology for student teachers' own development and learning
c) Use of technology as an assessment tool
d) Use of technology as a management tool…

- for organizing their work and keeping records
- for preparing lessons
- for finding digital learning resources
- for designing and producing their own digital learning resources

e) Student teachers' future integration of technology…

- to facilitate teaching specific concepts or skills
- to support various student learning styles and to personalize learning
- to facilitate teaching pupils with disabilities (cognitive, physical, behavioral)
- to support activities that facilitate higher-order thinking
- to support creativity
- to foster pupils' ability to use technology in their own learning
- Other (please specify)

32. Do you teach the use of the technological devices below to student teachers?

- Personal computers
- Interactive whiteboards
- Video conferencing systems
- Learning Management Systems/VLE (WebCT, Moodle etc.)
- Audio equipment (including software)
- Digital photo cameras (including editing software)
- Digital video cameras (including editing software)
- Projection system
- Other (please specify)

33. Describe your role as a teacher trainer in preparing student teachers to integrate technology into their future teaching.

Appendix C

Questionnaire for pre-service teachers

Student Teacher's Name:

A- Background information

1- Name of the university:

2- Gender: Female ☐ Male ☐

3- Your age range:

- 18-22 ☐
- 23-26 ☐
- 27-32 ☐
- 32+ ☐

4- When do you expect to graduate as an English teacher? *Year / Month*:

5- What grade level will you teach?

- Preschool ☐
- Cycle 1 (grade 1-3) ☐
- Cycle 2 (grade 4-6) ☐
- Cycle 3 (grade 7-9) ☐
- Cycle 4 (grade 10-12) ☐

B- Technology Use

6- What technological devices have you used in the educational technology course you have taken?

- Personal computers ☐
- Interactive whiteboards ☐
- Video conferencing systems ☐
- Audio equipment (including software) ☐
- Digital photo cameras (including editing software) ☐
- Digital video cameras (including editing software) ☐
- Projection system ☐

- Other (please specify)

7- Is there technological support available for student teachers at your institution?

☐ YES ☐ NO ☐ Don't Know

If YES, how would you rate the quality of the technological support?

- Poor ☐
- Mediocre ☐
- Good ☐
- Very good ☐

C- Pedagogical use of ICT

8- To what extent has the use of technology described below been present in the educational technology course you have taken?

	Never	Sometimes	About half the time	Often	Almost always
a) Use of technology for communication and/or networking					
b) Use of technology for your own development and learning					
c) Use of technology as an assessment tool					
d) Use of technology as a management tool…					
…for organizing your work and keeping records					
…for preparing lessons					
…for finding digital learning resources					
…for designing and producing your own digital learning resources					
e) Your future integration of technology…					
…to facilitate teaching-specific concepts or					

skills					
…to support various student learning styles and to personalize learning					
…to facilitate teaching pupils with disabilities (cognitive, physical, behavioral)					
…to support activities that facilitate higher-order thinking					
…to support creativity					
…to foster pupils' ability to use technology in their learning					
Other (please specify)					

9- After completing the educational technology course, to what extent do you feel confident to integrate technology in the following areas?

	Not confident at all	Somewhat confident	Confident	Very confident
a) Use of technology for communication and/or networking…				
b) Use of technology for your own development and learning				
c) Use of technology as an assessment tool				
d) Use of technology as a management tool…				
…for organizing your work and keeping records				
…for preparing lessons				
…for finding digital learning resources				
…for designing and producing your own digital learning resources				

e) Your future integration of technology…				
…to facilitate teaching specific concepts or skills				
…to support various student learning styles and to personalize learning				
…to facilitate teaching pupils with disabilities (cognitive, physical, behavioral)				
…to support activities that facilitate higher-order thinking				
…to support creativity				
…to foster pupils' ability to use technology in their learning				
Other (please specify below):				

10- To what extent do you think your teacher trainer modeled combining content, technologies and teaching approaches effectively in their teaching?

- Strongly disagree ☐
- Disagree ☐
- Neither agree nor disagree ☐
- Agree ☐
- Strongly agree ☐

Appendix D

Teachers' Beliefs regarding Technology Use Survey (TBTUS)

A- Your beliefs about technology use

Please read each of the following statements. Then decide the extent to which you agree or disagree. If you are uncertain of or neutral about your response, you may always select "Neither Agree or Disagree". Circle the number to the right of the question that best matches your choice. Go with your first judgment and do not spend too much time mulling over any one statement. **PLEASE ANSWER EVERY QUESTION**.

		Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1	Students have more respect for teachers they can relate to as real people, not just as teachers.	1	2	3	4	5
2	I can't allow myself to make mistakes with my students.	1	2	3	4	5
3	If students are not doing well, they need to go back to the basics and do more drill and skill development.	1	2	3	4	5
4	In order to maximize learning, I need to help students feel comfortable in discussing their feelings and beliefs.	1	2	3	4	5
5	It's impossible to work with students who refuse to learn.	1	2	3	4	5
6	Addressing students' social, emotional, and physical needs is just as important to learning as meeting their intellectual needs.	1	2	3	4	5
7	Even with feedback, some students just can't	1	2	3	4	5

	figure out their mistakes.					
8	My most important job as a teacher is to help students meet well-established standards of what it takes to succeed.	1	2	3	4	5
9	A quiet classroom is generally needed for effective learning.	1	2	3	4	5
10	If I don't provide students with enough direction and guidance, they won't get the right answer.	1	2	3	4	5
11	It is better when the students -not the teacher- decide what activities are to be done.	1	2	3	4	5
12	No matter what I do or how hard I try, there are some students who are unreachable.	1	2	3	4	5
13	Knowledge of the subject area is the most important part of being an effective teacher.	1	2	3	4	5
14	Students learn most effectively when lessons are broken down into sequential steps.	1	2	3	4	5
15	Innate ability is fairly fixed and some children just can't learn as well as others.	1	2	3	4	5
16	One of the most important things I can teach students is how to follow rules and to do what is expected of them in the classroom.	1	2	3	4	5
17	Student projects often result in students learning all sorts of wrong knowledge.	1	2	3	4	5
18	Collaborative work makes it difficult for teachers to determine who is responsible for what. That is why collaborative work should be limited.	1	2	3	4	5
19	I know best what students need to know and	1	2	3	4	5

	what's important; students should take my word that something will be relevant to them.					
20	For effective learning to occur, I need to be in control of the direction of learning.	1	2	3	4	5
21	Accepting students where they are no matter what their behavior and academic performance-makes them more receptive to learning.	1	2	3	4	5
22	I am responsible for what students learn and how they learn.	1	2	3	4	5
23	Students should help establish criteria on which their work will be assessed.	1	2	3	4	5
24	Cooperative group work is an effective way to help students learn.	1	2	3	4	5
25	Teachers shouldn't be expected to work with students who consistently cause problems in class.	1	2	3	4	5
26	Independent learning should be encouraged more than collaborative learning.	1	2	3	4	5
27	Instruction should be built around problems with clear, correct answers, and around ideas that most students can grasp quickly.	1	2	3	4	5
28	How much students learn depends on how much background knowledge they have--that is why teaching facts is so necessary.	1	2	3	4	5
29	Encouraging competition among students motivates them to learn more.	1	2	3	4	5
30	I am confident that I can use technology as an effective teaching tool.	1	2	3	4	5

31	I am confident that I can use one computer effectively during large group instruction.	1	2	3	4	5
32	I am confident that I can develop effective lessons that incorporate technology.	1	2	3	4	5
33	I am confident that I can use technology effectively to teach content across the curriculum.	1	2	3	4	5
34	I am confident that I can overcome difficulties using technology in the classroom (time, scheduling, accountability).	1	2	3	4	5
35	I am confident that I can manage the grouping of students while using technology as a teaching tool.	1	2	3	4	5
36	I am confident that I can meet the challenges of technology integration.	1	2	3	4	5
37	Technology can provide instruction suited to individual students' needs.	1	2	3	4	5
38	Technology use promotes student-centered learning and self-discovery.	1	2	3	4	5
39	Technology can enhance my students' creativity and imagination.	1	2	3	4	5
40	Technology can engage my students in collaborative work.	1	2	3	4	5
41	My students can learn problem-solving more effectively with technology.	1	2	3	4	5
42	Writing is easier for my students when they use technology.	1	2	3	4	5
43	I will encourage and model smart choices about tools students might use to accomplish	1	2	3	4	5

	tasks, such as using books, a spreadsheet or digital information when each one is the best.					
44	I will encourage students to use the Internet and e-mail to communicate with experts, other students and people from around the world to enrich their learning.	1	2	3	4	5
45	I will expect students to organize their thinking using Inspiration and other software programs to make mind maps.	1	2	3	4	5
46	I will ask students to use networked computers to explore important questions and issues arising out of the content of my class.	1	2	3	4	5
47	I will make more time for students to do more of the thinking, analyzing, interpreting, inferring, and synthesizing of information using technology.	1	2	3	4	5
48	I will use new and worthy technologies while avoiding the invaluable and traditional uses that waste time without delivering much value.	1	2	3	4	5

Appendix E

Survey of Pre-service Teachers' Knowledge of Teaching and Technology

Your technological pedagogical content knowledge and skills

Technology is a broad concept that can mean a lot of different things. For the purpose of this questionnaire, technology is referring to digital technology/technologies. That is, the digital tools we use such as computers, laptops, iPods, handhelds, interactive whiteboards, software programs, etc. Please answer **ALL** of the questions and if you are uncertain of or neutral about your response you may always select "Neither Agree or Disagree"

		Strongly Disagree	Disagree	Neither Agree or	Agree	Strongly Agree
1	I know how to solve my own technical problems.	1	2	3	4	5
2	I can learn technology easily.	1	2	3	4	5
3	I keep up with important new technologies.	1	2	3	4	5
4	I frequently play around the technology.	1	2	3	4	5
5	I know about a lot of different technologies. TK	1	2	3	4	5
6	I have the technical skills I need to use technology. TK	1	2	3	4	5
7	I have had sufficient opportunities to work with different technologies. TK	1	2	3	4	5
8	I know about technologies that I can use for teaching English subject matter. TCK	1	2	3	4	5
9	I can use technologies that enhance the teaching approaches for a lesson. TPK	1	2	3	4	5
10	I can use technologies that enhance students' learning for a lesson. TPK	1	2	3	4	5
11	My teacher education program has caused me to think more deeply about how technology could	1	2	3	4	5

	influence the teaching approaches I use in my classroom. TPK					
12	I can think critically about how to use technology in my classroom. TPK	1	2	3	4	5
13	I can adapt the use of technologies to different teaching activities. TPK	1	2	3	4	5
14	I can teach lessons that appropriately combine English subject matter, technologies and teaching approaches. TPCK	1	2	3	4	5
15	I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn. TPCK	1	2	3	4	5
16	I can use strategies that combine content, technologies and teaching approaches in my classroom. TPCK	1	2	3	4	5
17	I can use strategies that combine content, technologies and teaching approaches in my classroom that I learned about in my coursework at university. TPCK	1	2	3	4	5
18	I can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches at my school. TPCK	1	2	3	4	5
19	I can choose technologies that enhance the content for a lesson. TPCK	1	2	3	4	5

Appendix F

Questionnaire for in-service English teachers

English Teacher's Name: ____________________ Name of School: ____________________

A- Background information

1- What is your gender? Female ☐ Male ☐

2- In which age group do you belong?

- Less than 24 years ☐
- 25-29 years ☐
- 30 to 39 years ☐
- 40 to 49 years ☐
- 50 to 64 years ☐
- 65 years and over ☐

3- Please provide the following information about your own educational background.

a. University Major: ____________________

b. Highest Degree: ☐

- BA in English language and literature ☐
- BA in education ☐
- MA ☐
- EdD/PhD ☐
- Other (please specify) ____________________

c. Name of University Granting the Degree: ____________________

d. Year of Graduation: ____________________

4- At which type of school do you teach?

- at a public school ☐
- at a private school ☐
- at a private non-paying school ☐

5- For how many years have you been a fulltime English teacher?

- < 5 years ☐
- 6-10 years ☐

- 11-15 years ☐
- 16-20 years ☐
- 21-25 years ☐
- 26-30 years ☐
- > 30 years ☐

B- Your educational technology use

6- Please read the descriptions of each of the five stages related to the process of integrating computer technology in teaching activities. Choose the stage that best describes where you are in the process.

Stage 1: Inaction ☐

I am aware that technology exists but I have little or no knowledge of information technology in education and how I can integrate it into my classroom activities. I have not used educational technology for student learning

Stage 2: Investigation ☐

I am interested in using educational technology with students, so I am seeking or acquiring information about how to use it in education. I am preparing for the first use of educational technology by learning the basics before I use it in the classroom.

Stage 3: Application ☐

I feel comfortable and competent in using information technology in education. I understand the process of using technology in education and use it regularly with students. I use technology to present the lesson content and provide learners with extra practice. I am working on using educational technology to enhance student engagement and productivity.

Stage 4: Integration ☐

I use educational technology as a tool to address multiple learning outcomes. I am confident and competent in using technology in many applications and as an instructional aide. I am no longer concerned about the technical aspects and focus on cooperative, project-based and interdisciplinary work incorporating the technology as needed.

Stage 5: Transformation ☐

I can apply what I know of educational technology in new and innovative ways. I support the use of educational technology for collaborative, project-based and interdisciplinary learning. I examine new developments in the field to stay updated and explore new goals for myself and my colleagues.

7- Please check the ONE description of technology use that most closely applies to you.

a. I use technology in my classes ☐

(continue to question 8 and answer all other questions)

b. I use technology **only** to prepare for classes or in other professional activities ☐

(skip to question 13 and answer all other questions)

c. I have never used technology in teaching or for any professional activities ☐

(skip to question 14 and answer all other questions)

8- How many years have you been using technology in your classroom?

- 0 - 2 years ☐
- 3 - 5 years ☐
- 6 - 8 years ☐
- 9 - 11 years ☐
- 12 + years ☐

9- How often do you or your students use technology while you are teaching their class?

- Once a year ☐
- 4-5 times a year ☐
- Once a month ☐
- 2-3 times a month ☐
- Weekly ☐
- Daily ☐

10- Where do you or your students use technology during your class?

- Classroom ☐
- Computer lab ☐
- School library or media center ☐
- Other (please specify)

11- Which of the following are among the objectives you have for student technology use?

Check *ALL that apply*

- Mastering skills just taught ☐
- Remediation of skills not learned well ☐
- Expressing themselves in writing ☐
- Communicating electronically with other people ☐
- Finding out about ideas and information ☐
- Analyzing information ☐
- Creating digital artifacts ☐
- Presenting information to an audience ☐
- Improving computer skills ☐
- Learning to work collaboratively ☐
- Learning to work independently ☐
- Other (please specify)

12- For each of the following types of software, please indicate how often you have used that type of software last year in ANY of your classes.

	No lessons	1-2 lessons	3-9 lessons	10+ lessons
a. Games for practicing skills				
b. Simulations or exploratory environments				
c. Encyclopedias and other references on CD-ROM				
d. Word processing				
e. Software for making presentations (e.g. PowerPoint)				
f. Desktop Publishing (e.g. Microsoft Publisher)				
g. Graphics creation and/or editing (e.g. Paint Shop Pro, Adobe Photoshop)				

h. Spreadsheets (e.g. Microsoft Excel) or database programs (creating files or adding data)				
i. Hyperstudio, HyperCard, or other multimedia authoring environment				
j. Digital Video Editing (e.g. iMovie, Adobe Premiere, MovieMaker)				
k. Visual Thinking Software (e.g. Inspiration, Kidspiration, CMap)				
l. Web Page Development (e.g. Dreamweaver)				
m. Web 2.0 and Social Networking (e.g. Facebook, MySpace, Flickr, Twitter, YouTube, Nings)				
n. WebQuests				
o. World Wide Web browser				
p. Electronic mail				

13- In which of these ways do you use technology in preparing for teaching your classes or in other professional activities?

	Do not use	Occasionally	Weekly	Very often
a. Record or calculate student grades				
b. Create a test or quiz				
c. Make handouts or assignment for students				
d. Correspond with parents or students				
e. Correspond with other teachers at the school				

f. Write lesson plans or related notes				
g. Get information or pictures from the Internet				
h. Use camcorders, digital cameras, or scanners to prepare for class				
j. Exchange computer files with other teachers				
k. Post student work, suggestions for resources, or ideas and opinions on the World Wide Web				

14- What kinds of technology resources has the school provided for your use? Check *ALL that apply*

- Easy access to photocopying ☐
- A laptop computer for your own use while at school ☐
- A computer printer in your room or nearby ☐
- Access to computers in the teachers' lounge ☐
- Access to the Internet from the teachers' lounge ☐
- Access to the Internet from your classroom ☐
- Digital projectors ☐
- Interactive whiteboards ☐
- Camcorders and digital cameras ☐
- Handheld devices for student use ☐
- Other (please specify)

15- How adequate at your school is the supply of useful software for your needs?

	Poor	Fair	Good	Very good	Excellent
a. Instructional drills, games, and tutorials					

b. Computer-based information sources (e.g., CD-ROM encyclopedias and databases)					
c. Computer-based tools (e.g., word processors, database, presentation software, spreadsheets, etc.)					
d. The number of licensed copies of specific software titles					

16- How available is each type of support when you need it?

	Not available	Someti mes	Frequ ently	Mostly	Almost always
a. Technical Support (e.g., computer and software fixes)					
b. Instructional Support (e.g., incorporating technology into your lessons)					
c. Help in Supervising Students (e.g., aides, volunteers)					

C- Your formal educational technology preparation

17- Have you ever participated in scheduled professional development sessions regarding the integration of technology in education? Yes ☐ No ☐

18- Have you ever undertaken a pre-service teacher preparation course regarding the integration of technology in education while at university? Yes☐ No☐

Appendix G

Interview questions with in-service teachers

SET 1:

ICT and Teaching

1- At which stage of the integration process did you state you were in?

- *Stage 1: Inaction*
- *Stage 2: Investigation*
- *Stage 3: Application*
- *Stage 4: Integration*
- *Stage 5: Transformation*

2- What makes you think you are at this stage in particular?

3- Do you feel supported at your school in using ICT?

4- Do you think ICT makes a difference to the way teachers teach?

5- Do you think ICT changes a teacher's role in the classroom?

6- Describe your most memorable classroom practice integrating/not integrating technology in which you thought students were actively engaged and motivated to learn.

7- How do you generally use ICT with your learners? (for inquiry, communication, creativity, drill and practice, presentation, games, assessment)

8- Why do you use/not use computers in your classes?

9- Are your ICT knowledge and skill levels in harmony with what your school expects of you?

10- Do you know of any national policies that target the integration of technology in the English curriculum? What are they?

11- How would you describe other teachers' use of ICT at your school?

ICT and Learning

12- Do you think ICT makes a difference to the way learners learn?

13- Do you think ICT changes learners' role in the classroom?

14- Do you think ICT has an effect on learners' motivation to learn?

15-Do you think ICT has an effect on learners' understanding of ideas and concepts?

ICT and contextual factors

16- Describe the ICT equipment and facilities available at your school.

17- Do you have access to these facilities (e.g. computer lab)?

18- Does your school have an ICT policy plan?

19- What do you think are the barriers or constraints or restrictions that inhibit classroom use of technology?

20- What do you think are the enablers or opportunities or affordances that encourage classroom use of technology?

ICT and Teacher Knowledge/Skill Acquisition

21- Have you participated in professional development programs that taught you about using ICT in your teaching?

22- Describe the professional development program you participated in.

23- What effects did such participation have on your teaching and use of technology?

24- What made the program successful/unsuccessful?

25- Did your university experience include an educational technology preparation course?

26- Describe the educational technology course you undertook.

27- What effects did such a course have on your teaching and use of technology?

28- What made the course successful/unsuccessful?

29- What kind of support do you think you need to integrate technology in your classroom?

30- What do you suggest will help you enhance your use of technology in the classroom?

- At the national level:

- At the university level:

- At the school level:

SET 2:

1- What do you consider to be your most fundamental responsibilities as a teacher?

2- Describe the way you think teachers teach English in Tripoli. Do you think there is a social or historical or cultural background to the way many people teach in Lebanon?

3- What are your favorite teaching and/or learning activities which you think promote good learning of the English language in Tripoli students?

4- Do you think there is tension for some teachers to modernize the way they teach?

If yes, in which ways do you think teachers are expected to modernize their teaching practices?

5- Do you see any particular role played by ICTs in the teaching and/or learning which you consider to be the most valuable? What is this role?

6- Do you feel included in the change process when administrators expect you to change the way you teach using technology or not?

7- In my research so far, I seem to have picked up a few negative messages about both provision and use of technology in schools. What do you think this might mean?/Why do you think this is the case?

Appendix H

Consent form for government officials

MACQUARIE UNIVERSITY

Faculty of Human Sciences
School of Education
MACQUARIE UNIVERSITY NSW 2109
Phone: +61 (02) 9850 9898
Email: humansciences@mq.edu.au

Chief Investigator's / Supervisor's Name: Ian Gibson
Chief Investigator's / Supervisor's Title: Professor
ICT in ELT: A Mixed Methods Study of Lebanese National Policies, University Courses and English Teachers

Information and Consent Form

Name of Project: ICT in ELT: A Mixed Methods Study of Lebanese National Policies, University Courses and English Teachers

You are invited to participate in a study of Lebanese national policies, university courses and English teachers' knowledge, skills and beliefs as they pertain to the information communication technology status in Lebanon. The purpose of the study is to describe the status of technology integration in Lebanon through an analysis of national policy, university preparation, and classroom practice. In the process, the research will also investigate the potential barriers that may be hindering the integration of technologies at each of these three levels.

The study is being conducted by Youmen Chaaban, PhD candidate at Macquarie University, Australia, mobile: + 961 71 88 20 19, email: youmen.chaaban@mq.edu.au, as being conducted to meet the requirements of the Doctor of Philosophy under the supervision of Prof. Ian Gibson, telephone: +612 9850 9816, email: ian.gibson@mq.edu.au, and Dr. Robyn Moloney, telephone +61 2 9850 8605, email: robyn.moloney@mq.edu.au of the Department of Education at Macquarie University.

If you decide to participate, you will be asked to take part in an interview. During the interview, you will be asked several questions which inquire into the role played by the government regarding the integration of technology in the English curriculum. The interview will take approximately half an hour to forty minutes of your time and will be audio-taped to ensure the preservation of the information. You will also be requested to share any publications and statistical data found at the department.

Any information or personal details gathered in the course of the study are confidential. No individual will be identified in any publication of the results. The researcher and her supervisors; Prof. Ian Gibson and Dr. Robyn Moloney, will have access to the data. A summary of the results of the data can be made available to you on request. The researcher will need your email address in order to send you the data collected once it is transcribed. You will be requested to verify the data collected as it reflects your answers accurately.

Participation in this study is entirely voluntary: you are not obliged to participate and if you decide to participate, you are free to withdraw at any time without having to give a reason and without consequence.

I, __________________________ have read and understand the information above and any questions I have asked have been answered to my satisfaction. I agree to participate in this research, knowing that I can withdraw from further participation in the research at any time without consequence. I have been given a copy of this form to keep.

Participant's Name:____
(Block letters)

Participant's Signature:_________________________ Date:____________________

Investigator's Name:____
(Block letters)

Investigator's Signature: ________________________ Date: _______________________

The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics Committee. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director of Research Ethics (telephone (02) 9850 7854; email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome. For your inquires in Lebanon, you may contact Mr. Fawaz Dabbousi, School Principal at Azm Educational Campus (telephone +961 6 448 302).

Appendix I

Consent form for university lecturers

Faculty of Human Sciences
School of Education
MACQUARIE UNIVERSITY NSW 2109
Phone: +61 (02) 9850 9898
Email:humansciences@mq.edu.au

Chief Investigator's / Supervisor's Name: Ian Gibson
Chief Investigator's / Supervisor's Title: Professor
ICT in ELT: A Mixed Methods Study of Lebanese National Policies, University Courses and English Teachers

Information and Consent Form

Name of Project: ICT in ELT: A Mixed Methods Study of Lebanese National Policies, University Courses and English Teachers

You are invited to participate in a study of Lebanese national policies, university courses and English teachers' knowledge, skills and beliefs as they pertain to the information communication technology status in Lebanon. The purpose of the study is to describe the status of technology integration in Lebanon through an analysis of national policy, university preparation, and classroom practice. In the process, the research will also investigate the potential barriers that may be hindering the integration of technologies at each of these three levels.

The study is being conducted by Youmen Chaaban, PhD candidate at Macquarie University, Australia, mobile: + 961 71 88 20 19, email: youmen.chaaban@mq.edu.au, as being conducted to meet the requirements of the Doctor of Philosophy under the supervision of Prof. Ian Gibson, telephone: +612 9850 9816, email: ian.gibson@mq.edu.au, and Dr. Robyn Moloney, telephone +61 2 9850 8605, email: robyn.moloney@mq.edu.au of the Department of Education at Macquarie University.

If you decide to participate, you will be asked to take part in an interview. During the interview, you will be asked several questions which inquire into the information communication technology (ICT) course offered at your university. The interview will take approximately half an hour to forty minutes of your time and will be audio-taped to ensure the preservation of the information. You will also be requested to send an e-questionnaire and consent form to all the pre-service teachers who have most recently undertaken your course. These student teachers will be requested to take part in a questionnaire. In the questionnaire, they will be asked about the ICT course as well as their knowledge, skills and beliefs about technology integration in their future teaching professions.

Any information or personal details gathered in the course of the study are confidential. No individual will be identified in any publication of the results. The researcher and her supervisors; Prof. Ian Gibson and Dr. Robyn Moloney, will have access to the data. A summary of the results of the data can be made available to you on request. The researcher will need your email address in order to send you the data collected once it is transcribed. You will be requested to verify the data collected as it reflects your answers accurately.

Participation in this study is entirely voluntary: you are not obliged to participate and if you decide to participate, you are free to withdraw at any time without having to give a reason and without consequence.

I, __________________________ have read and understand the information above and any questions I have asked have been answered to my satisfaction. I agree to participate in this research, knowing that I can withdraw from further participation in the research at any time without consequence. I have been given a copy of this form to keep.

Participant's Name:____
(Block letters)

Participant's Signature:_________________________ Date:____________________

Investigator's Name:____
(Block letters)

Investigator's Signature: _________________________ Date: ______________________
The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics Committee. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director of Research Ethics (telephone (02) 9850 7854; email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome. For your inquires in Lebanon, you may contact Mr. Fawaz Dabbousi, School Principal at Azm Educational Campus (telephone +961 6 448 302).

Appendix J

Consent form for pre-service teachers

Faculty of Human Sciences
School of Education
MACQUARIE UNIVERSITY NSW 2109
Phone: +61 (02) 9850 9898
Email:humansciences@mq.edu.au

Chief Investigator's / Supervisor's Name: Ian Gibson
Chief Investigator's / Supervisor's Title: Professor
ICT in ELT: A Mixed Methods Study of Lebanese National Policies, University Courses and English Teachers
Information and Consent Form

Name of Project: ICT in ELT: A Mixed Methods Study of Lebanese National Policies, University Courses and English Teachers

You are invited to participate in a study of Lebanese national policies, university courses and English teachers' knowledge, skills and beliefs as they pertain to the information communication technology status in Lebanon. The purpose of the study is to describe the status of technology integration in Lebanon through an analysis of national policy, university preparation, and classroom practice. In the process, the research will also investigate the potential barriers that may be hindering the integration of technologies at each of these three levels.

The study is being conducted by Youmen Chaaban, PhD candidate at Macquarie University, Australia, mobile: + 961 71 88 20 19, email: youmen.chaaban@mq.edu.au, as being conducted to meet the requirements of the Doctor of Philosophy under the supervision of Prof. Ian Gibson, telephone: +612 9850 9816, email: ian.gibson@mq.edu.au, and Dr. Robyn Moloney, telephone +61 2 9850 8605, email: robyn.moloney@mq.edu.au of the Department of Education at Macquarie University.

If you decide to participate, you will be asked to complete a questionnaire. In the questionnaire, you will be asked about the ICT course as well as your knowledge, skills and beliefs about technology integration in your future teaching professions. The questionnaire will take approximately half an hour to forty minutes of your time. Please send the questionnaire once you complete all the questions.

Any information or personal details gathered in the course of the study are confidential. No individual will be identified in any publication of the results. The researcher and her supervisors; Prof. Ian Gibson and Dr. Robyn Moloney, will have access to the data. A summary of the results of the data can be made available to you on request.

Participation in this study is entirely voluntary: you are not obliged to participate and if you decide to participate, you are free to withdraw at any time without having to give a reason and without consequence.

I, __________________________ have read and understand the information above and any questions I have asked have been answered to my satisfaction. I agree to participate in this research, knowing that I can withdraw from further participation in the research at any time without consequence. I have been given a copy of this form to keep.

Participant's Name:____
(Block letters)

Participant's Signature:_________________________ Date:____________________

Investigator's Name:____
(Block letters)

Investigator's Signature: ________________________ Date: _______________________

The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics Committee. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director of Research Ethics (telephone (02) 9850 7854; email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome. For your inquires in Lebanon, you may contact Mr. Fawaz Dabbousi, School Principal at Azm Educational Campus (telephone +961 6 448 302).

Appendix K
Consent form for in-service teachers

Faculty of Human Sciences
School of Education
MACQUARIE UNIVERSITY NSW 2109
Phone: +61 (02) 9850 9898
Email: humansciences@mq.edu.au

Chief Investigator's / Supervisor's Name: Ian Gibson
Chief Investigator's / Supervisor's Title: Professor
ICT in ELT: A Mixed Methods Study of Lebanese National Policies, University Courses and English Teachers
Information and Consent Form

Name of Project: ICT in ELT: A Mixed Methods Study of Lebanese National Policies, University Courses and English Teachers

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If you decide to participate, you will be asked to complete a questionnaire. In the questionnaire, you will be asked several questions about your educational and professional background. Further, you will be asked about your knowledge, skills and beliefs about technology integration in your classroom. You will also be requested to describe the resources available at your schools. The questionnaire will take approximately half an hour to forty minutes of your time.

Any information or personal details gathered in the course of the study are confidential. No individual will be identified in any publication of the results. The researcher and her supervisors; Prof. Ian Gibson and Dr. Robyn Moloney, will have access to the data. A summary of the results of the data can be made available to you on request.

Participation in this study is entirely voluntary: you are not obliged to participate and if you decide to participate, you are free to withdraw at any time without having to give a reason and without consequence.

I, __________________________ have read and understand the information above and any questions I have asked have been answered to my satisfaction. I agree to participate in this research, knowing that I can withdraw from further participation in the research at any time without consequence. I have been given a copy of this form to keep.

Participant's Name:____
(Block letters)

Participant's Signature:_________________________ Date:____________________

Investigator's Name:____
(Block letters)

Investigator's Signature: _____________________________ Date: ______________________

The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics Committee. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director of Research Ethics (telephone (02) 9850 7854; email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome. For your inquires in Lebanon, you may contact Mr. Fawaz Dabbousi, School Principal at Azm Educational Campus (telephone +961 6 448 302).

Appendix L

Consent form for in-service teachers

MACQUARIE UNIVERSITY

Faculty of Human Sciences
School of Education
MACQUARIE UNIVERSITY NSW 2109
Phone: +61 (02) 9850 9898
Email:humansciences@mq.edu.au

Chief Investigator's / Supervisor's Name: Ian Gibson
Chief Investigator's / Supervisor's Title: Professor
ICT in ELT: A Mixed Methods Study of Lebanese National Policies, University Courses and English Teachers
Information and Consent Form

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You previously took part in the first phase of the study by responding to a questionnaire. For this second phase of the study you will be asked to take part in an interview if you decide to participate. During the interview, you will be asked several questions about the answers you previously gave in the questionnaire. Further, you will be asked about your classroom practices regarding the integration of technology as well as any solutions you may have that will help you to integrate technology in English teaching and learning. The interview will take approximately half an hour to forty minutes of your time and will be audio-taped to ensure the preservation of the information.

Any information or personal details gathered in the course of the study are confidential. No individual will be identified in any publication of the results. The researcher and her supervisors; Prof. Ian Gibson and Dr. Robyn Moloney, will have access to the data. A summary of the results of the data can be made available to you on request. The researcher will need your email address in order to send you the data collected once it is transcribed. You will be requested to verify the data collected as it reflects your answers accurately.

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I, __________________________ have read and understand the information above and any questions I have asked have been answered to my satisfaction. I agree to participate in this research, knowing that I can withdraw from further participation in the research at any time without consequence. I have been given a copy of this form to keep.

Participant's Name:____
(Block letters)

Participant's Signature:_________________________ Date:____________________

Investigator's Name:____
(Block letters)

Investigator's Signature: ________________________ Date: _______________________
The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics Committee. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director of Research Ethics (telephone (02) 9850 7854; email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome. For your inquires in Lebanon, you may contact Mr. Fawaz Dabbousi, School Principal at Azm Educational Campus (telephone +961 6 448 302).

Appendix M

Pilot results of interview questions with ICT lectures

Question	Feedback	Comment
Academic 1		
Various	The interview is very lengthy	Agreed (omission of certain questions as recommended)
2	Unnecessary to ask about the year of university establishment	Agreed
3	Unnecessary to ask about the year of education department establishment	Agreed
5	It is not clear whether the respondent will tick the table about available technological equipment	Leave (Interviewer will fill out this question during the interview. Interview will also be recorded and transcribed)
4	Unclear who the question addresses	Leave (the question addresses the ICT course as well as other courses taught at the university, specifically methods courses
5, 6	Reword to “Are there formal requirements for…	Agreed
7	Misdirected, how would a mentor teacher do this?	Agreed (Questions 6 about contracted partnership schools eliminated, mentor teachers are located at the schools where student teachers do their practicum courses)
5	Make explicit when asking about technology expertise the type of technology tools (too open to	Agreed (statement included which specifies the technology tools intended)

	interpretation)	
Academic 2		
3	Difficult for faculty to answer questions about finances	Agreed
1, 2, 3	Difficult to answer questions about university history	Agreed
5	Teachers prepared to teach more than one subject area	Agreed
Various	Yes/no/other is listed for some questions but not for all	Agreed
1	Ask for details regarding the projects	Agreed
6	Why ask about comfort levels at home	Agreed
2	Technology also used as an assessment tool	Agreed
Academic 3		
Various	Many answers about the history of the university found on the website	Agreed
Various	Sending the questions to each respondent ahead of time and getting them to 'fill out' their answers to the more fundamental questions in preparation for the more in depth questions	Leave (all the questions will be asked during the interview)
Various	Fill in the simple questions before hand - talk about them quickly at the front end of the interview, then get into the more substantial questions verbally	Agreed

Appendix N

Pilot results of the TBTUS questionnaire

Question in original TBTUS	**Feedback**	**Comment**
2, 4, 5, 9, 14, 16, 17, 18, 22, 27, 28, 30	Omit	Repetitive with other questionnaire items
15	Delete ‘prompt’	Agreed
20	Reword “in control of the direction of learning”	Disregard
54	Reword	Agreed
36-54	No change	Questionnaire items target self-efficacy and value beliefs, changes were made only to the pedagogical beliefs section of the questionnaire
Question in adapted TBTUS	**Feedback**	**Comment**
9, 11, 17, 23, 27, 28	Add	These items were adapted from Becker and Anderson’s (1998) questionnaire and were considered clear-cut criteria for distinguishing constructivist and traditional beliefs
14, 18, 24, 26, 29	Add	These items were adapted from Benjamin’s (2003) questionnaire and were tailored to address the constructivist vs. traditional methodologies

Appendix O

Ethics Clearance Approval

Ethics Secretariat <ethics.secretariat@mq.edu.au>

Approved- Ethics application- Gibson (5201100939)

Ethics Secretariat <ethics.secretariat@mq.edu.au> Tue, Apr 3, 2012 at 3:16 PM
To: Prof Ian Gibson <ian.gibson@mq.edu.au>
Cc: youmen.chaaban@students.mq.edu.au

Dear Prof Gibson

Re: "ICT in ELT: A mixed methods study of Lebanese National Policies, university courses and English teachers" (Ethics Ref: 5201100939)

Thank you for your recent correspondence. Your response has addressed the issues raised by the Human Research Ethics Committee and you may now commence your research.

The following personnel are authorised to conduct this research:

Chief Investigator- Prof Ian Gibson
Co-Investigators- Dr Robyn Moloney & Mrs Youmen Chaaban

NB. STUDENTS: IT IS YOUR RESPONSIBILITY TO KEEP A COPY OF THIS APPROVAL EMAIL TO SUBMIT WITH YOUR THESIS.

Please note the following standard requirements of approval:

1. The approval of this project is conditional upon your continuing compliance with the National Statement on Ethical Conduct in Human Research (2007).

2. Approval will be for a period of five (5) years subject to the provision of annual reports. Your first progress report is due on 03 April 2013.

If you complete the work earlier than you had planned you must submit a Final Report as soon as the work is completed. If the project has been discontinued or not commenced for any reason, you are also required to submit a Final Report for the project.

Progress reports and Final Reports are available at the following website:

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/forms

3. If the project has run for more than five (5) years you cannot renew approval for the project. You will need to complete and submit a Final Report and submit a new application for the project. (The five year limit on renewal of approvals allows the Committee to fully re-review research in an environment where legislation, guidelines and requirements are continually changing, for example, new child protection and privacy laws).

4. All amendments to the project must be reviewed and approved by the Committee before implementation. Please complete and submit a Request for Amendment Form available at the following website:

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/forms

5. Please notify the Committee immediately in the event of any adverse effects on participants or of any unforeseen events that affect the

continued ethical acceptability of the project.

6. At all times you are responsible for the ethical conduct of your research in accordance with the guidelines established by the University. This information is available at the following websites:

http://www.mq.edu.au/policy/

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/policy

If you will be applying for or have applied for internal or external funding for the above project it is your responsibility to provide the Macquarie University's Research Grants Management Assistant with a copy of this email as soon as possible. Internal and External funding agencies will not be informed that you have final approval for your project and funds will not be released until the Research Grants Management Assistant has received a copy of this email.

If you need to provide a hard copy letter of Final Approval to an external organisation as evidence that you have Final Approval, please do not hesitate to contact the Ethics Secretariat at the address below.

Please retain a copy of this email as this is your official notification of final ethics approval.

Yours sincerely
Dr Karolyn White
Director of Research Ethics
Chair, Human Research Ethics Committee