# A Case Study Exploring Bangladeshi Teacher Educators' Perspectives of Information and Communication Technology (ICT) in Education

Md. Ahasanul Arefin Chowdhury

Thesis submitted in partial fulfilment of the requirements of the degree of Masters of Education at University of Canterbury

UC
UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND
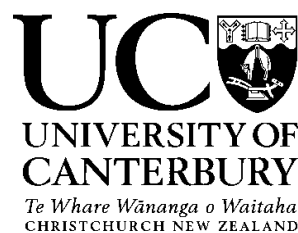
August, 2011

Acknowledgement

I gratefully acknowledge my supervisors Julie Mackey and Dr. Donna Morrow; your support, guidance, patience and encouragement enabled me to complete this study successfully. I humbly appreciate that you always made time in your busy lives to give substantial and meaningful feedback to my work. I am also grateful to Ann McGrath who kindly agreed to proofread my full thesis and provided me constructive feedback in a short time.

I would like to recognize the support I have received from Professor Janinka Greenwood, Associate Dean of post-graduate studies at College of Education. You were always beside us during the hard time after the devastating earthquake on 22 February, 2011, and provided us all with your support.

I also express my appreciation to the Teaching Quality Improvement in Secondary Education Project (TQI-SEP) under the Ministry of Education, Bangladesh for awarding me the subsequent scholarship that enabled me to come and study in New Zealand.

I would like to thank the participants in this study. You are a continual inspiration to me and you will make a difference to my practice as a teacher educator. I thank you for your enthusiasm, openness, and most of all for your insightful thoughts of ICT in education that you shared with me. Your contributions are significant. I also thank the participant teachers training colleges (TTC) in Bangladesh for valuing my study and allowing me access to your institutions.

Finally, I would like to thank my beloved wife Tania for her support and encouragement throughout this journey and my seven month old boy, Arian. Thanks to my family, for their love, patience, support and encouragement.

Abstract

This study explores teacher educators' perceptions of information and communication technology (ICT) within teacher education programs in Bangladesh. The study is set within the context of a nationwide focus on ICT shaped by the Bangladesh Government's National Information and Communication Technology (ICT) Policy – 2009. The intention of this policy is to increase the use and understanding of ICT by introducing specific courses in primary, secondary and tertiary education, technical and vocational education, and teacher education programs. Aligned with this overarching ICT policy, the National Education Policy, 2010, places special emphasis on the integration of ICT in education by recommending that ICT is taught as a separate learning area, and that it is used as a tool across all curriculum areas. Consequently the National Education Policy recommends that all teachers receive training to make the best use of ICT for educational purposes. Given the critical role of teachers in implementing these policies, this study explores teacher educators' perceptions of ICT within the teacher education programs in Bangladesh. Ten educators from four different teachers' training colleges (TTC) were interviewed to explore their experiences and understandings of ICT. This study found that the teacher educators believe ICT is more than a simple teaching-learning tool because it has potential for constructing knowledge and enhancing the quality of education. They also recognized that ICT provides relative advantages over traditional teaching tools, and that it facilitates professional learning via access to current knowledge from national and international sources. However, the educators also understood that the mere provision of computers or ICT in institutions does not ensure quality education. Teachers need to develop technological knowledge about how ICTs work; an understanding of pedagogical strategies that utilize ICT; and the capability to design learning experiences that appropriately integrate technology in relation to learning content. In addition, teacher educators should also be prepared with both pedagogical and andragogical knowledge of teaching about and with ICT. The teacher education programs should integrate ICT in cross-curricular activities so that the trainee

teachers can experience how to use ICT in different subject areas. Therefore, ICT courses in the B.Ed. curriculum in Bangladesh should be enriched not only with computer operational skills but also with features of social communication, knowledge construction and dissemination. It is also understood that the successful integration of ICT in Bangladeshi education requires a supportive professional culture and appropriate support from different educational administrative layers including the government sector.

Table of Contents

CHAPTER 1

Introduction

1.1. Introduction

Information and communication technology (ICT) has not only changed the nature of resources, communication, and information, but it has also transformed contemporary society by changing the way of life, work and education (McGrail, 2005). As a response to such technological influences, ICT has been integrated in education with a belief that it is a catalyst of change that can encourage knowledge transformation, critical thinking and student-centred learning (Roblyer & Doering, 2010). Accordingly, governments are adopting different policies and strategies for integrating ICT in education systems (Kozma, 2008); however, the potential of ICT in education is not clearly realized (Moonen, 2008). One reason for this is that teaching professionals are often not adequately prepared for teaching with ICT (McDougall, 2008). The school teachers are trained in and prepared for implementing school curricula by a cadre of professionals who are known as 'teacher trainers', 'teacher educators', or 'educators' (Swennen & Klink, 2009). The educators are often considered as the leaders who teach the school teachers how to implement curriculum and how to use teaching-learning tools in the classrooms (O'Sullivan, 2010). Therefore, the educators have an influence in teachers' use of ICT in the schools. This means that if the educators successfully prepare teachers for using ICT for educational purposes, these teachers are more likely to be able to successfully integrate ICT in schools.

It is often reported that the government initiatives regarding enhancing the quality of education around the world, in both developed and developing countries, mostly focus on primary and secondary education sectors and preparing the teachers of these schools; while little focus is given to teacher education programs and preparing the teacher educators, consequently this remains an under-researched area (Koster,

Brekelmans, Korthagen, & Wubbels , 2005; O'Sullivan, 2010). This is also true in regard to integrating ICT in education; a considerable number of studies can be found that focus on school teachers' perspectives and classroom practice of using ICT in schools (Ertmer & Ottenbreit-Leftwich, 2010), but relatively few studies are found that focus on the educators' perspectives of using ICT in teacher education programs (Peeraer & Petegem, 2011), particularly from a developing country's context (Shohel & Power, 2010). This indicates that conducting studies on educators' perspectives of integrating ICT in education in a developing country can contribute to knowledge. Therefore, this study endeavors to explore the educators' experiences and understandings of ICT in teacher education programs in Bangladesh, which is a developing country.

1.2 Context of the study: Bangladesh

Bangladesh is a developing country situated in the south of Asia surrounded by India on almost all sides except to the south by the Bay of Bengal and to the southeast part by Myanmar. Its total land area is 147,570 square kilometers where 65% of its geographical surface is arable land; accordingly its economy mostly revolves around agriculture. Total population of this country is 146.6 million with a density of 993 persons per square kilometre (Bangladesh Bureau of Statistics [BBS], 2009). This places this country as the eighth most populous country in the world. The natural resources available in this country are not sufficient to provide economic emancipation to this huge population, so the Bangladesh Government policies always emphasize transforming this large population into human resources (Hoque, 2002). Consequently, one of the major goals of its national education policy is to develop human resource through education and training for national and international markets, and, by doing so, to accelerate economic progress and to enhance the quality of life for the people of Bangladesh (Ministry of Education Bangladesh [MOEBD], 2010]).

One major source of earning for Bangladesh is the remittance from Bangladeshi people working overseas (Hoque, 2002). Bangladesh sees ICT as an important potential area of earning foreign currencies, and consequently established the National Information and Communication Technology Policy-2009 [NICTP-2009] as a key initiative to develop competent ICT resource persons who will work for international ICT markets and contribute to the national economy. This policy is also reflected in the recent education policy in Bangladesh where particular emphasis is placed on the development of ICT competency among the students (MOEBD, 2010).

1.2.1 ICT in education in Bangladesh

The Bangladesh National Education Policy-2010 places strong emphasis on producing educated citizens who will be skilled in ICT. Consequently, this policy has proposed to introduce a new compulsory subject called 'Information and Communication Technology' in the secondary education curriculum. The policy indicates that students studying tertiary courses should also gain a range of ICT skills.

It is notable that Information and Communication Technology (ICT) has become an essential part of the education curriculum in Bangladesh. The National Education Policy of Bangladesh has recommended including ICT as a compulsory subject in the secondary education sector. For this purpose, the teacher training programs have been modified to include the integration of ICT. In 2006, a new course titled Basic Computer Skills (BCS) was introduced in the Bachelor of Education (B.Ed.) curriculum in Bangladesh. This course aims to provide necessary ICT related knowledge and skills to the trainee teachers (both in-service and pre-service) who gain admission to the B.Ed. program. The educators in teachers' training colleges (TTC) teach this course to the trainee teachers, and anecdotally it is thought that trainee teachers are likely to reproduce or follow the educators' practices.

It is noteworthy that the existing education system in Bangladesh was introduced by the British colonizers in the early 18th century, and its aim was to produce some skilled people who could help the colonizers by assisting with clerical work (Salahuddin & Chowdhury, 2010). Consequently, the British schooling structure, including curriculum, syllabus, and textbooks, became part of the Bangladeshi education system, and to some extent there is still evidence of its influence. Therefore, historically there has been a dependence on European countries to inform the curriculum and recently ICT is a new addition to this list.

It is often claimed that ICT is a western innovation, and it is being infused in other countries by international commercial agencies such as the World Bank (Zembylas & Vrasidas, 2005). Similarly, in Bangladesh, ICT is being incorporated in education through support from international financial organization, such as the Asian Development Bank (ADB) (Pouezevara & Khan, 2007) and the Department of International Development, UK (Shohel & Power, 2010). In addition, foreign consultants are being appointed to design ICT curriculum and textbooks, and to train the educators so that the educators can then train the school teachers to implement ICT in education. For example, the Ministry of Education, Bangladesh, has been implementing a project called Teaching Quality Improvement in Secondary Education Project (TQI-SEP) since 2006 with an aim to enhance teaching quality of the secondary teachers. This project is supported by the Asian Development Bank, and one objective is to provide one multi-media supported computer laboratory with internet connection and local area network to all government teachers' training colleges (TTC), so that the educators and trainee teachers can develop their knowledge and skills in ICT. The project has also provided one multi-media equipped vehicle to each government TTC as a mobile resource unit; the educators use this vehicle to go to remote schools to train the school teachers in pedagogy and ICT skills.

1.2.2 Teacher education programs and professional development of teachers in Bangladesh

The Government of Bangladesh sees teacher education as essential for quality education. The education policy of this country perceives teaching as a skill that needs to be developed through training and practice. In order to enhance the qualities and qualifications of the teachers and also to make them more skilful in teaching, teacher education programs are offered. At present, there are three types of teacher education programs in the country corresponding to three types of institutions, these are: primary teacher education, secondary teacher education, and higher secondary teacher education. In Bangladesh, primary education consists of Grades 1-5 (6-10 year olds), secondary education includes Grades 6-10 (11-15 year olds), and higher secondary education includes Grades 11 and 12 (16-17 year olds). Secondary teachers are required to complete a post-graduate diploma of education called Bachelor of Education (B.Ed.) before or just after being appointed in schools. Higher secondary education is mostly part of colleges where tertiary education is provided, and the lecturers of the colleges teach the higher secondary students. However, there are some secondary schools that include Grades 11 and 12, and the teachers who teach these students are called lecturers. The lecturers generally have better qualifications and higher salaries than the secondary teachers. Since, secondary teacher education is the focus of this study; it is described in detail in the following sections.

In order to prepare the secondary teachers, there are fourteen government and 106 non-government Teachers' Training Colleges (TTC); one National Academy for Education Management (NAEM); one Madrasha Teachers Training Institute (MTTI) (for teachers of religion); five Higher Secondary Teachers Training Institute (HSTTI); and one Institute of Education and Research (IER) under the University of Dhaka in Bangladesh. Besides these, the Bangladesh Open University (BOU) offers secondary teachers' training through distance education programs. The TTCs, IER and BOU provide Bachelor of Education (B.Ed.) degrees, whereas MTTI and HSTTI

offer some short certificate courses, which run for a few weeks or up to three months. The TTCs follow the B.Ed. curriculum prescribed by the National University of Bangladesh, while IER and BOU have their own B.Ed. curriculum.

There are three types of B.Ed. (Bachelor of Education) programs in Bangladesh. These include a one-year post-graduate B.Ed., a two-year post-graduate B.Ed., and a four-year undergraduate B.Ed. (Honors) program. All of the government and non-government TTCs offer a one-year B.Ed. qualification which is a post-graduate diploma in teaching and learning. In order to enrol in this program, the applicants must have a graduation degree in a subject that is relevant to a secondary school subject. The in-service secondary school teachers and the fresh university graduates who want to be secondary teachers gain admission to these TTCs. The BOU offers a two-year long B.Ed. program in a distance mode, and the students are both in-service school teachers and pre-service graduates. The Institute of Education and Research (IER) under University of Dhaka, and one of the fourteen government TTCs, called Teachers' Training College, Dhaka, offer a four-year B.Ed. (Honours) degree. Students can be admitted to the four-year B.Ed. programs after completing Higher Secondary Certificate (HSC). Among these three types of B.Ed. programs, the one-year B.Ed. is the most popular one. The TTCs offer this program and they train the majority of new secondary teachers. As I am a teacher educator in a government TTC where the one-year B.Ed. qualification is offered, and my study context is situated within this program.

1.3 Purpose and significance of the study

I am a teacher educator in Bangladesh and have taught the Basic Computer Skills (BCS) course, which aims to provide some ICT, particularly computer-related knowledge and skills to the trainee teachers. I have encountered some problems while teaching the BCS course and I have also recognised the potential of the course to develop ICT skills and understanding. I have noticed that a lack of ICT related pedagogical knowledge, shortage of essential ICT equipment and the inadequacy of

6

ICT training are some of the issues the educators often struggle with when teaching this course. There was also pressure from the top level education administrators to implement ICT in the B.Ed. program. Therefore, the teacher educators who teach ICT courses face a twofold challenge: lack of ICT related knowledge and resources, and pressure from the higher authorities to use ICT in teaching. These challenges encouraged me to conduct this study; I wanted to explore the Bangladeshi educators' experiences and understandings of using ICT in their practice.

I believe that understanding the teacher educators' perspectives of ICT in education is important to recognize the extent to which ICT is being integrated in teacher education in Bangladesh. My own experiences of teaching the ICT related course in Bangladeshi teacher education programs leads me to consider possible gaps between the theory and practice of ICT teaching. As a researcher, my aims for this study were to explore Bangladeshi educators' perspectives of ICT education as it is presented in the Curriculum.

This study contributes at three levels: firstly, it helps me as an educator to find out some of the challenges in teaching ICT in teacher preparation programs and to identify possible solutions; secondly, it helps to inform the Ministry of Education about the further development of ICT curriculum in teacher education programs; and thirdly, it contributes to the knowledge about ICT curriculum change in developing countries.

1.4 Research question

This study investigates the perspectives of ten teacher educators regarding the teaching ICT in Bangladesh. The research question that guides this study is:

> What are the educators' experiences and understandings of ICT within the B.Ed. teacher preparation program in Bangladesh?

In order to answer the research question, four complementary questions were framed:

What are the educators' beliefs about ICT in education?

How do educators address the aims of ICT education in their practice?

What do educators perceive as key issues in implementing the ICT curriculum in B.Ed. program in Bangladesh?

What are the educators' suggestions to improve the teaching of ICT courses in the B.Ed. classroom?

These questions have guided interviews with the participating educators to explore their understandings and experiences. The following chapters describe and present the details of the study. Chapter 2 reviews relevant literature to establish a broader conceptualization of the research question from other scholars' works, while Chapter 3 frames the methodology and procedures used to conduct the study. Chapter 4 presents the findings of this study, and Chapter 5 discusses the findings with relation to the literature, and concludes the study.

CHAPTER 2

Literature Review

2.1 Introduction

This chapter aims to present relevant literature to inform and support the goals of this study. The literature review can be considered the compass that guides a study (Hesse-Biber & Nagy, 2010). Reviewing related literature facilitates building the contextual framework and rationale for selecting the particular research question. However, its purpose is not just to reflect the summary of other literature relevant to the research topic; rather the research studies are critically evaluated and purposefully used to establish the importance of the inquiry of this study. Another objective of this chapter is to establish the significance of this study, that is, it can be shown to the readers that this study contributes to the significant gap in the prevailing understanding of ICT education in developing countries. Through a review of relevant literature, this chapter also constructs a conceptual framework for the investigation of the undertaken research issue.

2.2 Different perspectives of ICT in education

2.2.1 Definition of ICT

ICT stands for Information and Communication Technology, and in general, it refers to all technologies that support the processing and communicating of information. In most educational circles, ICT is described as the container name for all kinds of information and communication technologies, including computer technology, multimedia, and networking, especially the Internet, that are commonly available in educational sectors (Romeo, 2008). The term computer technology has generally been replaced by information and communication technology (ICT) used mostly in Europe, or information technology (IT) or technology in North America (Voogt & Knezek, 2008). Education professionals also use the terms 'computer technology' or

'information technology (IT)' instead of ICT (Anderson, 2008). Some educators also use 'new media' (Anderson, 2008) or 'digital media' or 'digital technology' (Brown & Davis, 2004) or 'e-learning' (Ministry of Education New Zealand [MOENZ], 2007) to refer to ICT. This semantic diversity is influenced by the rapidly evolving integration of computers with communications, video, and audio technologies, where the separate technologies become nearly indistinguishable. In this thesis the acronym ICT is used to mean the same as 'IT' or 'technology'. Whatever the terms used to describe ICT, the issues regarding implementing ICT in education are related to developing teachers', students', institutions' and their wider communities' abilities and inclination to use ICTs appropriately (Anderson, 2008).

2.2.2 Rationales for ICT in education

Since the introduction of the computer into education in the 1980s, its potential for education has been recognized by many researchers, policymakers and practitioners (Romeo, 2008). Accordingly, different rationales for the introduction of ICT in education have been prescribed. Hawkridge (1990) identified four major rationales for using ICT for educational purposes: social, vocational, pedagogic and catalytic rationales. Although these rationales have been promoted for over two decades they are still applicable (Kozma, 2008; Voogt, 2008).

The social rationale is related to the preparation of students for their place in society. This rationale comes from the assumptions that the modernisation of schooling requires the incorporation of ICT into schools. Kozma (2008, p. 1086) notes that the policy documents in different countries justify the introduction of ICT in education "to share knowledge, foster cultural creativity, increase democratic partnership, make government services more widely available, and enhance social cohesion and the integration of different cultural groups and individuals with different abilities". The national education policy of Bangladesh, for instance, recognizes the social rationales of ICT by mandating the inclusion of ICT in the school curriculum in order to raise students' awareness of, and confidence with computers and other ICTs.

10

The Bangladesh education policy aims to provide all children an equal opportunity to access the benefits of ICT.

The vocational rationale sees ICT as a means to prepare students for jobs in the market-place (Voogt, 2008). The belief is that ICT can provide students with the skills to enter successful money-making and wealth-creating careers (Kozma, 2008). Accordingly, substantial knowledge of how ICT equipment is designed and used becomes part of the school curriculum (Hawkridge, 1990; Kozma, 2008). One challenge of including ICT in the school curriculum is that ICT changes very fast, so the ICT curriculum needs to be frequently updated or the curriculum needs to be developed in more generic ways to accommodate the rapid changes. However, critics of the vocational rationale question whether schools are the right place for vocational training (Hawkridge, 1990).

The pedagogic rationale focuses on improving teaching and learning through the greatest support of ICTs. This rationale claims to extend the traditional ways of presenting information to students, and to offer new opportunities through ICT supported techniques, such as simulation (Hawkridge, 1990; Romeo, 2008). The visual and interactive features of ICT motivate students for learning by gaining their attention (Mayer, 2009). Multimedia and interactive software are used to make abstract and unfamiliar concepts understandable to the students (Roblyer & Doering, 2010). Doering and Veletsianos (2007) found that students who use technologies, such as multimedia and hypermedia to present their own work showed higher engagement in learning. Similarly Doering, Beach and O'Brien (2007) reported that when students are asked to publish their writing on the web, they become self-motivated to write and do their best work since they understand their work could be seen by other people. Application software, such as word processors and desktop publishing, facilitates spelling and grammatical corrections that can scaffold students' writing (Kennewell, 2007). Moreover, innovative use of ICT increases the educational opportunities of children with special needs, and different intelligent

programs are being developed that support the learning of people with sensory impairments and physical disabilities (Jane & Peg, 2003). Therefore, the pedagogical rationales of ICT suggested by the literature have a strong influence in the implementation of ICT in education. However, Peck and Sprenger (2008) note that the initiatives of pedagogical use of ICT often begin with providing hardware to the schools but these initiatives sometimes overlook the ways that this might support teaching and learning through appropriate software, teacher professional development and learning resources.

The catalytic rationale, the fourth presented by Hawkridge (1990), points to ICT's influence to transform the education system with new forms of schooling. Supporters of this rationale claim that ICTs will help students to move away from rigid curricula, rote-learning, and teacher-centred lessons, by giving children more control of their own learning (Finger, Russell, Jameson-Proctor, & Russell, 2007). According to this theory, ICTs are expected to be embedded in the central curricula in a way that teachers will adopt more relevant curricula to address students' individual and social needs by using ICTs, and bring educational opportunities to a larger number of students (Peck & Sprenger, 2008). However, the critics of this rationale contend that ICT can help in changing the ways of practice, but it cannot initiate the changes automatically (Finger et. al., 2007). Again, it would seem that teacher education and ongoing professional development might be important factors in supporting change.

Besides the above rationales, Zembylas and Vrasidas (2005) argue that ICT can be used by rich countries to take control of poor countries, thereby fostering a new form of colonization. They explain that ICT is being infused in many developing countries (e.g. African countries) uncritically by international finance organizations (e.g. World Bank, IMF). They claim that this infusion is happening in such an innocent way in the name of social and economic development that developing countries are often consuming ICT without a critical awareness or without asking how and in

12

which way ICT can contribute to their society. ICT is produced and marketed by western countries and the rest of the world mostly remains the passive consumers of ICT. Marketing and business policies are significant factors in colonialism (Andreotti, 2005), because, in the past, colonizers went to a country for business, and this often led to a process of colonization. Hawkridge (1990, p. 3) critiqued that "the international capitalist financiers and manufactures of ICT influence the Governments to introduce ICT education so that they can make great profit out of wide spread acceptance of ICTs". As a result, ICT related subjects in the school curriculum are being influenced by multi-national companies who sell ICT devices as well as information. Again, the English language has been another tool to promote colonialism (Pennycook, 1998), and the English scripts embedded in ICT equipment can be considered a colonial factor to take control over developing countries. Therefore, Zembylas and Vrasidas (2005) suggest respecting local language and culture while producing ICT devices for a particular society.

Clearly, there are different reasons that ICT is being used in schools. This section has considered four rationales for the introduction of ICT in education. These rationales also attract criticism and highlight the challenges of understanding ICT in education particularly in developing nations where external influences are strong.

2.2.3 The Nature of ICT in education

In response to the different rationales for ICT, governments develop policies to integrate ICT into their education systems. Government policies tend to recognise three different roles related to the incorporation of ICT in education: learning about ICT (including knowledge and skills), learning with ICT, and learning through ICT (Law & Plomp, 2003). The Ministry of Education, New Zealand [MoENZ] (2003) explains that learning about ICT aims to develop knowledge and skills about current ICTs in order to gain the experience necessary to understand the potential of ICTs and to develop the attitudes necessary for ICT capabilities. Learning *about* ICT places the focus on the ICT and its applications. Learning *with* ICT recognises the

broad use of ICT, particularly computers and network communications, to support teaching and learning. This role includes a wide range of applications of ICT as a tool, for example, using a word processor to enable redrafting of an essay, running a simulation to test a prediction in science, and developing cross-cultural understanding through computer conferencing. The third role of 'learning through ICT' is about "using ICT to *support* new ways of teaching and learning" (MoENZ, 2003, p. 8). This aspect of using ICT relates to situations where ICT changes the way teaching and learning occurs. For example, children participate in virtual field experiences by interacting with experts in remote and interesting locations using a mixture of synchronous and asynchronous web-based tools; or students study online using three-dimensional virtual worlds to facilitate connections, interactions and creativity.

With a view to promoting ICT education in schools, teacher education programs typically aim to equip in-service and pre-service teachers to understand and use ICTs in four different ways including: the acquisition of ICT skills, developing pedagogical understanding of the cross-curricular use of ICT, providing experiences of learning through ICT, and understanding what it means to transform education with ICT (McDougall, 2008). The first aspect aims to encourage the acquisition of IT skills to ensure teachers have the confidence and capability to use ICTs (Law, 2008). The second aspect indicates that teachers not only need ICT skills but they also need to understand how to use ICT to enhance students' learning within the existing curriculum as well as how to design and implement different learning experiences using technologies (Thomas & Knezek, 2008). According to the third aspect, ICT education in professional development further aspires to introduce ICT as an integral component of broader curricular reforms that are changing not only how learning occurs but what is learned (Law, 2008). The fourth aspect points toward introducing ICT as an integral component of the reforms that alter the organization and structure of schooling itself (Finger et. al., 2007).

The pre-service undergraduate teacher education programs (e.g. B.Ed.) often include ICTs in courses in two ways: ICT as a specialist subject, and cross-curricular use of ICTs in teaching (McDougall, 2008). The former approach adopts one core ICT methods related subject along with one or more elective subjects for ICT skill development. The latter approach considers using ICT across the curriculum throughout the teacher education courses. According to their study with some pre-service trainee teachers, Downes et al. (2001) point out that the separate ICT subjects provide a focus on skill acquisition which can be more appropriate where accreditation of skills is necessary. However, this approach often does not tend to provide the opportunities for trainee teachers to consider the use of ICT across a range of subject areas; accordingly it does not lead to integration of ICTs within practical experiences in school (McDougall, 2008). On the other hand, the proponents of the second approach believe that ICT should be used extensively to support learning throughout initial teacher education programs (Davis, 2003; Pearson, 2003). They emphasize a wide range of ICT's affordances (e.g. electronic portfolio or toolkits) for teaching and learning in a range of curricular areas. This approach may ignore the importance of providing necessary up-to-date ICT skills to the trainee teachers since ICTs are changing rapidly (McDougall, 2008).

2.2.4 The Integration of ICT in education: Some issues

The literature frequently notes that the integration of ICT in education can contribute to change in schooling and can enhance the quality of education (Hinostroza, Labbe, Lopez, & Iost, 2008; Hoque & Alam, 2010). As a result governments are developing different policies and strategies to integrate ICT in education (Kozma, 2008). However, it is reported that governments' expenditure for ICT in education increases each year, but the potential of ICT is not fully realised (Moonen, 2008). There are different reasons for the reported failures of ICT in education, but before discussing the reasons, it is helpful to define what 'ICT integration' means rather than presuming the reader understands the term.

The Cambridge Dictionaries Online defines the term 'integrate' as "to mix with and join society or a group of people, often changing to suit their way of life, habits and customs" ("Integrate", 2011a). Similarly, the Merriam-Webster online dictionary explains it as "to form, coordinate, or blend into a functioning or unified whole" ("Integrate", 2011b). In both definitions, 'change' appears to be an important criterion to integrate something in a situation. Acknowledging 'change' as an important aspect, Lloyd (2006, p. 4) defines the term 'integrate' as to "seamlessly combine components, parts or elements into a complex but harmonious whole." Therefore, the integration of ICT in education is considered as a seamless combination of ICT with all the curricular components including curriculum, instruction, assessment, professional development, and academic culture (Finger et. al., 2007; Kozma, 2008).

According to the above definition, it is important to note that a successful ICT integration requires a holistic change in the education system. This indicates that providing computers in schools without reforming curriculum, developing professionals and changing traditional teaching and learning practices does not mean ICT integration. It has been widely recognized that government policies often focus on providing ICT equipment in schools presuming that this will instigate integration or expected change automatically (Cuban, 2001). While Cuban noted this in 2001, more recent authors point to similar issues. For example, Twining (2008) argues that the use of ICT in classrooms is mostly about scaffolding traditional practices, and ICT is being used in similar ways to traditional teaching tools. Peck and Sprenger (2008) argue that the potential of ICT for bringing change in the education system is not being successful due to the lack of appropriate educational strategies, such as ICT supported curriculum reframing, professional development and infrastructural establishment. As a result, the potential of ICT in education is not fully realized, although governments are increasing their investments in ICT. This remains an issue in the field of ICT in education.

2.3 A conceptual framework for investigating ICT in education

This section develops a conceptual framework for this study on the basis of the literature. Relevant literature is examined to build a clear understanding of how scholars and other researchers have investigated teachers' experiences and understandings of ICT, what themes or ideas they have explored; what issues they faced during their study; what they have suggested to investigate in future; and what gaps in knowledge remain in this field. This understanding helps a researcher to situate his study and knowledge in a scholarly conversation (Anfara, 2008).

An education system is a multi-layered combination of people including teachers, administrators, curriculum developers and policy makers (Davis, 2008). The meaning of ICT in education may be interpreted differently by each of them. Without ensuring a coherent meaning of ICT integration among the people of the multi-layered academic culture, ICT incorporation may not be sustainable in education. Therefore, the achievement of a sustainable integration of ICT in education is situated in different layers of the education system.

On the basis of situated learning theory, Davis (2008, p. 507) has proposed a framework called the "educational ecosystem" that needs to be addressed for educational renewal with technology (Figure 1).
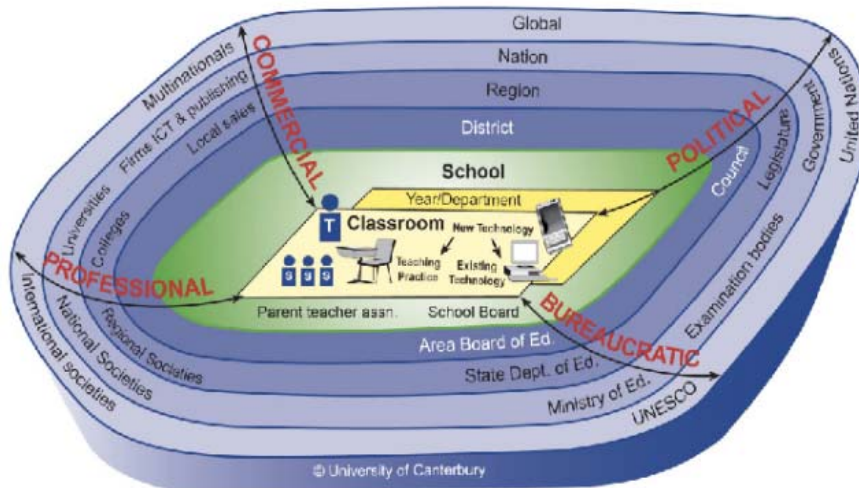
Figure 1: Educational Ecosystem. [Source: Davis, N. E. (2009). 'Arena of Change' graphic]

At the centre of this model are the teachers and their students, which is a micro ecosystem called the "classroom ecosystem" (Davis, 2008). Davis states that teachers are the keystone species of this ecosystem, and they play the key role to accept and deploy technology through their practice. Therefore, teachers' beliefs, attitudes and views are important factors that lead them to make decisions about technology use in classrooms. Davis (2008) argues that the teachers individually cannot make technology sustainable in their settings because this requires renewal of curriculum and pedagogy with ICT with supports from the school authority and colleagues. Davis calls this layer the "school ecosystem". Similarly, a school ecosystem is dependent and intertwined with its "regional ecosystem" which is also situated within a "national ecosystem" and "global ecosystem". Davis (2008) notes that all these ecosystems are interdependent and intertwined, and the success of ICT integration in education depends on a balanced endeavour of these ecosystems to embrace ICT in their settings. She suggests designing research in a way that can address the issues embedded within the ecosystems. She recommends not to

investigate individual factors isolated from the ecosystem, but to consider the factors embedded within it.

Davis, Preston and Sahin (2009, p. 861) argue that "Training teachers to use technologies impact multiple ecologies". They explain that teacher education creates a direct bonding between the classroom, school and regional ecosystems. Other aspects of the broader 'Educational ecosystem' are involved with teacher education at least indirectly (Davis, 2010) (Figure 2). This indicates that the investigation of the use of ICT in teacher education can help understand the broader picture of ICT integration in education.
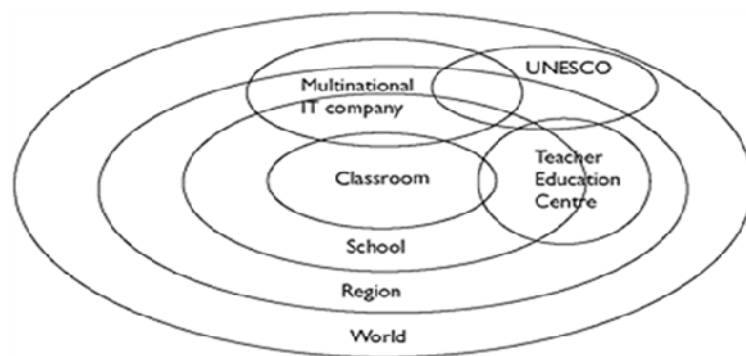
Figure 2: Venn diagram of a teacher's classroom nested within a school ecosystem and regional eco-zone in the Global Biosphere: Ecosystems for a multinational IT company, a teacher education college and UNESCO illustrate overlapping ecosystems (source: Davis, 2010).

Davis (2010) indicates that relevant knowledge about how the processes of integration can be speeded up is in demand. She suggests that researchers should adopt appropriate methodologies and research questions in order to investigate how change in one ecosystem impacts related ecologies. She recommends gathering

evidence from multiple ecologies that influence the innovation of ICT with a view to exploring ways for better integration of technology in education. In this regard, Davis, Preston and Sahin (2009) indicate that investigating teachers' use of ICT in their professional practice can shed light on multiple ecologies.

A considerable number of studies have been conducted to investigate teachers' use of ICT in education (Ertmer & Ottenbreit-Leftwich, 2010; Peeraer & Petegem, 2011). Ertmer and Ottenbreit-Leftwich (2010) reviewed more than 40 studies on teachers' use of ICT in education and indicated that some variables were commonly identified by the researchers that affect teachers' ICT practices: pedagogical beliefs, knowledge, confidence and school culture. They note that each of these variables consists of different factors, and all these are intertwined and inter-dependent on each other. They identified that researchers often adopted a conceptual framework consisting of these variables to investigate teachers' perspectives of ICT in education. Figure 3 represents an interwoven illustration of these variables.
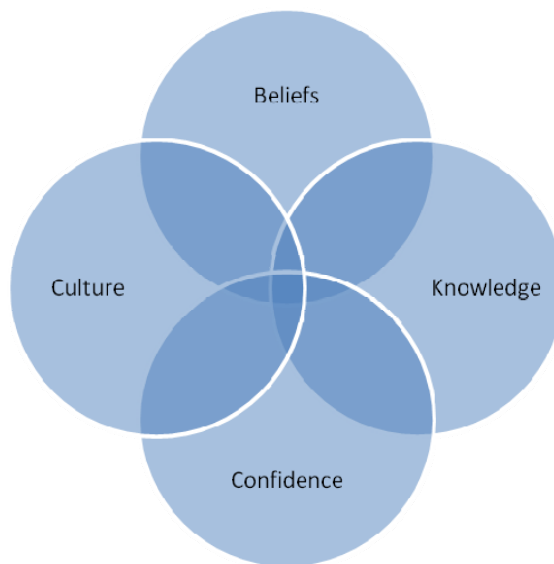
Figure 3: Variables that affect teachers use of ICT in classroom

Peeraer and Petegem (2011) adopted a similar framework that consists of variables including "ICT knowledge and skills", "ICT confidence", "Attitudes towards ICT", and "Access to computer and intensity of use". Li and Nang (2009) interviewed five teacher educators on their experiences of teaching with ICT and found that educators' ICT skills and knowledge, beliefs in ICT to support students' learning, academic performance with support of ICT, and the factors that motivate their use of ICT were the major themes that emerged from the interview data. Similarly four broad themes have been adopted as a framework for this study namely, educators' beliefs in ICT to contribute to teaching-learning activities, their pedagogical knowledge and technological skills about ICT, their confidence in using ICTs, and the professional culture that influence their practice of ICT. A brief description of these broader themes follows in the following sections.

2.3.1 Beliefs in ICT

Belief is a significant factor to understand human behaviour. Pajares (1992, p. 307) reviewed several studies on teachers' beliefs and identified that "beliefs are the best indicators of the decisions individuals make throughout their lives". He noted that there are strong links between what teachers believe, what they plan, what they decide, what they instruct to students, and what they practice in classrooms. He further argued that teachers' beliefs are more influential than knowledge in influencing their behaviour or practice. Ertmer and Ottenbreit-Leftwich (2010) reviewed a wide range of studies on teachers' use of ICT and found two types of beliefs prominent in influencing teachers' practices - namely their pedagogical beliefs and their value beliefs. While pedagogical beliefs are related to teachers' beliefs in how ICT can support students' learning, value beliefs relate to how ICT can help teachers achieve instructional goals.

Recent studies on the academic use of ICT also suggest that teachers' beliefs have a strong influence in using technologies in the classrooms (AnGers & Machtmes, 2005; Li & Ngan, 2009; Peeraer & Petegem, 2011). Judson (2006) found that

teachers with traditional pedagogical beliefs implement more traditional or low-level technology use strategies; whereas, teachers with more constructivist beliefs use more student-centred or high-level technologies. Zhao, Pugh, Sheldon and Byers (2002) argue that teachers make value judgments of any new pedagogical approach or technological innovation as to whether it meets their purposes. Hughes (2005, p. 295) notes that "The more content specific the example is, the more likely the teacher will see value and learn it". He explains that when learning about technologies is focused solely on the technology itself and isolated from content learning goals, teachers are less interested or likely to integrate technology into their practices. On the contrary, when teachers understand how to use technologies within their specific subject areas, they are more likely to use that technology in their classroom activities (Hughes, 2005). However, Ertmer and Ottenbreit-Leftwich (2010) state that although teachers' beliefs direct their use of technology, the school culture in which they practice has a strong influence in shaping their beliefs.

2.3.2 Knowledge of ICT

Borko and Putnam (1995) claim that teachers' knowledge guides their decisions in academic practice, therefore they argue that in order to "help teachers change their practice, we must help them to expand and elaborate their knowledge system" (p. 37). With a view to promoting teachers' knowledge for academic purposes, Shulman (1986) proposes a framework called pedagogical content knowledge (PCK). Shulman explains that teachers should have knowledge of the subject (content knowledge, CK), knowledge of teaching methods in the classrooms (pedagogical knowledge, PK), and knowledge of teaching specific content to a particular group of students in a particular context (pedagogical content knowledge, PCK). In addition to these, Shulman (1987) further proposed four other categories of knowledge: curricular knowledge, learner knowledge, context knowledge and knowledge of educational goals and beliefs. While the curricular knowledge is explained as the knowledge of the materials used for instruction including multimedia; learner knowledge is related to having preconceptions about students'

22

characteristics and knowledge base; contextual knowledge includes social and cultural factors that influence classroom as well as school practices.

With the introduction of ICT in education came the need for teachers to develop their knowledge base about how it could be integrated effectively in the classroom (Cuban, 2001; Mishra & Koehler, 2006). Koehler and Mishra (2008) argue that the reason behind teachers' less effective use of ICT is because of their lack of knowledge about how ICT can be intertwined with pedagogical content knowledge. Therefore, they proposed a theoretical framework of teachers' knowledge on the basis of Shulman's PCK framework, and called it Technological Pedagogical Content Knowledge (TPCK). This framework guides ways to effective teaching with technology that require proper understanding of the potential of technologies to support the representation of concepts along with appropriate pedagogical approaches to use technologies in a constructive way to teach content knowledge. It suggests the specific knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face (Mishra & Koehler, 2006). Furthermore, Koehler and Mishra (2008) consider that students' prior knowledge of both technology and content is essential so that technological supports can be employed in a better way to develop their new knowledge. Therefore, it is understood that only ICT (or technological) knowledge is not sufficient to integrate ICT in education; rather teachers require an intertwined knowledge of ICT, pedagogy and subject in order to implement ICTs for teaching-learning activities.

Both Shulman (1987) and Koehler and Mishra (2008) place importance on developing teachers' pedagogical knowledge, which is related to the knowledge of how children learn. However, they do not discuss andragogical knowledge, or the ways that adults learn and Merriam, Caffarella and Baumgartner (2007) argue that adults learn in different ways from children. Therefore, teacher educators need to be knowledgeable about both pedagogical models and adult learning theories (Fransson,

Lakerveld, & Rohtma, 2009; Swennen & Klink, 2009). While Koehler and Mishra's (2008) TPCK framework is useful for preparing teachers to use technology; it lacks specialist understanding of andragogical knowledge that might help teacher educators to teach the trainee teachers with and about technology (ICT).

Teachers' pedagogical knowledge of using ICT is related to their strategies for designing learning activities. Instructional strategies are divided into two broader categories on the basis of how teachers identify the conditions required to make learning happen: directed or teacher-centred models, and constructivist or student-centred models (Roblyer & Doering, 2010). Directed instructional models reflect teachers' direct influence in students' learning. Here, teachers aim to transfer a set of knowledge or skills to the learners, and expect all learners to adopt that to the same extent (Roblyer & Doering, 2010). For example, teachers instruct the students and then set them some drill-and-practice strategies to build ICT skills (Dede, 2008). On the other hand, through constructivist instructional approaches, teachers often cultivate environments for student-centred learning where students work with ICT individually or in groups to develop new knowledge on the basis of their existing knowledge (Dede, 2008).

For example, students can be asked to create multimedia products to illustrate and report their research, or they are shown video-based scenarios and then given a problem to solve in groups (Roblyer & Doering, 2010). Therefore, it is suggested that teachers should have sound pedagogical knowledge about how to teach with ICT and how to instruct students to learn with ICT (Dede, 2008; Roblyer & Doering, 2010). Unfortunately, teachers' knowledge of ICT is often not enough and they are not confident in using that knowledge to facilitate student learning (Ertmer & Ottenbreit-Leftwich, 2010). The following section describes the confidence component of the conceptual framework (Figure-3) to illustrate how confidence contributes to teaching about and with ICT.

2.3.3 Confidence in using ICT

Teachers' confidence in using ICT for instructional purpose is an important consideration. Ertmer and Ottenbreit-Leftwich (2010) note that frequently a gap is noticed between what teachers know about and what they do with ICTs in their classrooms, and they explain that it is due to their lack of confidence in completing the task successfully. Piper (2003) conducted a survey with 160 teachers and reported that teachers' confidence in using computers had significant influence in integrating technology in schools. Similarly, Wozney, Venkatesh and Abrmi (2006) undertook a survey with 764 teachers and found that teachers' confidence was one of the biggest factors that contributed to their achieving instructional goals using computers. Both of these studies suggest that increasing teachers' confidence in using ICTs for teaching and learning activities is an essential prerequisite for integrating ICTs in education.

Studies suggest different ways of developing confidence in teachers' practices. Bandura (1997) points out that gaining personal mastery and experiencing successful examples contribute to improving people's confidence. Mueller, Wood, Willoughby, Ross and Specht (2008) argue that although knowledge of teaching about and with ICT is important, it is teachers' positive experiences with computers that promote their belief in the technology and builds their confidence in its potential in education. They conclude that these positive experiences impact on teachers' ability to integrate ICT in education. Similarly, Ottenbreit-Leftwich (2007) state that when teachers see how ICT facilities can enhance students' success in learning, their confidence in ICT use increases. Furthermore, working with proficient peers (Ertmer, Ottenbreit-Leftwich, & York, 2006), participating in a professional learning community (Looi, Lim, & Chen, 2008), and providing training and access to suitable models (Ertmer, 2005) are also strategies which will improve teachers' confidence in integrating ICT in education.

2.3.4 Professional culture

Davis (2008) shows that the integration of ICT in education is related to multiple layers in the education system ranging from classroom perspectives to global perspectives. She argues that although teachers play the key role of implementing ICT in education, they alone cannot make it successful; the success of ICT integration in education depends on different sub-cultures of her proposed 'Educational Ecosystem'. Hennessey, Ruthven and Brindley (2005) claim that "teachers are reluctant to adopt a technology that seems incompatible with the norms of a subject culture" (p. 161). Similarly, Somekh (2008, p. 450) states that:

> Teachers are not 'free agents' and their use of ICT for teaching and learning depends on the interlocking cultural, social, and organizational contexts in which they live and work.

Therefore, it is also important to investigate the contextual factors that teachers perceive as influential for integrating ICT.

Romeo and Russell (2010) claim that adopting the strategies of what works best in a social study and ignoring the cultural influence of that society is a technical approach, because human should not be undervalued by process. The culture of a society shapes the nature of activities taking place in that society (Crotty, 1998). This indicates that what works in one culture may not work in another culture; for example, the ICT adoption process of a developed country may not be applicable in a developing country because their cultural difference may influence the adoption process. Therefore, the process of investing teachers' use of ICT needs to consider how their social and professional culture might influence their ICT adoption (Davis, 2008).

Studies show different aspects of the cultural influence in implementing ICT in educational practices. Somekh (2008) describes examples of pedagogical integration

of ICT in three schools from three different countries, and notes that the principal's vision and motivation as a leader played the key role to bring innovative changes with ICTs in schools. Similarly, Dexter (2008) argues that an effective leadership for integrating ICT in a school includes coordinating ICT facilities to support teaching-learning activities, and distributing the responsibilities of implementing ICT across a team of multiple staff members. Drent and Meelissen (2008), in their case study, show that team-work among the educators is critical in developing an ICT integrated academic environment. Besides these, the nature of the frequent change of technology makes many teachers feel that they are perpetually novice in its use (Wood, Mueller, Teena, Specht, & Deyoung, 2005). Teachers' fear of being replaced by technology is also a factor influencing the implementation of ICT (Li, 2007). Moreover, insufficient training of the educators, and lack of appropriate software and hardware are reported as the barriers for integrating ICTs in teacher education programs (Goktas, Yildirim, & Yildirim, 2009).

2.4 Studies on ICT in teacher education

Peeraer and Petegem (2011) investigated Vietnamese teacher educators' perceptions and uses of ICT in their professional practice regarding the factors of their ICT related knowledge and skills, beliefs and attitudes, access to computers and intensity of use, and confidence in using computers in teaching-learning activities. They surveyed the opinions of 783 educators from five different teacher education institutes regarding these factors and statistically analyzed the data to explain the extent to which these factors influence the integration of ICT in Vietnamese teacher education programs. They found that the educators' access to computers was satisfactory, and it was not reported as a barrier to ICT integration in the Vietnamese teacher education institutes. However, the educators' use of ICT in teaching-learning activities was reported as being low compared to their ICT use for personal communication and administrative work, such as preparing official letters. The educators' ICT skills were also reported as being limited in basic computer operations, such as word processing and making slide presentations, and the majority

of them had low skill levels of using the internet, maintaining computers and security issues. It is argued that the limited and low competency of ICT was the reason that the educators were not very confident in using computers in the classrooms; consequently, their pedagogical use of ICT remained low. The educators' confidence bore a direct relationship to their subject culture; for example, the mathematics and science educators seemed more confident in using ICT than the humanities or arts educators.

Peeraer and Petegem further reported that the Vietnamese educators had strong beliefs in ICT that can contribute to their personal, social and academic practices; however, these beliefs could not influence them in using ICT in teaching practices. Although the educators believed in constructivist approaches for students' learning, their ICT use remained low. The researchers recognised this as a gap between the educators' stated beliefs and actual practice; and explained that the reason was a lack of pedagogical knowledge of ICT accompanied by a lack of confidence. Whenever these educators used ICT for teaching purposes, they used it to replace traditional teaching practice. The majority of these educators' ICT use, as reported, included word processing applications for producing documents and some use of presentation software for lecturing, and internet browsing for accessing information on the web. Their subject specific application of ICT and electronic communication for collaborative learning was found to be low. Therefore, Peeraer and Petegem suggested educating the educators with both ICT skills and the pedagogical use of ICT. Furthermore, the researchers acknowledged the importance of the policy makers' and education administrators' responsibilities to conceptualize the integration of ICT in teacher education from the educators' perspectives.

Angers and Machtmes (2005) investigated whether there are certain beliefs, context factors, and practices of an exemplary technology teacher that may provide an in-depth understanding of exemplary teaching practices that leads to a technology-enriched curriculum. This empirical study looked at exemplary technology teachers

who can demonstrate skills, knowledge and understanding of current available technology, and can translate that knowledge by designing and developing appropriate learning opportunities for students. The researchers took a qualitative approach and designed an ethnographic-case study. Three exemplary teachers from three different middle schools were selected as participants. Data were collected through direct observation, participant observation, in-depth interviews and relevant document analysis. Data were analyzed in three processes: data reduction, data display, and conclusion verification. Data were coded into the categories of beliefs, context factors and practices, as specified in the central research questions. The study reflected on the integration of technology with a perspective on beliefs about computer technology as a tool for teaching and learning. What is important here is that teachers' beliefs and confidence are important in the implementation of new technological tools. The findings indicated that exemplary teachers believe that technology is a tool that adds value to lessons and to students' learning and motivation. Support from the state, district and school level was also found necessary for the teachers. It should be noted that the study recognised the importance of beliefs and confidence in the implementation of new technological tools.

2.5 Summary

Literature related to ICT integration in education, and teachers' ICT use in particular, focused extensively on the themes discussed above: knowledge, beliefs, confidence and culture. Therefore, it is useful to consider these themes including the aspects related to each theme when investigating the perspectives of ICT in education.

Teachers' beliefs in ICT's potential of contributing to education are reported to be very important. If teachers believe that ICT supports their instructional goals and students' meaningful learning, they are more likely to appreciate ICT in their classrooms. However, teachers' negative beliefs in ICT, such as being overwhelmed at the thought of using ICT or fear of trying to keep up with frequently changing

technologies, can hinder integration of ICT in education. Teachers' beliefs in ICT are often influenced by the culture in which they work.

It is reported that teachers' knowledge of how to use ICT to facilitate learning is crucial for making meaning of ICT in education. Although both technological skills and pedagogical knowledge are suggested as being important for teachers to develop, an interwoven understanding of technological pedagogical content knowledge (TPCK) is important in this regard (Koehler & Mishra, 2008). It is also reported that technological knowledge isolated from pedagogical application is less effective in education; rather, teaching ICT skills through instructional activities is found more useful for teachers.

Although relevant knowledge of teaching about and with ICT is reported as crucial for integrating ICT in education, teachers' confidence and self-efficacy is critical for this purpose. Teachers with a good knowledge base of ICT and low confidence can be less effective in using ICT for instructional purposes than teachers with less knowledge but more confidence to use ICT in the classroom (Ertmer & Ottenvreit-Leftich, 2010). Teachers' confidence increases when they get sufficient training, experience successful use of ICT, observe their students' successful learning, and participate in professional learning community.

Although teachers' knowledge, confidence and beliefs in ICT are necessary, their professional culture has a strong influence in implementing ICT their practice. The education system is considered as a multi-layered culture, and each layer contributes to ICT's access to education. Effective leadership, teachers' community of practice, and developing essential infrastructure including hardware and software are often reported as influencing factors in this regard.

This chapter has shown that there is a need to understand the factors discussed, particularly in relation to the introduction of ICT in the curriculum in developing

nations. It takes into account the literature pertinent to this study in order to situate it within the cultural practices and understandings of Bangladesh, whilst at the same time building on the scholarly work and research about the factors for successful ICT integration. It also provides support from the literature to demonstrate that this study, in the context of Bangladesh, can contribute to the understanding of ICT in education.

CHAPTER 3

Methodology

3.1 Introduction

This chapter considers the research methodology for this study. It establishes the theoretical framework of the study and clarifies the position of this researcher in relation to the research objectives. The chapter introduces the interpretive paradigm on which the study is based, and describes the case study research methodology that has been adopted. This chapter also includes a description of the data-gathering and data analysis methods. The overall considerations of trustworthiness and triangulation are considered along with discussion of ethical considerations and the limitations of this research.

The research question is concerned with the Bangladeshi teacher educators' experiences and their understanding of ICT education in the B.Ed. curriculum, the influences of the introduction of ICT education in the B.Ed. program, the implications of the ICT education in professional teacher education programs, and the crucial themes the educators believe need to be addressed for the introduction of ICT education in teacher education. To answer these questions, the following sections describe the methodology adopted in this thesis.

3.2 Theoretical framework

As discussed in the literature review chapter, there are some specific rationales and factors that influence the integration of ICTs in educational contexts. These rationales may vary from society to society suggesting that ICT is perceived by people according to their socio-cultural perspectives (Kozma, 2008). While social factors shape ICT for educational purposes, ICT also triggers changes in educational activities (Voogt & Knezek, 2008). From this perspective, research on ICT in education should not be isolated from the particular environment where it is situated;

rather, research studies in ICT need to focus on the whole environment of actions, content and processes that take place in a specific context (Cox, 2008).

This study is embedded in an interpretivist ideology, accepting that meaning is socially constructed in an inter (between) and intra (within) personal manner (Crotty, 1998). The major concern in interpretive studies is developing an understanding of the individual's interpretation of the subjective world around them (Cohen, Manion, & Morrison, 2007). Therefore, the researchers usually listen and talk to people, and observe, record and examine people's activities to explain the way people construct meaning of social actions (Willis, 2007). In this study, I recognize that the knowledge and understanding of my research interest may transform, along with the understandings of the participants, which are dependent upon the personal constructions and interactions they adopt. Consequently, this study's theoretical perspectives are situated within an interpretivist phenomenological viewpoint. With the process of phenomenological research, my personal experience of the phenomenon remains central to the research process. Whilst bringing my own experiences into the study, I set aside what is "taken for granted" (Burr, 2003, p. 3) in order to understand the social phenomena of how the research informants experience their world. The goal of interpretive studies is to understand and interpret the complex world of lived experience from the point of view of those who live in it (Crotty, 1998). Crotty (1998, p. 8) also notes that the interpretivist approach "looks for culturally derived and historically situated interpretations of the social life-world". This study aims to provide an in-depth description and understanding of the educators' experiences of ICT in their practice. Therefore the purpose of this study is situated within the paradigm of qualitative research with phenomenological perspectives providing the theoretical underpinning.

3.3 Rationale for qualitative approach

A qualitative approach has been adopted because I want to understand the educators' ontology and epistemology about ICT integration in their practice. For this, I

investigate how the educators make sense of ICT in their daily activities and what they count as legitimate ICT knowledge. Davidson and Tolich (2003, p. 25) argue that "ontological and epistemological questions cannot be answered scientifically," because the traditional positivist or scientific approach to research is based on "reductionist" ideology where it is believed that the social world can be divided into components and each component part can be isolated from its natural settings. This ideology leads to quantitative research where components or variables are considered to be the same in isolation as they might be in a whole natural setting. However, I am not interested in isolated factors (such as attitudes, knowledge, skills) of educators' perspectives; I want to systematically analyse how the educators make meanings of ICT in their professional practices. For this purpose, I want to talk to them in their natural settings, so that I can arrive at understanding and interpretations of how they explain and maintain their activities regarding the course 'Teaching ICT in Education.'

In the case of using ICT in educational settings, several quantitative research studies have been conducted in order to identify cause and effect relations between some specific variables (for example, Ertmer & Ottenbreit-Leftwich, 2010). I am not interested in breaking down educators' perspectives into separate variables to find out how one variable is influenced by another, or how several variables are related to each other. On the contrary, I plan to study the educators' perspectives, experiences and understandings in a holistic way and embedded in a natural setting. Lichtman (2010, p. 15) states that, "Qualitative research involves the study of a situation or thing in its entirety, rather than identification of specific variables". Therefore, a qualitative research design is appropriate for my study purpose.

The qualitative research design is said to be a dynamic, fluid and ever changing approach (Lichtman, 2010). This approach gives an opportunity to pose new questions and explore new ways of answering them as the study unfolds. It does not require the researcher to rigidly follow a predetermined format or set of questions;

rather it provides opportunities to explore new areas of the educators' perspectives, and to discover and unravel intriguing puzzles related to implementing ICT in education. This responsiveness to the dynamic nature of data is a critical element in the development of a successful qualitative study. This is another reason for selecting a qualitative approach for this study.

The qualitative design also allows modifying protocols as the study progresses through the ever-changing landscape of teachers' perspectives. This means the researcher can be responsive to the context and situation and is not locked into a detailed and concrete plan (Flick, 2009). There are multiple realities in human society that require alternative ways to be discovered (Lichtman, 2010). Different educators may have different perspectives of understanding ICT in their practice, and the objective of this study is to explore these different perspectives. The qualitative approach allows adopting different ways of understanding the educators' thoughts about ICT.

Qualitative inquiries can be conducted using a range of approaches including case study. The case study approach has been found to be a viable method for research set in educational settings, especially studies on how ICT education is incorporated into school curricula (Angers & Machtmes, 2005; Gough-Jones, 2008; Lim, 2002; McGrail, 2005). The following section describes the case study approach as an appropriate methodology for this study.

3.4 Case study

The case study is a research approach which allows one social issue or phenomenon to be studied in depth from multiple perspectives (Yin, 2009). Social constructivist theories emphasize the importance of the individual's perceptions, and the case study is an appropriate approach for investigating social aspects including ideas and perceptions (Blatter, 2008). It is described as 'an umbrella term' for a family of research methods having in common the decision to focus on inquiry around an

instance (Merriam, 1998). Like all research methods, in a case study the researcher collects evidence systematically, studies relationships and promotes a methodical study. Case study mainly deals with the interaction of factors and events and sometimes it is only by taking a practical instance that we can obtain a full picture of this interaction (Merriam, 1998; Yin, 2009). An important strength of the case study method is that it allows the researcher to concentrate on a specific instance or situation and to identify, or attempt to identify, the various interactive processes at work (Merriam, 1998).

According to Yin (2009) a case study is the preferred strategy when '*how*' and '*why*' questions, emerging from '*what*' questions, are being posed; especially when the investigator has little control over events and when the focus is on a contemporary phenomenon within some real-life context. This is the first time, in the 2005 curriculum reform, that the Ministry of Education in Bangladesh has introduced ICT education officially into the professional teacher education (i.e. B.Ed.). Thus, it is necessary to understand '*what*' is the strategy that educators choose for developing an ICT education infusion approach in this new curriculum, '*why*' and '*how*' do they choose the strategies to achieve this goal, and finally '*what*' is the context into which they infuse ICT education in B.Ed. curricula.

Critics of the case study approach point to the fact that generalisation is not usually possible and question the value of the study of single events (Bell, 2010). However, Flick (2009) argued that the 'reliability' of a case study is more important than its 'generalisability'. He emphasises that the contribution of a case study may be valued by the extent to which another researcher or practitioner working in a similar situation can relate his decision-making to that described in the case study. Therefore, the researcher should identify an 'instance', such as the introduction of a new syllabus, the way a school adapts to a new role, or any innovation or stage of development in an institution, and then observe, question and study it (Bell, 2010). Accordingly, the case study approach of this study aims not to generalize or to

produce theories, but to provide insightful findings that may show some evidences of ICT curriculum implementation in teacher education programs within a developing country.

3.5 The participants

The context of this study is Bangladesh and ten educators from four different government teachers' training colleges (TTC) are the participants. Four government teachers' training colleges were selected from different parts of Bangladesh: one from the north-west region, one from the north, one from the north-east area, and one from the central part of the country. A total of ten educators were purposively selected from these colleges and invited to participate. The educators of these colleges who regularly taught the Basic Computer Skills course were selected as participants. A brief description of the ten participants is presented in the following table, and pseudonyms are used to introduce them.

Table 1: Brief description of the participants

Name (pseudonym)	Academic qualifications	Number of years in teacher educator role in TTC	Previous professional education experience
Abdal	M.Sc. , B.Ed.	Assistant Professor for 10 years	Lecturer in college
Bipul	B. Ed. (Honours); M.Ed.	Lecturer for 5 years	Education consultant in a non-government organization (NGO)
Didal	B.Ed. (Honours); M.Ed.	Lecturer for 5 years	Teaching autistic students
Habil	BSS, MSS ; B.Ed.	Lecturer for 5 years	Education consultant in a NGO
Manto	B.Sc.; M.Sc.M.Phil.; B.Ed.	Assistant Professor for 5 years	Lecturer in general college
Mozam	B.Sc.; M.Sc.	Lecturer for 5 years	Education administrator
Muhin	B.Sc.; M.Sc.	Lecturer for 6 years	Agriculture consultant in a NGO\n\nScientific officer in a research institute
Munsar	B.Sc.; M.Sc. ; B.Ed.	Lecturer for 5 years	Primary and secondary school teacher
Raz	B.A.; M.A.	Lecturer for 5 years	Secondary school teacher
Rosan	B.Sc.; M.Sc.	Lecturer for 5 years	Lecturer in a NGO

Additional biographical details were collected from the participants including their degree and subject teaching specialisms, and the number of years they had spent in previous positions prior to becoming teacher educators. However, these details are not presented here in order to preserve the anonymity of the participants.

3.6 Data collection methods

This section describes the data-collection methods adopted in this study. There are three general methods of information gathering in case study research: interview, document analysis and observation (Merriam, 1998). These three methods are often used in the same study, either concurrently or in sequence, to verify or to supplement

the information gathered by any one of them or for the emerging advantages of each at various stages (Meriam, 1998; Yin, 2009). Interviews are the major method for collecting data in this research, while documents provide important supplementary and contextual information. These two methods are described in the following sections.

3.6.1 Interview

Interviewing is the most commonly used data collection tool within interpretive research. The interview process involves a specialized pattern of verbal interaction around a specific purpose focusing on a content area and eliminating excess information that is not required (Kvale & Brinkmann, 2009). The idea of this planned conversation is to seek explicit information that, according to Kvale and Brinkmann (2009), must be based not only on the investigator's subjective preference but must also align with an objective assessment of the information being gathered including personal characteristics, resources and skills of the investigator. Mears (2009) alerts that an interview which is initiated by the interviewer is aimed at obtaining research related information. This information involves a systematic description with a prediction or explanation (Mears, 2009; Kvale & Brinkmann, 2009). Witz, Goodwin, Hart and Thomas (2001) also promote the importance of multiple expressions, including gestures, body language, and voice tones to provide a richer interpretation of meaning. Interviews have the potential to provide rich insights into people's experiences, perspectives, beliefs and feelings (Bogdan & Biklen, 2007).

The purpose of the interviews in this study is to explore educators' understandings and experiences regarding the ICT curriculum in the B.Ed. program. The educators in this study participated in two semi-structured interviews, one face-to-face and another by telephone. The first interview was approximately 45 minutes in length and the second one was 10-15 minutes long. The participants were asked some questions (see Appendix-E), and they discussed these with the researcher. The form

of 'semi-structured' interview was chosen as it provides a structure with questions prepared in advance, but does not limit the interview to the questions specified. All interviews were conducted in Bengali, recorded and then transcribed verbatim in Bengali. Within one month of the interviews being conducted, the transcripts were posted and emailed to the individual participants so that they could verify the accuracy and give feedback. Later these Bengali transcripts were translated into English and were checked and verified by another Bangladeshi educator, who was not a participant of this study, to ensure the original meanings were translated as consistently as possible.

3.6.2 Documents

Documents often form the basis for qualitative studies and they are viewed as key sources of social scientific data (Given, 2008). A document can be a text-based file including primary data (collected by the researcher) or secondary data (collected and published by others). Primary data documents include research journals and field-notes taken by the researcher; whereas, secondary data documents can include diagrams, other researchers' works and government publications that are important in describing the historical background and current situation in a community or country where the research in being conducted. These are considered as conduits of communication between a writer and a reader, because documents convey historical, philosophical and contextual messages that help the researcher gain understanding (Flick, 2009). The importance of documents in a social study is twofold: firstly, documents are receptacles of instructions, obligations, wishes, and reports that are valuable for research works; and secondly, documents are lived representatives of their human creators who passed away or who are not reachable (Given, 2008).

There are multiple approaches to the analyses of documents, such as: content analysis, and discourse analysis. Content analysis is the most straightforward method of data inquiry. This process can utilise word and phrase counts along with numerical measures of textual expression with a view to finding out themes.

Discourse analysis is a sophisticated approach to document analysis where a researcher's interest revolves around the ways in which a set of ideas and concepts tend to cohere into existing ways of viewing the world. The standard way to analyse documents is to focus on the content (Given, 2008).

In this study, I have analyzed several documents related to the teacher education program in Bangladesh. These documents include the National ICT Policy-2009, the National Education Policy-2010, and the Bachelor of Education (B.Ed.) Curriculum of Bangladesh. The policy documents and curriculum have provided critical contextual information. I have analyzed the content of these documents to understand the Bangladeshi Government's perceptions about ICT. An understanding of these documents was essential in helping to interpret and understand the perspectives of the participant educators. My own research journals and field-notes were important sources of data that helped me to capture some of the contextual and situational elements of the research particularly in relation to specific TTCs and participants. These were things I was able to observe from visiting the contexts and immersing myself in the environments of my participants. Both the policy documents and field-notes provided important complementary data for the study. These documents also helped me to identify differences between intended and implemented ICT objectives in teacher education programs in Bangladesh.

3.7 Data analysis

Qualitative data analysis involves some common characteristics, such as: data collection, writing memos, coding data, writing for analysis, developing concepts or themes, and connecting the themes with literature (Bogdan & Biklen, 2007). Data sources for my study included interview transcripts, field-notes, and some secondary documents (policy documents and curricula).

In this study I have used an interpretivist research approach (Bogdan & Biklen, 2007) to analyze the interview transcripts. In order to analyze the data intensively, I

first examined the interview-transcripts and field notes with utmost care. Initial analysis and coding was conducted in Bengali to work as closely as possible with the original meanings of the participants. I read the transcripts several times, and each time, while reading I developed a preliminary list of possible 'coding categories' in my research notebook (Bogdan & Biklen, 2007). Beside the categories, I often included lists of ideas and diagrams that sketched out any relationships that I noticed.
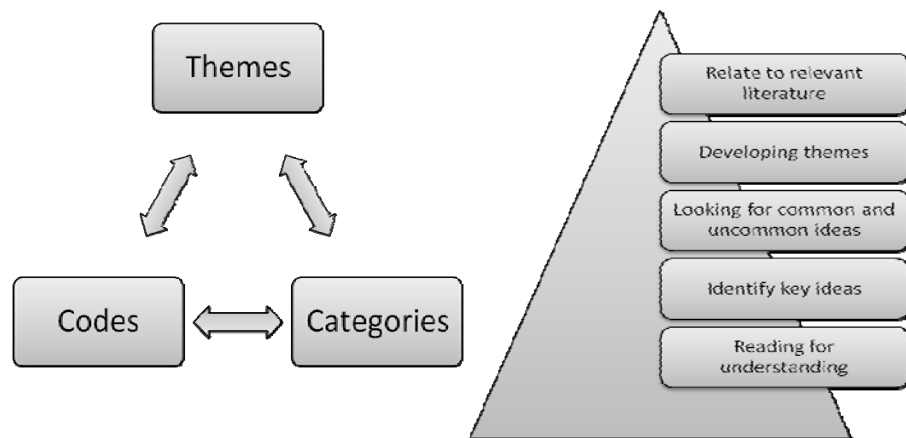
Figure 3: Data analysis process.

While developing codes, I found some words and phrases the participants used that were unfamiliar to me or that required more explanation. I re-read the transcripts purposefully to map relevant quotes, descriptions and observer comments to discover the inner meanings of those words and phrases. I distributed the categories under some 'units of data' (Bogdan & Biklen, 2007) that represented the particular topics of the coding category. I assigned the coding categories and modified them where necessary with a view to establishing meaningful coding groups. After developing initial coding categories, I made abbreviations of some frequently used phrases and listed the categories alphabetically. Then, I re-read all the data and scrutinised sentences in the field notes carefully and matched appropriate codes with the most

appropriate sentences and paragraphs. I marked each unit of data with the relevant coding category.

3.8 Overall considerations

This section presents some important considerations in the process of the research methodology for this research. The considerations include trustworthiness, triangulation, ethical considerations and limitations of this study.

3.8.1 Trustworthiness

Trustworthiness relates to the ways qualitative researchers ensure the quality of their research work (Given & Saumure, 2008). In the quantitative research paradigm, generalizability, validity, reliability and objectivity are some characteristics which help to establish the acceptability of a work. However, in the interpretivist paradigm, trustworthiness means to ensure transferability, credibility, dependability, and confirmability (Flick, 2009).

Transferability means the extent to which the results of the study can be applied to other situations (Jensen, 2008c). Transferability requires providing enough rich details of the design, process and results to enable readers to understand how the study was conducted. Transferability also allows the readers to know as much about the research as possible, such as details about the participants, the process of the data collected and the context of the study, so that the reader can judge whether the results of the study can be expected to inform their own research (Jensen, 2008c). According to Jensen (2008c), transferability can be increased in two ways: by providing thick description of context, participants, and research design; and by selecting participants purposefully. In this study, a thick and detailed description of each step of the research work has been explained to improve the transferability quality. Chapter 3 describes the research process, Chapter 4 gives thick description of the findings, and Chapter 5 provides a critical and comparative discussion of the findings in relation to the literature presented in Chapter 2.

Credibility is related to establishing a theoretical framework for undertaking a study; sound practice in conducting the research as identified in the literature; and triangulating the data collection methods (Jensen, 2008b). In this study, Chapter 2 develops a conceptual framework based on the literature for investigating the research question and Chapter 3 establishes a sound research methodology (a qualitative case study). Chapter 3 also ensures data triangulation by involving multiple participants (10 educators) from multiple contexts (four different TTCs), and using multiple methods (interview and documents). Another important aspect of credibility is establishing an understanding of the culture of the organization that one is studying (Morgan & Guevara, 2008). This study is based on Bangladeshi educators' professional culture which is illustrated in Chapter 1 and Chapter 4.

Dependability involves ensuring consistency and stability of data. It involves providing rich details or thick descriptions of the process, events and participants' views (Bogdan & Biklen, 2007), and using methods that can be assessed as representing good research practice (Merriam, 1998). The research methodology has been explained to clarify why the case study as a qualitative paradigm was selected, and how the data was collected and analyzed based on established theories and practices (e.g. thematic analysis).

Confirmability is concerned with showing evidence that the data are rooted in the participants' context and the results are based on the research purpose and are not altered due to the researchers' biasness (Jensen, 2008a). According to Jensen (2008a), confirmability can be expressed in four different ways: making the research process as transparent as possible by clearly describing how data were collected and analyzed; conducting an audit trial by engaging an independent reviewer to verify the research process and interpretations of the data; allowing participants to review the data to check for consistency with their perceptions; and employing multiple coders of the same data to establish consistency in the coding of themes. In this study, the data collection and analysis process is described in Chapter 3, and the

supervisors of this study verified the research process and interpretation of the data. Moreover, interview transcripts were sent to the participants to check.

3.8.2 Triangulation

Triangulation in qualitative research means to apply multiple approaches to data collection and data analysis for increasing the validity of the research findings (Rothbauer, 2008). Rothbauer (2008) describes four different approaches to apply triangulation in a qualitative study: using multiple data collection methods such as interview, observation and documents; collecting data from multiple sources (e.g. multiple participants); employing multiple investigators in the study; and applying multiple theories to examine the research issue. In this study two methods (interview and document) were used, and data were collected from ten different participants and three policy documents.

3.8.3 Ethical considerations

Ethical concerns are related to the issues of harm, consent, privacy and confidentiality. In devising the data collecting methods, ethical concerns were considered carefully and scrutinized by the University of Canterbury Educational Research Human Ethics Committee. Before interviewing, I ensured the rights and privacy of the participants by providing them with details of the research intentions and procedures (see appendices A and C). The participants were able to independently decide whether they wanted to be involved or not, and when they agreed, a consent form was signed (see appendices B and D). Their anonymity and confidentiality in relation to data analysis and reporting was guaranteed.

3.8.4 Limitations of the study

The results of this study are based on what the educators said during interviews and what was stated in the documents. The interviews were the educators' self-reflections of what they believe and do regarding the ICT component of the

curriculum, and may not accurately reflect what they actually do in their classrooms. Similarly, the analysis of the documents reflects what the educators are expected to do while teaching ICT. Therefore, the data from these two sources relate to intended practices, and may not be what is actually implemented in the teaching and learning about ICT in the teacher education program. This can be considered as one limitation of this study.

Another potential limitation is the absence of female educators in the participant list. In the selected four teachers' training colleges, the majority of the educators who teach ICT are male. When I visited these colleges, female educators who used to teach ICT were not available.

An overall limitation acknowledges that the results of this study may not be generalized or transferred in broader contexts, because the data was collected from a small number of participants from a small number of areas of Bangladesh.

This chapter has identified the theoretical underpinnings of the study and described how the study was conducted. The following chapter will present the findings.

CHAPTER 4

Findings

4.1 Introduction

The key objective of this study was to explore Bangladeshi teacher educators' experiences and understandings of ICT in teacher education and this chapter presents the findings of this study. Corresponding to this goal, ten educators were interviewed and asked to share their views of ICT in education with the researcher. In addition, three key ICT-related Bangladesh policy documents were examined to understand how the policies make sense of ICT for educational purposes in Bangladesh. The policy documents and the interview data were analyzed and presented as findings in this chapter. As the policies shape the context of the study and influence the integration of ICT in education in Bangladesh, this chapter discusses the policy documents first, and then presents the educators' perceptions.

4.2 ICT policies in Bangladesh

The Government of Bangladesh has given emphasis to the inclusion of ICT in the education system. For this purpose, different policies have been developed and are being implemented to integrate ICT in education system. In this study, three key policies are investigated to understand how ICT is perceived and addressed in education in Bangladesh. The policy documents include: the National Information and Communication Technology Policy-2009 [NICTP-2009], the National Education Policy-2010 [NEP-2010], and the Bachelor of Education Curriculum.

4.2.1 The National Information and Communication Technology (ICT) Policy-2009

The National Information and Communication Technology (ICT) Policy-2009 of Bangladesh considers ICT as an essential means for the country's economic and social development (Ministry of Science and Information and Communication

47

Technology of Bangladesh [MOSICTBD], 2009). The policy defines ICT as any kind of electronic technology that supports the creating, preserving, processing, transforming and disseminating of information. This policy addresses all public sectors of Bangladesh, such as business, social-welfare, and education, and it recommends strategies for integrating ICT in each sector. In regard to the education sector, this policy aims to develop citizens' computer literacy, and to encourage research and development work in ICT. In order to develop ICT literacy among Bangladeshi citizens, the policy advocates ICT courses in primary, secondary, technical and vocational education and training programs.

Bangladesh's National ICT policy considers ICT as a fundamental skill of the 21st century, and suggests different strategies to develop ICT literacy for primary and secondary teachers and students. For this purpose, the policy recommends developing the ICT infrastructure in schools and teacher training institutions through the provision of computers, local area networks and internet connections. The policy also regards ICT as an effective tool for teaching and learning activities, and mandated the preparation of multimedia-based content and materials for the teacher training programs. In order to encourage the teachers and educators to use ICT in classrooms, the policy advises providing them with ICT loans and incentives so that they can buy ICT equipment and prepare resources for multimedia based classroom environments. It also recommends peer-learning methods and action research as key strategies for preparing teachers to use ICT in classrooms.

With a view to integrating ICT in education, the ICT policy suggests preparing digital learning content, such as e-books, in Bengali scripts and to disseminate those in schools. The National ICT policy aims to introduce ICT-related subjects in primary, secondary and tertiary levels of education, and to upgrade the curriculum in a regular time basis. It also proposes to set up a central online database of digitally developed learning materials, e-books and lesson-plans so that teachers as well as students can gain easy access to resources and find essential information. The policy

further recommends recruiting teachers in schools who have considerable ICT knowledge and skills. In addition, the policy advocates the preparation of appropriate learning materials to support the education of children with special needs (disabled children).

4.2.2 The National Education Policy-2010

The National Education Policy-2010 of Bangladesh also emphasizes the integration of ICT in the education system suggesting that ICT is one of the most important elements to lever the quality of education (Ministry of Education of Bangladesh [MOEBD], 2010). The first chapter of the policy (the Goals and Objectives of Education) consists of 30 general objectives of education in Bangladesh and the twenty-first objective is "to increase the use of information and communication technology as a teaching-learning tool in all levels of education" (p. 2). Accordingly, in chapter four 'Secondary Education', the policy proposes to introduce ICT as a compulsory subject in the secondary curriculum, and recommends the Government provides the necessary ICT infrastructure in schools. In order to prepare the teachers for teaching with and about ICT, in Chapter 24 'Teacher Training', it proposes to modernize the teacher education curriculum and syllabus with ICT knowledge and skills.

Moreover, there is a separate chapter on ICT education, Chapter 12: 'Information Technology Education', in which it is stated that ICT education can contribute to reducing the poverty of the country by preparing the pupils with effective skills to work abroad in ICT sectors and consequently to send remittance back to Bangladesh. Here, ICT is perceived as special knowledge that has the potential to reduce the country's poverty. It states two specific objectives of ICT education: firstly, preparing international standard ICT-experts, and secondly, giving importance not only to computer science, but also to a wide range of communication technologies, such as mobile and telecommunication technologies, radio, and television. In order to introduce ICT to the children, the policy recommends including ICT as a teaching-

learning tool within primary schools, and it proposes to include 'computer science' as a subject in the secondary curriculum for those students who want to further their study of ICT within the science discipline.

4.2.3 The Bachelor of Education Curriculum (B.Ed. Curriculum)

There are five learning areas stated in the Bachelor of Education Curriculum: professional studies, teaching studies, education studies, technology and research studies, and teaching practice (Ministry of Education of Bangladesh [MOEBD], 2005). The professional studies focus on developing the trainee teachers' "confidence and skill across all aspects of pedagogy including classroom management, giving instructions, lesson planning, questioning, group work and providing feedback to students" (MOEBD, p. 21). The teaching studies area involves pedagogical content knowledge of school subjects, while education studies include the knowledge of educational policy, theory and practice in Bangladesh context. The technology and research studies are a relatively new learning area introduced in 2006. This learning area includes two courses: Basic Computer Skills (BCS), and Action Research. While the former course aims "to develop basic computer skills for use in organizing and presenting information and for recording assessment data" (MOEBD, p. 22), the latter course's objective is "to examine Action Research methods and carry out and write up a small scale project on some aspect of teaching and learning" (MOEBD, p. 22). The fifth learning area of this curriculum is to provide the trainees with practical experiences through teaching practice in schools.

The B.Ed. curriculum perceives ICT as an essential teaching skill for upgrading teacher performance. The curriculum states that "In the rapidly changing IT environment of Bangladesh, it is essential that secondary teachers are able to use the computer to prepare written resources, store information and record data; and communicate and access information through the internet" (MOEBD, p. 60). It explains that ICT skills can enable teachers to prepare supplementary teaching-learning materials, to exchange information, knowledge and ideas, and to increase

students' participation in the classroom. Accordingly, the course content includes the skills of using a computer in a networked environment, saving, retrieving and printing a file document, producing word processed documents, using spreadsheets for calculations, sending and receiving email with attachments, and locating resources on the World Wide Web (WWW) using a search engine and evaluating and downloading resources for academic use.

The curriculum is prescriptive in nature because it identifies the concepts and skills of ICT to be taught to the trainee teachers. The prescribed concepts and skills include "computer, keyboard, network, logging in, software, floppy disk, printer, word-processing, spell-check, spreadsheet, managing file and folder, internet, email, www and search engine" (MOEBD, 2005, p. 61). The curriculum clearly instructs the educators to teach these concepts and skills. The curriculum does not allow flexibility for the educators to change or modify the ICT concepts or skills in the curriculum. In addition, the curriculum prescribes some of the teaching-learning methods including directed instruction, demonstration, 'hands on' activities, peer teaching, and 'trial and error' methods to teach the trainees about ICT skills, but it does not specify which approach to use for which content areas.

4.2.4 Critical analysis of the policy documents

According to the policy documents, ICT is a lever to lift the economic development, social progress, and educational advancement of Bangladesh. These perceptions are related to the vocational, social and pedagogical rationales explained by Hawkridge (1990) and Voogt (2008). Finger et. al. (2007) argue that the pedagogical use of ICT can be twofold: using ICT to support traditional educational practice, and using ICT to change educational practice. The pedagogical rationale of ICT in the Bangladeshi policies mainly emphasizes using ICT as a tool to support the existing teaching-learning practices, not to transform traditional practices with the innovative use of ICT. However, there are examples of more innovative teaching approaches associated with technology. For example, a mobile technology based teacher training

51

project was conducted in some rural parts of Bangladesh (Pouezevara & Khan, 2007) as a pilot project organized by the Asian Development Bank, a non-government agency. The objective of this project was to examine the possibility of a mobile learning approach in the Bangladeshi context, and it reported that mobile learning can be applied for training teachers in rural and remote areas in Bangladesh. Although the policy documents do not explicitly recommend mobile learning, there is an implicit instruction to conduct research on exploring the potential of ICT in the education sector in Bangladesh and presumably this extends to innovative and new approaches to teaching and learning.

4.3 Educators' experiences and understandings of ICT

The participant educators have diverse perceptions of ICT in education, particularly in relation to its role in teacher education programs. Their perceptions include what they believe ICT can contribute to education, what they know about how ICT contributes to education based on their experiences, how they practice ICT in their profession, and how their ICT use is influenced by their professional culture. Their perceptions are presented here under four broad themes: beliefs, knowledge, self-efficacy and professional culture. Although many of their perceptions coincide, the educators have different and sometimes conflicting views regarding ICT in initial teacher education. The results are presented under headings corresponding to these four broad themes: educators' beliefs in ICT, their knowledge about ICT, their confidence in using ICT, and the professional environment that influences the integration of ICT in their practice.

4.3.1 Educators' beliefs in ICT

Although ICT equipment, such as computers, mobile phones and multimedia, are not new to many Bangladeshi people, the concept of integrating ICT in education is a relatively new phenomenon to them. In 2010, the Government of Bangladesh developed a new education policy which introduces ICT as a separate learning area in secondary education and also in teacher education. Since this is a fresh concept in

Bangladesh, this study begins by investigating how the teacher educators define ICT in general, and ICT as a separate learning area, because understanding these can help conceptualize their beliefs in, knowledge about, and practices with, ICT in their profession.

ICT is a combination of hardware and software supported by humans

The participant educators have a common understanding that ICT is both electronic devices and the logic behind their functions. In answer to the question about what they mean by ICT, their answers were mostly about 'computers,' 'internet,' 'remote communication via electronic devices,' 'electronic processing of information,' all sorts of 'digital devices' in general like 'mobile phones.' The common view is that any electronic device that can help manipulate information and can present or communicate that information in a convenient way can be regarded as ICT. Raz generalizes the concept of ICTs as:

> …From my little wrist watch to the sophisticated computer
> systems, everything is part of ICT … (because) they give me
> some information I need.

While ICTs are viewed as communication technologies, most of the educators mention 'world wide web (WWW),' 'online,' 'internet,' 'social networks' as part of ICT. They believe that the WWW and internet are integrated features of ICT that contribute to communication and transformation of knowledge among people around the world.

Moreover, the majority of the educators recognised the importance of 'the logic' behind the devices that make them work as part of ICT. They identified 'software,' 'programming' and 'designing applications' to extend their ICT conceptions. Rosan, in this regard, explains that, "Nothing will work if there is no logic embedded within the ICT equipments…without software computers cannot work". In addition to

hardware and software, some educators emphasized the role of the people who operate these. As Abdal argues:

> If you consider ICT as a system, you cannot exclude the users or operators of these hardware and software. People are the most important element of ICT as well. … I would suggest that they (the users) are 'humanware'.

Here Abdal places importance on the people, or, as he describes it the 'humanware', who operate ICTs for specific purposes. This argument is also found in Munsar's explanation about effective use of ICT in education where he said, "These (ICTs) are lifeless objects… A teacher makes the meaningful use of these for their students".

Munsar's argument clearly highlights the vital role of people in making ICTs effective. This is particularly the case in the education sector, where, as he explains, teachers are considered the most important element for making meaningful use of ICT. Munsar also describes ICTs as 'lifeless objects', and suggests that teachers make them effective for academic purposes. In general, the educators understand ICTs as a combination of electronic hardware and software supported by human beings. However, the common understanding is that ICTs cannot be effective in schools without teachers' commitment in this regard.

The importance of teaching ICT in teacher education program

While the educators believe that teachers play the key role of implementing ICTs in schools, they argue that teachers should be given ICT related knowledge and skills for integrating ICT in education. They think that introducing ICT as a learning area in teacher education is important. Their rationales include developing teachers' personal skills and enriching their professional knowledge.

The educators consider that learning about ICT in teacher education is important because it gives the trainee teachers some opportunities to learn about operating the latest information technologies, such as computers. The importance of teaching ICT skills to the trainee teachers is supported by all of the educators. Considering the level of ICT knowledge of the Bangladeshi school teachers, the educators suggest that there is a need to teach ICT skills to the teachers. As Munsar says:

> The majority of the trainee teachers I taught in the last four
> years did not know how to operate computers ... I think it is
> important to teach them basic computer skills.

Here Munsar reports that the in-service school teachers who came for training to his institution had little knowledge about computers prior to arriving at the institution. This situation is also supported by another senior educator, Mozam, as he explains:

> Computers are new in Bangladesh. Many of our teachers do not
> know how to use computers and internet. ... It is crucial to
> include ICT skills as a learning area in our B.Ed. programs.

It is reported that the ICT related course in the B.Ed. program is an opportunity for these trainees to learn computer skills. Like Munsar and Mozam, all other participant educators affirm that teacher education programs should include ICT related courses to teach basic computer skills to ensure the teachers become ICT literate. Therefore, teaching about ICT in teacher preparation program is perceived as useful for developing the trainees' personal skills of using ICTs.

The educators also described the multi-modality facilities of ICTs that are helpful for teaching learning activities. They recognised that people learn in different ways, as Abdal states, "Some learn by seeing, some learn by listening and some by doing". He argues that ICTs support these multiple ways of learning at a time. He explains that:

55

Using ICT facilities, one can design learning materials where voice, pictures and videos can be integrated all together. This sort of material can be helpful for students with different learning needs.

Abdal's argument of ICT's support for multi-modality facilities was supported by most of the other educators, including Muhin, Manto, Habil, Mozaf, Munsar and Rosan. They agree that ICTs can be used to support different ways of learning. Furthermore, Rosan thinks that ICT is better than any other traditional teaching tools because it is flexible for designing teaching-learning materials. He says:

ICT is better than our traditional chalkboards, paper-posters, audio-record player and other teaching materials that we use to teach our students, because ICT combines multiple mediums of communication, such as colourful images, sounds, and animations.

Rosan here compares ICTs with traditional teaching tools. He explains that traditional tools such as posters and audio players mostly support one way of learning, such as visual or auditory, and rarely two or more modalities. On the other hand, audio, visual and kinetic modalities can be integrated using ICTs. This is another reason that the educators find ICT important for teachers.

All of the educators further see ICT as a means of enriching the trainees' knowledge and developing their professional quality. They think that by using ICT facilities, particularly the internet and the World Wide Web (www), teachers can access necessary information for increasing their knowledge base. It is argued that they can enhance their knowledge by finding relevant information on the web and by communicating with others through the internet. Moreover, the online communication facilities, such as email, blogs, wikis and social networks, enable teachers to share their ideas, and in this way, they can elevate their quality of

professional practices. These benefits of online communication were mentioned by Abdal, Manto, Habil, Didal, Muhin, Munsar and Bipul. Habil, in this regard, noted that social networks mean that teachers "can produce collaborative knowledge that can fit in their context". Therefore, the educators agree that teaching the trainees about learning with ICT is a valuable learning area in a teacher education program because it can give them opportunities to create collaborative knowledge which will enhance the quality of the graduates.

The importance of ICT in educators' professional development

Some of the educators also see ICT as a means of developing their own professional knowledge and the quality of their performances as teacher educators. They argue that they develop their knowledge from different sources on the web. Social network facilities and email services provide them with opportunities to construct their own knowledge and enhance their skills through independent professional learning.

Several of the educators described the process of becoming a teacher educator within the context of Bangladesh and argued that ICT enhances their professional knowledge as educators. In Bangladesh, there is little formal education or training for becoming a teacher educator. The requirements of becoming a teacher educator in Bangladesh include having a postgraduate degree along with a one year diploma in teaching and learning, or having a bachelor degree in Education (Honours). The fresh postgraduate students having good academic results are generally appointed as teacher educators in the teachers' training colleges through some public examination and recruitment procedures. Often these newly appointed educators have little or no teaching experience. Besides this, at times some lecturers or professors from general colleges are transferred to the teachers' training colleges as educators. Although they have no experience of teaching in the school sector, they are responsible to train the school teachers. Muhin (who had no experience in a school), says that:

... Although I have been working here for more than four years, I was not trained in how to train the school teachers. ... At the beginning, I used to observe the senior educators to see how they take classes; I talked to them about how to teach the teachers in an effective way. I used to read the books locally available here. ... In this way I tried to prepare myself as an educator. But, now I have got internet; I can find updated information about teacher education on the web and can develop myself.

Here Muhin asserts that ICT helps him to fill the lack of his professional knowledge, so he suggests that ICT can be useful to educators who need updated knowledge for developing the quality of their skills. Some of the educators take this idea further and perceive ICT as a virtual mentor for them. They argue that by browsing the web they often find necessary information that helps them to prepare learning materials using current information. In this regard, Munsar asserts that:

Whenever I get any confusion about any idea or concept, I first remember the internet ... there are many free books, journals, articles, newspapers etc. on internet ... these help me to develop my knowledge base.

Like Munsar, the majority of the participating educators believe that the internet has been a good support for them in finding the information they require, while some of the educators appreciate the support of ICTs for providing them with the latest information. Some of them expressed their concerns about the reliability and usability of the available information on the web. A senior educator Manto expresses his concern as:

We need to be very selective while searching information online. Not all information can be applicable for us. For

example, you cannot necessarily apply the developed countries'

practices of ICT integration in the developing countries'

classrooms. They have different perspectives, different

situations. If you read something online, and try to infuse the

ideas in your classrooms, it may cause more complexities.

While Manto is critical about the appropriateness of the information and its applicability within the Bangladeshi context, some other educators think that the available information on the web is still helpful for them because it keeps them up-to-date with the practices of ICT in teacher education around the world and how ICT is being integrated for this purpose. Accordingly, the educators perceive that ICT is important for them because it is helping them to develop their professional knowledge where necessary.

Therefore, the educators consider that learning about ICT is important for both the trainee teachers and the educators themselves because it supports enhancing their knowledge and developing their quality relevant to their profession.

The purpose of ICT in teacher education

Besides acknowledging the importance of preparing teachers for using ICTs for academic purposes, the educators suggest some specific objectives that may guide designing and implementing ICT courses in teacher education programs.

While describing the purposes of integrating ICT in education, Manto, Muhin, and Habil distinguish two terms that they think are often confusing to non-professional people: 'ICT Education' and 'ICT *in* Education'. They define the former term as learning about and developing ICT skills, such as word processor, spreadsheet, database, PowerPoint and internet browsing. On the other hand, they describe the latter term as using ICT skills for supporting teaching and learning processes. Manto explains these concepts as:

59

Knowing what Google is and how to search information in
Google is 'ICT Education'; whereas, using Google for
developing your professional knowledge is 'ICT in Education'.
If I join in a social network with my colleagues and we share
ideas among us, this is 'ICT in Education'.

After distinguishing between these two terms he emphasizes that teacher education
should focus on the pedagogical use of ICTs, i.e. 'ICT in Education', so that trainee
teachers can use ICTs for teaching practices. However, considering the ICT skills
level of Bangladeshi teachers, Manto, Muhin and Hanil agree that teacher education
in Bangladesh at present should include both ICT skills and pedagogical knowledge
of ICT.

The majority of the participating educators consider ICTs as sophisticated tools that
can be used for instructional purposes. Consequently, they considered that one
purpose of integrating ICT in education is to support teaching strategies. For
example, Raz stated: "Teachers can use multimedia for presenting their lessons in
more attractive way". Similarly, Habil says that teachers can use computer facilities
to prepare "teaching materials, such as slide-presentations and handouts". A central
thought is that ICT can be introduced in teacher education as a tool for instructing
the students.

Some educators gave further consideration to learning through ICT and they suggest
introducing ICT not only as a tool but also as a medium of learning. Bipul, for
instance, states that: "We can learn different things when we browse on the web". He
sees the web as a medium of learning. Similarly, Manto and Bipul point to social
networks such as 'Facebook'; Didal and Habil describe 'email and group-mail';
Abdal and Muhin mention 'blogs and wikis' in order to indicate the characteristics of
ICT as a medium of learning and creating knowledge. Therefore, the educators also
suggest that ICT should also be introduced to the trainee teachers as a medium of
learning.

Furthermore, Munsar believes that the purpose of ICT education in teacher preparation can be twofold, as he says: "bringing ICT to education" and "bringing education to ICT". He explains the former objective as the trainee teachers can learn how to use the features of ICT for educational purposes. For this purpose, he argues that teachers need to know about the skills of ICTs so that they can use ICTs for teaching-learning activities. At the same time, he explains the latter objective as the education system can also be modified with ICT facilities. He argues that with the help of ICT facilities, education is becoming "more accessible for anyone from anywhere at any time". He mentioned "mobile learning" and "online distance education programs" in this regard, and stated that "ICT has opened windows of new forms of education" that the existing traditional education system of Bangladesh does not yet have. Therefore, he argues that the trainee teachers should also learn how ICTs can be used to transform education in more flexible ways.

4.3.2 Educators' knowledge of teaching about and with ICT

After investigating the educators' beliefs about the importance of integrating ICT in education and some purposes of this in teacher education in particular, the researcher focused on exploring their knowledge of what to teach about ICT and how to teach with ICT in teacher preparation programs. In this section, the educators' knowledge of teaching about and with ICT is presented.

Educators' knowledge of teaching about ICT

The educators' opinions about the purpose of ICT in teacher education clearly support trainees learning about ICT skills to enhance their teaching capability and efficiency. They argue that teachers must learn some ICT skills before they can use ICT in schools. Therefore, the researcher was interested to explore what skills the educators suggest the trainees should learn, and the reasons for these choices. The educators agree on some of these points but also offer a range of views.

The trainee teachers learn ICT skills through a course called Basic Computer Skills. According to the B.Ed. curriculum, this course aims to provide "instruction and direct experience to enable trainees to develop basic computer skills for upgrading teacher performance" (MOEBD, 2005, p. 59). The skills that the curriculum prescribes include basic operational control of computers, such as saving documents and retrieving them from a hard drive or a networked computer, and manipulating and printing documents. In addition to this, trainees are expected to master word processing to produce learning materials to supplement textbooks. The ability to use spreadsheets for keeping student records, and computing those for academic purposes is considered a useful skill. Moreover, using the internet for locating and downloading useful resources is identified as an important skill for improving teachers' professional knowledge. Furthermore, a capability to "send and receive emails with attachments" is perceived as a crucial proficiency in order to "share teaching-learning resources with colleagues and authorities" (MOEBD, 2005, p. 59-60). The ability to use the internet is perceived as critical for both enhancing individuals' professional knowledge and developing a sense of community of practice.

Clearly, the skills to be taught in the B.Ed. program in Bangladesh are defined in the curriculum as learning about word processors, spreadsheets and communicating through the internet. Although the B.Ed. curriculum clearly prescribes some specific ICT skills that the trainees must learn, the participating educators have different views about the content of the ICT curriculum. Some educators suggest including more skill based knowledge, others suggest excluding a few topics and replacing them with contemporary skills, such as blogs, wikis and online forums; and others consider that the existing content is appropriate.

The majority of the educators suggest that the trainee teachers should learn how to present information in an attractive and effective way using electronic presentations

and multimedia projectors. They consider that the ICT curriculum should include the knowledge and skills of PowerPoint and operating multimedia facilities.

Manto points out that the 21st century is experiencing ubiquitous uses of ICTs in almost all sectors of people's lives. People are becoming more connected around the world, and as he adds, ICTs are the key instruments that are connecting people. He states:

> A new form of socialization is emerging, where people are
> connected with each other through the internet. If one fails to
> communicate, s/he will fall behind others and become isolated.
> Our students need to know how to be connected with people
> around the world via ICT supports.

Accordingly, Manto argues that some knowledge about social networks can be valuable for the trainees. Didal held similar views about learning to be connected with people to share ideas online. He believed that teachers should communicate with each other to share and upgrade their knowledge, so that they could be taught how to become connected online. Although Didal does not explicitly speak about social networks, he implicitly supports that learning about social networks can be a part of B.Ed. ICT curriculum. However, Mozaf suggests that if someone can use email, they will be able to use social networks, consequently he does not consider social networks as a necessary part of the ICT curriculum. Therefore, including knowledge about social networking strategies in the B.Ed. curriculum appears to be controversial.

On the other hand, some educators question the importance of teaching these skills in a postgraduate qualification like B.Ed. For example, Habil contends that:

Teaching about ICT skills is waste of time in B.Ed. program,
because our focus here should be to teach them the pedagogical
use of ICTs, not the technological skills.

Habil argues that a teacher preparation program should mostly focus on teaching
with ICT rather than teaching about ICT. Other educators like Manto, Muhin and
Bipul support Habil's view, and affirm that trainees are expected to learn how to use
ICT skills for academic purpose. Manto states:

If the trainees feel that they need to learn ICT for their work,
they will learn it anyhow. The important thing is to teach them
how to teach with ICT, because if they realize the benefits of
ICT, they will learn it and use it in schools. Otherwise, if they
are given so many ICT skills, but they are not taught how to use
those skills in their profession, they will eventually forget the
skills.

Here Manto emphasizes the applied knowledge of ICT in education, and suggests
teaching ICT skills while applying those in educational activities.

Although Habil and Manto are critical about the ICT curriculum in the B.Ed.
program, other educators think that the curriculum is appropriate and reasonable
considering the existing context of Bangladesh. For example, Rosan and Raz believe
that the extant ICT curriculum is good and sufficient for the trainee teachers, because
it gives them necessary basic skills to work with computers. Considering the context
of Bangladesh where most of the school teachers have little experience of using
computers, they agree that the course content is appropriate for the teachers, because
they need to know how to operate computers including a sound knowledge of word
processors, spreadsheets and internet browsing.

While some educators agree with the prescribed ICT skills, some other educators suggest increasing class time for teaching the ICT course. For example, Muhin, Raz, Abdal, Bipul and Munsar think that the content of this course is too big to complete in the prescribed time. The prescribed time for teaching this course is 45 minutes, four days a week for a whole year. They claim that for most of the trainees it is their first chance to learn about computers, so they take more time to learn a skill than is expected. As a result, Muhin states: "it is difficult and sometimes not possible to teach them all skills during the allocated time". He, therefore, suggests increasing the allocated time for this subject. Bipul, Raz, and Munsar hold similar views to Muhin, indicating a need for extending the class time for teaching ICT skills.

Educators' knowledge of teaching with ICT

The educators consider that pedagogy is the centre of the teacher education programs and they believe that ICT courses in these programs need to address teaching-learning strategies. Although the educators agreed that learning some ICT skills is fundamental for the trainee teachers, there is a debate about whether ICT skills should be taught separately (as currently offered in the subject called Basic Computer Skills) or whether ICT should be integrated in all other subjects. Some educators support the Basic Computer Skills course and argue that the trainees should learn ICT skills in a separate course, because they need to be confident in using the technologies themselves before they teach their students. For example, Rosan argues that:

> As most of the trainees do not have previous experience of working with computers, a separate course would be helpful for learning the skills.

In a similar vein Mozaf explains that the trainees need to be confident in using computers before they use them in classrooms. However, Manto and Habil counter this approach and argue that learning ICT skills through cross-curricular experiences

65

are more helpful then teaching these separately. They explain that ICT skills can be included in all B.Ed. courses, and the trainees can learn ICT skills while learning their teaching subjects. Manto and Habil question the benefit of ICT courses isolated from pedagogical practice. Manto says:

> One can learn ICT skills in some ICT training institutes... It is of no worth to teach only ICT skills in a teacher education program like the B.Ed. because the B.Ed. aims to prepare skilled teachers for academic purposes, and for other purposes. Creating ICT users should not be the purpose of ICT courses in the B.Ed. In fact, ICT courses in the B.Ed. programs should focus on how the ICT skill can be used to support students' learning in a better way.

On the other hand, Mozaf points that there is a lack of ICT expert educators in the teachers' training colleges, so it may be difficult to find sufficient teachers who can teach ICT through cross-curricular use. The lack of computer knowledge of the educators is identified as a potential barrier to cross-curricular use of ICT.

Acknowledging their different approaches to teaching ICT skills, the educators consider that ICT can contribute to improving teacher preparation programs. They have a positive belief about integrating ICT in teacher preparation programs. They believe that ICTs can be used to motivate the trainee teachers by gaining their attention, engaging them in productive works and presenting visual illustrations of learning contents.

Although a majority of the educators think that ICT can motivate the trainee's learning, some educators questioned the ways ICT is being used and taught in teacher education programs. For example, Abdal states:

Our trainee teachers are all graduates. They have a good
knowledge base of their subject's contents. ICT may have little
influence in teaching them some content knowledge.

Manto pointed out that the trainee teachers are all adults and they learn in different ways to children. While children need to be motivated to learn, adults are generally self-motivated and self-directed towards learning. Referring to the adult learning theories, he argued that the trainees have their own motivation for learning, and they can direct their own learning. He argued:

The trainee teachers want to learn something that can fit into
their real life purposes. … They can use their ICT knowledge
for preparing lesson plans and attractive teaching materials
containing colourful images.

Manto explains that the trainee teachers should be taught ICT skills in relation to their practical professional work. He believes that if the trainees are shown how ICT can be useful for their real work, they will be self-motivated to learn it spontaneously.

The educators also identify ways that ICT supports different instructional strategies. Some educators asserted that ICT can be used to instruct the students for learning both individually and collaboratively. Bipul described learning software available in the market place that can supplement textbooks to teach children. He added that:

There are some playful programs that guide children to learn
alphabets, word-making, arithmetic and so on. … We can show
our trainees how to use these for teaching children.

Some of the educators also expressed the opinion that ICT facilities can be used to teach the trainees in a constructivist way. Didal thought that adult students can be

encouraged to learn through ICTs in a collaborative way. He suggests using social networking for teaching the trainees. He explained the collaborative learning approach:

> We can create some group-email addresses for them, and as an educator I can also be a member of these groups. Then, I can raise a question in the group-mail and they will answer individually. They will be allowed to argue against each other. For example, I can pose a question like 'What is the importance of ICT in your teaching practice?' Each one will answer this question, and will debate it. In this way they will construct their own knowledge and learn from each other.

Didal argues that ICT facilities support a constructivist teaching-learning approach. Accordingly he suggests teaching email skills for group discussions and collaborative education.

Some of the educators argued that ICTs can be integrated for 'problem-based learning' and 'learning by doing' activities while teaching ICT skills. For example, Abdal studied in Mathematics, and he narrated his strategy:

> I give them a problem that they will solve using computers. For example, I write a mathematical equation on the board and ask them to write that into the computer. They read help files; discuss amongst themselves or ask help from me for the tricky things - such as writing superscripts and subscripts. In this way, while writing a mathematical equation, they learn superscript and subscript skills.

Abdal adopts a strategy of just-in-time learning, that is, the trainees learn some skills when they need them for a real purpose. In this example, the trainees learn how to

use superscripts when they are writing a mathematic equation. This instruction is also 'student-centred' because the trainees learn skills spontaneously and independently. Abdal thinks this strategy helps the trainees to learn ICT skills effectively. Conversely, Habil adopts a technicist strategy where he demonstrates every ICT skill to the trainees and then asks them to try that skill individually. He describes his practice as "I demonstrate to them how to create a table, and they do it individually". Here, Habil's strategy can be considered as a 'just-in-case' approach because the trainees are learning individual ICT skills in isolation. This strategy represents a teacher-centred instruction because the educator prescribes their learning.

Similar to Habil, Raz adopts a teacher-centred approach followed by a student-centred activity. He first demonstrates a skill using a computer multimedia system, and then he divides the trainees into groups and instructs them to work together and help each other to learn the skill. Bipul, Rosan, Munsar and Mozaf also iterated that in most of their classes they follow this strategy, that is, demonstration followed by group work.

4.3.3 Educators' confidence in integrating ICT into their practice

This theme is developed on the basis of the participating educators' feeling about the use of ICT for teaching-learning purposes. During the interviews the educators described the ways they used ICT in their profession. They expressed their confidence, confusions, concerns, issues and challenges faced while teaching about and with ICT to the trainee teachers. These are accumulated under this section to present what enables or inhibits the educators to integrate ICT in their practice.

Educators' early education has influence in their ICT practice

Although the participant educators are teaching ICT skills to the trainees, very few of them have any professional training or education on integrating ICT in education. They use their general knowledge and experience and understandings to teach ICT.

This knowledge is developed from their previous academic education and personal experiences about using computers. The technological (ICT) knowledge of the participant educators is varied. While all of them have knowledge of basic computer skills (e.g. file saving, printing, word-processing, spreadsheet, PowerPoint and internet browsing), a few educators have advanced knowledge of programming languages (e.g. Visual Basic). The educators have had little formal training or education in the academic use of ICT and they are largely self-taught which stems from their own interest and endeavours to learn about computers and their operation.

Among the ten participating educators, six educators studied science related subjects at tertiary level including Agriculture (Muhin), Mathematics (Abdal and Munsar), Physics (Manto and Mozam), and Psychology (Rosan), while the others studied Social Science and Humanities related subjects, such as Bengali Literature (Raz), Education (Bipul and Didal) and Political Science (Habil). The educators with a background in science disciplines said that they had completed some compulsory computing courses during their study; whereas, the other educators had little or no exposure to computers during their academic courses. The group with science-related backgrounds was more confident about teaching ICT skills because of their experiences than those with non-science backgrounds. For example, Muhin studied in Agriculture and had completed some computing courses during his study. He was confident in teaching ICT skills to the trainees. He said:

> I know the computer skills as mentioned in the curriculum, so it was not difficult at all for me to teach the BCS (Basic Computer Skills) course.

On the other hand, Raz studied Bengali Literature and had no academic courses related to the computer. Raz developed his computer skills through self-study with the help of friends and colleagues. Initially he was less confident in teaching the BCS. Raz remembered his early days of teaching that subject as:

It was a challenge for me. I was a bit worried about whether I
would be able to teach computer skills to them (the trainees). I
practiced the skills (e.g. Word, Excel) a lot before going to the
classroom.

Although the educators said that their previous knowledge about ICT influenced
their confidence, all the educators agreed that their self-study about ICT was critical
in teaching ICT skills to the B.Ed. trainees. Regardless of their prior experiences, all
of the educators recognised the need for ongoing learning in this area and they
adopted different strategies (e.g. self-study, peer work) to prepare themselves to
teach the trainees about ICT.

ICT is not a specialist subject

There is a view among most of the participant educators that ICT is not a specialist
subject, because they think anyone who can use a computer can teach ICT skills. The
ten participant educators have different subject backgrounds and different prior
experiences with computers. They also have different skill levels and yet all were
able to take responsibility for teaching the ICT course. Rosan stated: "As I knew
some computer skills, I was assigned to take ICT class". This is also true for the
other educators. However, some educators think that ICT-expert educators should be
appointed for teaching this subject. For example, Mozam said:

Different educators are teaching ICT in different way, and it is
because they do not have proper ICT education or training. This
may have an effect on the trainees' quality of ICT learning.

He believes ICT should be taught by expert and trained educators in order to
implement the goals of the course as stated in the curriculum. He explains that the
curriculum suggests teaching the trainees about spreadsheets so that they can use
these for preparing students' results and preserving records, but some educators may

not have enough knowledge about how to do these tasks using spreadsheets, and, consequently, the trainee teachers will not develop sufficient knowledge to accomplish those tasks in schools. Similarly, Manto supports the idea that educators who teach the ICT course must have specialist knowledge of teaching with ICT. He adds that since ICT is rapidly changing, a general educator may find it difficult to keep up-to-date with new technologies. Therefore, he argues that if some ICT-specialist educators are appointed, they will be able to adopt and teach new technological knowledge to the trainee teachers.

Affective dimensions

Although concern was expressed about the educators' knowledge and proficiency, the educators feel confident when they see their trainee students successfully operating computers. As Raz says:

> Many trainees did not know about computers before they
> enrolled here. At the end of the year, when I see them working
> with computer, I feel that I have been successful.

This feeling of success give them confidence that they are teaching the right way. While some educators find themselves confident in teaching ICT, a few of them find it overwhelming. These educators claim that often ICT gets more attention than the main subject content. Didal says:

> Sometimes, when I present the trainees with some information
> using PowerPoint, it seems like they are more interested in the
> attractive slides than the content in it.

He thinks the reason behind it is that because the trainees are learning new ICT skills, they focus on how to learn to use the technology for their teaching purpose rather than the content of the lesson.

Some educators think that ICT can be a disempowering element for some educators and teachers. They argue that senior educators are proficient and confident in their existing experience and knowledge. They often are less efficient in using ICTs than their younger colleagues, so they may not be as successful in teaching with ICT as they are comfortable with traditional teaching tools. As a result they may feel disempowered while teaching with ICTs.

4.3.4 Educators' professional culture

The integration of ICT in teacher education is influenced by the professional culture of the teachers' training colleges. The educators mention that several elements of their professional environment influence the integration of ICT in their training institutes. These elements include the physical facilities, available infrastructure, resources, administrative supports and educators' attitude towards ICT in education. This section presents the educators' opinions about how their professional culture affects their practice of ICT.

Muhin, Habil, Manto, Bipul and Raz identify that there are some other educators in the TTC who do not appreciate the benefits of teaching with ICT and who do not think it is essential for them to teach the trainees about ICT. These other educators are not interested in learning about or using ICT in their classes. The participants in this study argue that all educators should be involved in ICT implementation strategies to promote consistent ICT integration in the TTC classrooms and beyond into school classrooms. They argue that it is important for all educators in the institution to demonstrate a positive attitude towards ICT otherwise, ICT cannot be implemented successfully. For example, Habil believes that, "If some educators use ICT and some do not, there will be a divide among the educators and ICT will not be successfully implemented in the TTC". Similarly, Manto suggests that it is important to assess whether all the educators really want to use ICT in their classroom or not. He states:

If a good computer system is provided to the educators, and if
they do not want to use that system, that system will not work.

Manto argues that ICT cannot take place in classroom if the educators do not believe
in ICT's potential in supporting both teaching and learning processes. Similarly,
Muhin and Habil also emphasize that a positive attitude towards ICT needs to be
cultivated amongst the educators' circle. The educators also suggest some ways that
can help to develop positive attitudes in this regard. For example, Raz points out that
appropriate knowledge of teaching with ICT in the classroom can help grow positive
attitudes. For this purpose, he demands adequate training in both ICT skills and its
academic applications for the educators. In addition, Habil thinks that providing
some successful evidence of using ICT in classroom can also contribute to
developing educators' positive attitudes.

The educators also consider a professional culture of collaborative work among the
educators is important for developing appropriate knowledge and experience of
successful use of ICT. In this regard, Didal suggests that the Government could
support online forums for educators and teachers to share ideas and resources. Raz
also advocated the value of personal meetings with friends and colleagues for
discussing and practicing ICT skills and for conceptualizing ICT's application in
education.

Some external reinforcements are also considered as helpful to encourage educators
to use ICTs. Manto argues that some incentives can be given to the educators and
teachers to encourage them to integrate ICT in their profession. He explains that
teachers are accustomed to using the traditional teaching tools, and that they are less
likely to leave their traditional practice and to adopt new ICT tools, because adopting
new skills requires extra time and a new approach. In order to motivate them to work
with ICT, incentives such as monetary compensation or social recognition might be
effective. Manto further suggests that financial rewards or acknowledging educators'

work in academic circles can be good motivations for the educators and will increase their interest in using ICT in their practice.

The availability of physical facilities, infrastructure and relevant ICT resources are also articulated as critical by the educators to ensure the integration of ICT in education. All of the educators pointed out that ICT rich classrooms are essential for preparing the trainees to use ICT facilities. An ICT rich classroom is described by Didal as having "sufficient computers with internet connection, multimedia facilities, and appropriate software" for all trainee teachers. As well as this, Manto spoke of "a digital white board" which is similar to a big touch-screen computer that can be used to show information, images and videos and can be written on by the teachers and student. However, the educators consider that a lack of these facilities can hinder the integration of ICT in teacher education. For example, Bipul states that there is a lack of computers in his college:

> Two or three trainees share a computer to work with in a class, so some trainees work on the computer and others watch them working. … Some are learning by doing, and some are learning by watching.

He accordingly believes that a lack of computers is a barrier to learning ICT skills. Similarly, Munsar points out that that access to the internet should be available to all trainees in the class to prepare them to use internet facilities. Furthermore, Manto argues for an appropriate 'infrastructure' and 'platform' for both the educators and the teachers from where they can communicate and share their knowledge. He explains 'infrastructure' as "computers with a robust internet connection" and 'platform' as a "common place from where they can raise their voice, share ideas and demand changes" for their purpose. Manto indicates the importance of establishing social networks for teachers and educators from where their voices can be cumulated to influence policy making in regards of ICT in education.

75

Additionally some of the educators consider that government-level support is also important for building an ICT infrastructure. Mozam iterates that "financial support from the Government" is essential in this regard, because the institutions cannot afford to buy expensive ICT equipment. He also argues that the Government should instruct the educators and school teachers to use ICT so that they would feel some pressure to implement it in the classroom. Similarly, Rosan also believes that the government from the top level should develop policies and strategies for motivating and influencing teachers to use ICT in education. He also suggests recruiting educators and teachers who have considerable knowledge about ICT. Besides this, he proposes that "The Government can give some one-off incentives to the in-service teachers who will learn ICT skills," because he believes that this can motivate in-service teachers to adopt ICTs in their practice". Both Mozam and Rosan consider a 'top-down' strategy to integrate ICT in education. However, Manto disagrees with the top-down strategy, and argues for a "demand pull" strategy where the teachers should be "self-motivated and self-empowered" to accept ICT. As he explains:

> Teachers learn what they need to learn. If they find ICT is
> helpful for them, they will be self-motivated to learn ICT. Again
> they should have freedom for their learning. They should be
> empowered to decide what ICT skills are worthwhile for them.

Manto points to a 'bottom-up' strategy for integrating ICT in education, because he thinks teachers' demand for ICT facilities in classrooms can accelerate the integration of ICT. However, he recognizes that the Government's supports for providing ICT devices are critical for this purpose. Therefore, the educators consider both 'top-down' and 'bottom-up' strategies important for integrating ICT in education.

Most of the educators also reported that it was important to keep the ICT devices running reliably, providing sufficient computers and ensuring robust internet connections for the successful implementation of the ICT curriculum in the teacher

education programs. Some educators emphasized a need for yearly budgets for maintenance and servicing of the ICT resources and infrastructure as crucial for the sustainable integration of ICT in the education sector. Abdal, Rosan, Bipul and Habil point out that often computers are broken and are not serviced due to lack of financial support. That is why Didal emphatically believes that a yearly budget is essential for maintaining ICT devices and buying new software for academic purposes.

4.4. Summary

This study explores teacher educators' experiences and understandings of ICT in teacher education programs. The interview data from ten Bangladeshi educators were analyzed and presented in this chapter. It is understood that educators' personal beliefs in ICT guide their knowledge of teaching about and with ICT. Their knowledge and experience appears to influence their self-efficacy and confidence in using ICT in education. Along with beliefs, knowledge and self-efficacy, educators' professional environment, available physical facilities and infrastructure influence their adoption of ICT.

The educators perceive that ICT provides many relative benefits over traditional teaching-learning activities, such as multi-modal facilities, multiple communication mediums, a wider source of knowledge on the web comparing to traditional textbooks, and new opportunities of develop knowledge and skills. Contrary to this, a few educators regard ICT as overwhelming and disempowering to some extent. However, all the educators believe that teachers play a vital role for integrating ICT in education so teachers should be prepared for using ICT. Accordingly, the purposes of ICT in teacher education have been considered as learning ICT as skills, as tools for teaching and learning, and as a medium of transforming education with the support of ICTs.

The educators' positive beliefs in ICT lead them to acquire knowledge of learning about and with ICT. Although they agree about learning software applications like word processing, spreadsheets, electronic presentations and internet browsing, there is some debate amongst the educators about the learning value of social networking. While some argue for teaching these skills as a separate subject, others argue for teaching these skills through cross-curricular activities. Besides these, the educators express a range of views about teaching with ICT. While some educators apply directed or teacher-centred instructional strategies, others employ constructivist or student-centred instructional strategies, and some others use peer-tutoring strategies in some cases.

The educators also consider self-efficacy and confidence critical for teaching about and with ICT. A lack of knowledge about ICT decreases their self-efficacy and confidence. They consider adequate training, sufficient practice and evidence of successful ICT approaches helpful for increasing their confidence in this regard.

Finally, the educators perceive the supports from their professional culture and environment as crucial for successful integration of ICT in education. Although some educators consider the top-down strategy critical for this purpose, others emphasize a 'bottom-up' approach with support of higher authority. The physical facilities, teachers' attitudes and a like-minded community of practice are also perceived important in the integration of ICT in education.

CHAPTER 5

Discussion

5.1 Introduction

The preceding chapter reported on the presentation and analysis of the data gathered for this study. This chapter presents a summary of the study, discussion of findings, implications for practice, recommendations for further research, and conclusions. The following sections expand upon the concepts that were explored in the data with an effort to offer a further understanding of their potential influence on ICT in teacher education programs, and to present suggestions for further studies.

5.2 Summary of the study

This study explored the Bangladeshi teacher educators' perspectives of information and communication technology in education. The research question asked:

What are the educators' experiences and understandings of ICT within the B.Ed. teacher preparation program in Bangladesh?

Consequently, four complementary questions were defined to answer the research question:

1. What are the educators' beliefs about ICT in education?
2. How do the educators address the aims of ICT education in their practice?
3. What do the educators perceive as the key issues in implementing the ICT curriculum?
4. What are the educators' suggestions to improve the teaching of the ICT component in the B.Ed. program?

In order to answer these questions, 10 educators were interviewed, and the results presented in Chapter 4 show that the educators have both personal and pedagogical beliefs about ICT that guides them to use ICT in education. The educators hold a variety of views of learning about and with ICT and how ICT can be used in classroom activities. There are some factors that influence their confidence in implementing ICT in the classrooms, and they have suggested some ideas and issues to be addressed for integrating ICT in the teacher education programs. This chapter will discuss those findings in relation to the literature and the particular context of teacher education in Bangladesh.

5.3 Discussion of the findings

The discussion in this section responds to the four complementary research questions.

5.3.1 Educators' perceptions of ICT in education

This section discusses some of the key beliefs about ICT expressed by the educators in relation to the first sub-question: What are the educators' beliefs about ICT in education? The following themes emerged in relation to this question.

ICT is more than a teaching-learning tool

The Bangladesh policy documents regarding ICT in education present ICT as an effective tool that can enhance the quality of education by supporting students to learn subject content in meaningful ways. The policy documents state that ICT can be used to present content knowledge attractively and that multimedia can motivate students to learn. There is a tendency within the documents to focus on ICT as a teaching-learning tool to enhance the quality of traditional educational approaches. The policy documents support learning about and with ICT, but they do not seem to emphasise the potential of ICT to change the way students learn. ICT has the

potential to change the way students learn and this is often described as 'learning through ICT' (Cook, 2010; Finger et al., 2007).

The educators in this study believe that ICT can support not only meaningful learning for individual students but also a range of collaborative and constructive teaching-learning activities. Some of the educators described how online group discussion can provide a novel platform for knowledge construction, presentation and sharing ideas. While, the policy documents present a relatively limited view of how ICT can support students' learning, the educators expressed their belief in the broader potential of ICT in education. Romeo and Russell (2010) note that teachers' opinions need to be reflected in the policies for a successful integration of ICT in education. Therefore, the Bangladeshi educators' beliefs in ICT as more than a teaching-learning tool could be influential in the further development of the national policies and they could also make valuable contributions to the revision of the curriculum to embrace some of the more progressive views of ICT.

ICT provides relative advantages over traditional teaching tools

The reason for using ICT in the classroom is an important question to be addressed before providing computers in schools. Roblyer and Doering (2010) point out that teachers' understanding of how ICT can contribute to their practice is important for successful implementation of ICT in the classrooms. In Bangladesh, both the policy documents and the educators perceive the relative advantages of ICT over traditional teaching tools. Traditionally the educators use chalk-board, posters and some locally available, often handmade, teaching materials. These materials are often less interactive and less motivating than digital technologies; whereas, ICT supports multiple types of interactions simultaneously, such as seeing, listening and interacting together. Moreover, the reusability feature of digitally developed teaching-learning materials is another reason the educators appreciate using ICT in classrooms. Using ICT instead of traditional teaching tools requires some attitudinal and behavioural change, and Rogers (2004) notes that people are often reluctant to

change their way of doing things, even if new ways are better than the traditional ways. However, people are more likely to change their approaches if they clearly understand the benefits of new concepts, strategies and tools (Roblyer & Doering, 2010). Since the Bangladeshi policy documents and the educators identify relative benefits of ICT over traditional teaching-learning tools, there is an expectation that ICT will begin to be implemented more in Bangladeshi classrooms.

Teachers are key-agents to integrate ICT

The Bangladeshi educators believe that teachers are critical to the process of the integration of ICT in education. Although they understand ICT is a combination of different hardware and software, they count 'humanware' (i.e. the people who operate ICT, particularly the teachers in educational settings) as key to the successful use of the hardware and software. This understanding that teachers are key players in the successful integration of ICT in the classrooms is widely supported. For example, Ertmer and Ottenbreit-Leftwich (2010) argue that teachers are the 'key agent' of implementing ICT in educational settings, and any initiative of incorporating ICT in classrooms should first consider whether teachers understand the pivotal role they play. Teachers should believe that ICT will not replace them, and they are more important than technologies (Li, 2007). Some teachers are afraid of ICT because they think ICT may replace them and this fear often creates a feeling of disempowerment in teachers' minds (Li, 2007). Therefore, Li suggests that teachers' beliefs in their own importance concerning ICT are important for the successful implementation of ICT in schools. Hence, the Bangladeshi educators' perception of the critical role of teachers should be considered a positive indicator or sign to the successful integration of ICT in Bangladeshi classrooms.

ICT is a virtual mentor to the teacher educators:

The participant Bangladeshi educators perceive ICT as an opportunity for them to develop their professional knowledge and skills. As described earlier in the results chapter, there is little formal education for preparing the teacher educators;

consequently it is the educator's own responsibility to become a teacher of the teachers. O'Sullivan (2010) points out that the preparation of teacher educators in most countries tends to be 'ad hoc' or informal, and the newly appointed educators take personal responsibility to become the teacher educators. Like Bangladesh, in many countries, including both developed and developing countries, there is little formal education for becoming a teacher educator (Murray & Male, 2005; Swennen & Klink, 2009). Murray and Male's (2005) study among newly appointed teacher educators in the UK shows that it takes several years after appointment for educators to become confident in their profession. Becoming a teacher educator, as reported by Murray and Male, is also stressful as educators are often uncertain about new professional roles and concerned about their knowledge sufficiency. The scarcity of sufficient knowledge for becoming a teacher educator is also articulated in the Bangladeshi educators' opinions. They described their struggles of becoming an educator, and their search for relevant and recent knowledge. The educators considered ICT facilities helpful for developing their professional knowledge and skills. They described three aspects of ICT in this regard: the wide source of information on the web that considerably fills their knowledge gap, the email facilities that help them to communicate and consult on academic issues among their professional community, and the social networks that enable them to construct context relevant knowledge through collaborative discussions among likeminded people. Accordingly, the participant educators consider ICT as virtual mentor for their professional development.

The conception of ICT as a virtual mentor is also recognized by other researchers. Whitehouse, Breit, McCloskey, Ketelhut and Dede (2006) reviewed some empirical studies on online teacher professional development programs and noted that online communications among teachers were regarded as a useful strategy for their professional development. Similarly, Looi, Lim and Chen (2008) point out that computer-mediated communication (CMC) is becoming popular among teachers and educators as it supports constructing knowledge from different perspectives. Therefore, the Bangladeshi educators' perception of ICT as a virtual mentor

indicates that they recognize ICT not only as a teaching-learning tool, but also as a way of knowledge constructing and sharing.

Is ICT a colonial consequence, or an opportunity of decolonizing?

The policy documents of Bangladesh, such as the National ICT Policy - 2009 and the National Education Policy - 2010, perceive ICT as a means for economic development by preparing people for the international labour market. The belief is that if the Bangladeshi pupils are taught well about ICT skills, they can find jobs in developed countries and send remittance back to the country. Andreotti (2005) argues that educating children for the international labour market is a colonial thought, because it creates dependency on other countries. Historically, the education system of Bangladesh was founded by the British colonizers during the early ninetieth century, and the early objective of education was to prepare some native people for assisting the colonizers (Salahuddin & Chowdhury, 2010; Shah, 1995). In relation to this, it can be argued that the objective of ICT policies for preparing labour for other countries is a consequence of colonial thought, because this does not build independent capacity within the country of Bangladesh. However, the educators see ICT as a means to create knowledge appropriate to their context by facilitating knowledge sharing and easy communication. Developing their own knowledge base is essential for a community to become independent from colonial thoughts, because it helps to develop abilities for economic emancipation (Andreotti, 2005). Therefore, the Bangladeshi educators' beliefs in ICT as a means to develop their context-appropriate knowledge can be justified to contribute to their own economy and ability to participate in a global economy. It is noteworthy that while the Bangladeshi policies see ICT as a skill, and endeavour to develop these skills in the children to prepare them as international labourers; the educators believe that ICT can be implemented to prepare children to create their own knowledge with the support of ICT.

5.3.2 Educators' Understanding of ICT within teacher education program

This section discusses the Bangladeshi teacher educators' understandings of implementing ICT within teacher education in response to the complementary question: How do the educators address the aims of ICT in education in their practice? The responses are discussed in the following themes.

The integration of ICT in education is a staged process

The B.Ed. curriculum in Bangladesh describes two layers (or steps) of ICT learning in teacher education: teachers will learn some ICT skills, and they will use ICT for teaching-learning activities (MOEBD, 2005). However, the Bangladeshi educators consider three layers (or steps) of ICT learning in education: acquisition of ICT skills, using ICT as a tool for teaching-learning activities, and ICT as a medium of teaching and learning (e.g. online distance learning). Finger, Russell, Jameson-Proctor, and Russell (2007) reviewed different research studies and policy documents on ICT in education from different countries, and note that the integration of ICT in education is often conceptualized as three staged process: acquiring ICT skills, enhancing learning and teaching with ICT, and transforming pedagogy, content and structure of schooling with ICT. Clearly, the educators show a broader understanding of implementing ICT in education than what the B.Ed. curriculum states, and they are ahead of the government's vision and strategies. This finding is similar with what Davis, Preston and Sahin (2009) and Davis (2010) argue that teacher education programs impact multiple 'ecologies' of education 'ecosystems', and can bring innovative change in education systems with ICT. Therefore, the Bangladeshi educators' insights of the ICT's potential to bring change in education system should be taken into account in the policy documents.

The educators' subject sub-culture has influence on their ICT practice.

The educators in Bangladesh who teach ICT courses in the B.Ed. program have different subject backgrounds; while some studied in physics or mathematics or agriculture, some others studied in literature or social and political sciences. The

educators explained their ways of teaching the ICT courses, and Chapter 4 shows that their ICT practices varied from one to another. This variation in teaching ICT is related to their previous education and experiences, because teachers often have a subjective view of technology within their concept of a subject area (Jones, 1999). This indicates that different educators can teach and use ICT in different ways and for different purposes and this variation might lead to some innovative approaches of teaching ICT (Jones, 1999; John, 2005). However one senior educator's concern was that if different educators teach ICT in different classrooms, the trainees might have disparate knowledge of ICT among themselves. Therefore, one suggestion in the study proposed that some specialist ICT educators could be recruited in the teachers' training colleges who would teach ICT to all trainees. Recruiting ICT specialist educators might be considered if learning about ICT skills is the main focus, but John (2005) notes that if pedagogical use of ICT is the objective, educators from different subject background can teach ICT to the trainees. Therefore, this study suggests that ICT should be taught to the trainee teachers within different subject contents and not just as isolated skills for the successful integration of ICT in education.

Educators understanding of teaching and learning about and with ICT

The B.Ed. curriculum of Bangladesh prescribes some skills, such as file and folder maintenance, word processing, and internet browsing, to be taught to the trainees. The educators think the prescribed ICT skills are not enough for teaching with ICT. They consider the skills of knowledge presentation (e.g. creating and using PowerPoint), multimedia content development and social networking should be taught to the trainees in addition to the prescribed curriculum. They argue that these skills would enable the trainees to present and to share knowledge with others as the trainee teachers are expected to know how to prepare learning materials using computers (digital content development skills), and how to present content to the students (presentation skills). Roblyer and Doering (2010) argue that teachers need to be critical consumers of ICT and understand how ICT can support their practice.

The Bangladeshi educators seem not to be passive consumers of ICT; they see different potentials of ICT in education and show considerable knowledge of teaching about and with ICT. Learning about technological skills and using that skill pedagogically in the classroom is crucial for the teachers (Koehler & Mishra, 2008), and the educators understanding of this knowledge should be included in the B.Ed. curriculum.

Although the educators recognize some ICT skills the trainees may learn, they debate on whether social networks should be included in teacher education programs. Some educators perceive social networks as a platform for the trainees to share ideas and create their own knowledge. They argue that the experience of being engaged in social networks and debating on academic issues can give the trainee teachers twofold opportunities: learning how to use social networks as a skill, and constructing appropriate knowledge that fits within their context. However, some other educators consider social networks as advanced knowledge and as the majority of school teachers do not know basic ICT skills, they may not be able to work with social networks. Nevertheless, the majority of the educators consider including social networks as a part of ICT curriculum in teacher education. The potential of social networks for learning is recognized by the scholars (Archambault, Wetzel, Foulger, & Williams, 2010; Kop & Bouchard, 2011). Kop and Bouchard argue that social networks are particularly appropriate for those who are autonomous, self-motivated and self-controlled learners. As the trainee teachers are all adult and they prefer to learn what they find relevant to their life, social networks can be useful learning area for the trainee teachers, and social networks can be included as part of the B.Ed. ICT curriculum.

The educators also have different pedagogical and andragogical understanding of teaching about and with ICT in the classrooms. They consider both the children's way of learning (pedagogy) and the adult's way of learning (andragogy) while teaching the trainee teachers. When they teach ICT skills to the trainee teachers, they

87

follow adult learning models of collaborative work and problem based learning. The adult learning theories suggest that adult learners are self-motivated, self-directed, and they want to learn what relates to their real-life practices (Tusting & Barton, 2006; Merriam, Caffarella, & Baumgartner, 2007). The present study finds that some of the educators give the trainees some real-life problems and instruct the trainees to solve those using ICT. At the same time, the educators teach them the pedagogical use of ICT which is important for the trainees when they go to schools for teaching practice. The pedagogical use of ICT involves reflecting on the prevailing learning theories (such as Behaviourist and Constructivist models of learning) in order to help children learn subject knowledge meaningfully (Dede, 2008; Roblyer & Doering, 2010). Clearly, the Bangladeshi educators are adopting adult learning principles in the way they design lessons for the trainees but at the same time they are conscious of the need to help trainees understand pedagogical approaches of teaching with technology.

However, some educators think that it is a challenge for them to incorporate both andragogy and pedagogy in the same class, because they have a lack of knowledge and experience. This indicates that there is a need to develop a framework of teaching about and with ICT in teacher education programs that can address both andragogy and pedagogy. The TPCK framework (Koehler & Mishra, 2008) considers pedagogical knowledge and not andragogical knowledge; therefore this study recommends developing a framework including both andragogical knowledge and TPCK for teacher educators who are responsible to prepare school teachers to teach about and with ICT. Accordingly, this study recommends future studies to explore how andragogy and TPCK can be combined to frame a model for the teacher educators, something like, Technological Andragogical Pegadogical Content Knowledge (TAPCK).

A debate on ICT as a specialist subject or an integral part of all subjects

There is a debate among the educators about whether ICT should be taught as a specialist subject or as an integral part of all subjects in the teacher education curriculum. When the teachers have a little or no knowledge about ICT and learning ICT skills is the goal, ICT is often taught as a specialist subject (McDougall, 2008). On the other hand, when the trainees have considerable ICT knowledge and they are expected to learn the pedagogical use of ICT, a cross-curricular approach of teaching ICT is often preferred (McDougall, 2008).

The former approach is often isolated from the pedagogical knowledge resulting in lack of confidence in using ICT in classroom; whereas, the latter approach often lacks the expert knowledge of ICT operations that can also result in a lack of confidence (Roblyer & Doering, 2010). Law and Plomp (2003) note that although ICT has been introduced as a specialist subject in many countries, later this approach shifted towards the pedagogical use of ICT across the curriculum. As many of the Bangladeshi educators are not well-skilled in ICT, teaching ICT across the curriculum is a challenge. Therefore, the Bangladeshi educators suggest that all the educators must be trained in pedagogical use of ICT before they teach the cross-curricular use of ICT to the trainee teachers. McDougall (2008) notes that there are a considerable number of studies on the use of ICT in teaching-learning activities, but there are few studies conducted on teaching ICT as a specialist subject. The Bangladeshi educators' debate on teaching ICT as a specialist subject or as an integrated part of all subjects should be examined by conducting relevant studies on this issue in the future.

5.3.3 Key issues in implementing the B.Ed. ICT curriculum

This section discusses some key issues raised by the educators in response to the third complementary research question: What do educators perceive as key issues in implementing the ICT curriculum in B.Ed. program in Bangladesh?

The educators had raised a variety of issues regarding the implementation of the B.Ed. ICT curriculum, and these are described in following sections.

The ICT curriculum is highly prescriptive

One of the key factors is that the B.Ed. ICT curriculum is highly prescriptive. It defines objectives, competencies, concepts of ICT to be taught, and methods of teaching-learning in the B.Ed. classrooms. The educators have little flexibility to identify and include ICT concepts different from the curriculum to teach the trainees, because at the end of the year the trainees are assessed according to the curriculum's prescribed guidelines. However, if the educators do identify some different ICT concepts which might be useful for the trainees they have some freedom to include these in their teaching programmes. The educators suggest designing the ICT curriculum in a way that can give them some flexibility to decide what ICT concepts are included and how they might be taught to the trainees. McDougall (2008) notes that in different countries, including the USA, the teacher education curriculum defines some generic competencies and educators decide what and how to teach these competencies to the trainees.

As the data indicates the educators of Bangladesh often have a broader understanding of teaching about and with ICT than what is prescribed in the curriculum. It is therefore possible that the B.Ed. curriculum could include some general competencies and allow teacher educators some flexibility to decide the content and methods of teaching ICT.

The curriculum is mostly teaching about ICT

Although one objective of the B.Ed. curriculum is to prepare the trainees to use ICT in teaching-learning activities, the curriculum focuses mostly on teaching them ICT skills isolated from pedagogical application. The educators think the curriculum should give emphasis to the pedagogical use of ICT. Teaching about ICT skills isolated from pedagogy is one reason teachers are less confident in using ICT in the

90

classrooms (Ertmer & Ottenbreit-Leftwich, 2010, Somekh, 2008). Therefore, the structure of the B.Ed. ICT curriculum itself remains a key issue to the educators as it prioritises skills over pedagogy.

Not all of the educators are prepared for teaching with ICT

Another key issue found in the data is that many of the educators have little or no knowledge of ICT. This is an issue because the educators are expected to train the school teachers in how to use ICT in the school classrooms. If the educators do not know about ICT, they are unlikely to prepare school teachers for using ICT. This indicates that the educators should have a sound knowledge of technology along with pedagogical understanding of content knowledge for the successful implementation of ICT in education (Mishra & Koehler, 2006). Therefore, it is crucial to recognize that teaching and learning with ICT itself is a specialist learning area in teacher education, and the teacher educators must be prepared well for teaching this knowledge to the trainee teachers.

Lack of ICT resources and infrastructure

It is reported in the data that there is a lack of computers, multimedia facilities and internet connections in most of the teacher training institutions. Two or more trainee teachers share one computer in the classroom. The educators often cannot teach the trainees about email and online search skills due to insufficient or unreliable internet connections. Besides this, the computers often go out of order, and a lack of computer maintenance budget is a reason the broken computers are not repaired for reuse. This view is supported by Ertmer and Ottenbreit-Leftwich (2010) who report that technical problems often contribute to a lack of confidence amongst teachers. Hew and Brush (2007) also demonstrated that lack of resources can be a barrier to teachers' technology use. Therefore, when building a supportive infrastructure, it is also important that schools be well equipped, not only with ICT resources, but with the pedagogical expertise to facilitate meaningful uses and maintenance.

English scripts embedded in computers is a barrier

Some educators also think that English script embedded in computer programs is a potential barrier to the teachers to use ICT in the classrooms, because English is a foreign language in Bangladesh. Although the educators understand English to some extent, they reported that it was often not comfortable to learn new knowledge in a foreign language. Ingec (2009) found that Turkish students also had problems learning concept maps in a foreign (English) language. Similarly, it can be argued that learning ICT in English language posits a dual challenge to the Bangladeshi teachers: firstly, learning about a new technology, and secondly, learning it in a foreign language. Therefore, the Bangladeshi educators' perception of English language embedded in computer programs can be considered a key issue in implementing ICT in education.

Confidence in teaching about and with ICT

Confidence is one of the key factors that enable the educators teaching ICT courses. The participant educators of this study state that they were assigned the responsibilities of teaching ICT courses as they have had previous experience of working with computers. Previous knowledge of computers is perceived as a factor that influences their confidence. The educators also study and practice computer technology regularly for preparing themselves to take ICT classes. Their self-study and practice increases their confidence. They also maintain communication with their professional community to discuss, share and learn ICT knowledge. The trainee teachers' success in using ICT also encourages the educators to use technology as when they observe the trainees learning ICT skills, they feel more confident. Ertmer and Ottenbreit-Leftwich (2010) note that teachers' confidence in relation to ICT is more important than their ICT knowledge and skills, therefore, prior experience of ICT, self-study, communicating with knowledgeable peers, and students' success of using ICT are factors that need to be considered to prepare both school teachers and the educators for teaching about and with ICT.

Literature suggests different strategies for building confidence in using ICT. Playing with ICT (Somekh, 2008), starting with small successful experiences (Ottenbreit-Leftwich, 2007), working with knowledgeable peers (Ertmer, Ottenbreit-Leftwich, & Youk, 2006), providing suitable environments and infrastructure (Ertmer, 2005), participating in a professional learning community (Putnam & Borko, 2000) are all suggestions for developing confidence and self-efficacy in ICT.

5.3.4 Educators' suggestions to improve the teaching ICT course

This section reflects and discusses some key ideas the educators suggested for improving the teaching ICT course in response to the fourth complementary research question: What are the educators' suggestions to improve the teaching ICT courses in B.Ed. classroom? The educators recommended a range of ideas in this regard, and the most frequently mentioned ideas are discussed in this section.

A strong opinion came from the educators to include pedagogical knowledge of ICT in the curriculum so that the trainee teachers can understand the practical applications of ICT while learning about ICT skills. As educators' lack of ICT knowledge is found as one barrier for teaching the trainees about and with ICT, it is suggested to train the educators before they teach ICT to the B.Ed. trainees. In order to increase the educators' confidence in using ICT and to encourage them using ICT, one recommendation was to implementing yearly awards or incentives for those educators who will show examples of best practices.

Some of the educators also recommended increasing all the educators' positive beliefs and attitudes towards ICT in education, as, as noted earlier, positive beliefs in the importance of ICT in education has a direct bearing on its success in the classroom. Wozney, Venkatesh and Abrami (2006) argue that a sound knowledge base and strong self-efficacy cannot ensure the meaningful technology use; one more important thing is to investigate teachers' attitudes towards ICT, because attitude acts as a lens when people work with new knowledge and skills. Therefore, this

study recommends working towards developing positive attitudes towards ICT of not only those educators who teach ICT, but also all other educators in the TTC, to help cultivate a suitable environment for integrating ICT in teacher education successfully.

The educators' professional culture including the principal's leadership and the government-level supports are also recognized by the participants as important for the successful implementation of ICT in education. Ertmer and Ottenbreit-Leftwich (2010) note that the professional culture makes an impact on the development of teachers' knowledge and beliefs, and it is important to take account of both the context in which they are prepared, and the context in which they will teach. Therefore, this study suggests that the principal as a leader should encourage the development of a community of practice among the educators with a view to developing their positive attitudes towards ICT, and increasing their ICT knowledge and skills.

5.4 Implications for practice

The findings of this study may have implications for those people who are involved at various levels in the "educational ecosystem" (Davis, 2010), and are responsible for planning and implementing ICT in education. School teachers and educators may find some critical insights for not becoming a passive consumer of ICT (Davis, 2010), but becoming a "critical consumer" (Roblyer & Doering, 2010, p. 51) of ICT and initiate ways that they can integrate it into their practice themselves. The educators and teachers may also conceptualize the opportunities and tensions in implementing ICT in teacher education programs. The critical examination of the Bangladeshi ICT policy documents conducted in this study may offer a broader understanding of the potential of ICT to the policy makers of Bangladesh, and also to the other developing countries that endeavour to integrate ICT in their education.

A lack of pedagogical knowledge of ICT is identified in the study, and curriculum developers may address this shortage in future planning. The shortage of ICT-knowledgeable educators in teacher training institutions found in the data indicates that educators must be trained well in ICT with technological, pedagogical and content knowledge (Mishra & Koehler, 2006), before they are given responsibilities to prepare the school teachers for teaching with ICT. The scarcity of ICT equipment and necessary infrastructure is one of the barriers to be addressed. The English script embedded in computers and on the web is also a perceived barrier that can be partly minimized by introducing Bengali scripts in computers. Awarding some sort of incentives to the exemplary teachers may encourage others to implement best-practices in using ICT in education. Finally, strengthening the community of practice among the teachers and educators may influence a faster integration of ICT in education.

5.5 Recommendations for further research

This study identifies three key areas where further study can support and promote the integration of ICT in education: the extension of this study to other teacher education institutions involving more educators, trainee teachers and the principals as a leader and an administrator; the evaluation of the ICT curriculum of the teacher education programs; the exploration of the ICT trained teachers' implications in their school practices. One limitation of this study is that the findings are based on the educators' self-reports during the interviews and on the intended objectives of the B.Ed. ICT curriculum and policy documents. The educators were not observed during their class teaching sessions and so the operational implications of ICT in the classrooms were not explored in this study. Therefore, further study can include the operational perspectives of ICT in the classrooms.

5.6 Conclusion

The research question that underpins this study investigates the Bangladeshi teacher educators' understanding and experiences of ICT in their practice in the B.Ed.

teacher education program. Ten educators were interviewed to find answers to this question and relevant policy documents in Bangladesh were reviewed to provide a contextual meaning of what the educators identified. The study shows that the educators understand ICT as a teaching tool, a medium of education, and a means of knowledge construction. Although the curriculum prescribes some limited views and methods of teaching with ICT, the educators have a considerable understanding of the pedagogical use of ICT and could contribute more than the current curriculum allows them. Therefore, this study recommends reviewing the Bangladeshi curriculum and policies to better reflect the broader understandings of the educators.

References

Anderson, R. E. (2008). Implications of the information and knowledge society for education. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 5-22). New York: Springer Science.

Andreotti, V. (2005). Modernity, capitalism and colonialism and their effects on schooling, alterity and 'active citizen participation' in Wildermeersch. In D. Bron, M. and Stroobants, V (Ed.), *Active Citizenship and Multiple Identities in Europe* (pp. 105-120). Frankfurt: Lang Verlag.

Anfara, V. A. (2008). Theoretical framework. In L. M. Given (Ed.), *The Sage encyclopaedia of qualitative research methods* (pp. 869-873), Los Angeles: Sage Publications.

Angers, J., & Machtmes, K. (2005). An ethnographic-case study of beliefs, context factors, and practices of teachers integrating technology. *The Qualitative Report, 10*, 771–794.

Archambault, L., Wetzel, K., Foulger, T. S., & Williams, M. K. (2010). Professional development 2.0: Transforming teacher education pedagogy with 21st century tools. *Journal of Digital Learning in Teacher Education, 27*, 4-11.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Bangladesh Bureau of Statistics. (2009). *Statistical pocket book-2009,* Dhaka. Retrived on 11/01/2011 from:

http://www.bbs.gov.bd/WebTestApplication/userfiles/Image/SubjectMatt
erDataIndex/pk_book_09.pdf

Bell, J. (2010). *Doing your research project: A guide for first-time researchers in
education and social science* (5th ed.). Buckingham: Open University Press.

Blatter, J. K. (2008). Case Study. In L. M. Given (Ed.), *The Sage encyclopedia of
qualitative research methods* (pp. 68-71), Los Angeles: Sage Publications.

Bogdan, R., & Biklen, S. K. (2007). *Qualitative research for education: An
introduction to theories and methods* (5th ed.)*.* Boston: Pearson.

Borko, H., & Putnam, R. T. (1995). Expanding a teacher's knowledge base: A
cognitive psychological perspective on professional development. In T. R.
Guskey & M. Huberman (Eds.), *Professional development in education:
New paradigms & practices* (pp. 35–66). New York: Teachers College
Press.

Brown, A., & Davis, N. (Eds.) (2004). *World yearbook of education 2004: digital
technologies, communities and education*. London: RoutledgeFalmer.

Burr, V. (2003). *Social constructionism* (2nd ed.). East Sussex: Routledge.

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education*
(6th ed.). London: Routledge.

Cook, D. (2010). Views of learning, assessment and potential place of information
technology. In A. Murnane, A. Jones, & N. Reynolds (Eds.). *Researching*

IT in education: Theory, practice and future direction (pp. 39-45). USA and Canada: Routledge.

Cox, M. J. (2008). Researching IT in education. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 965-982). New York: Springer Science.

Crotty, M. (1998). *The foundations of Social Research - meaning and perspectives in the research process,* Sydney, Australia: Allen and Urwin.

Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Cambridge, Mass: Harvard University Press.

Davidson, C., & Tolich, M. (2003). Competing traditions. In C. Davidson & M. Tolich (Eds). *Social Science Research in New Zealand , New Zealand: Pearson.*

Davis, N. (2003). Technology in teacher education in the USA: What makes for sustainable good practice? *Technology, Pedagogy and Education, 12, 59–63.*

Davis, N. (2008). How may teacher learning be promoted from educational renewal with IT? In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 507-519). New York: Springer Science.

Davis N.E. (2009, March). *The Co-Evolution of Information Technology and Education*. Keynote presentation to the annual conference of the Society of Information Technology and Teacher Education (SITE), Charlotte, North Carolina.

Davis, N., Preston, C., & Sahin, I. (2009). Training teachers to use new technologies impacts multiple ecologies: Evidence from a national initiative. *British Journal of Educational Technology, 40*(5), 861-878.

Davis, N. (2010). Global interdisciplinary research into the diffusion of information technology innovations in education. In A. Murnane, A. Jones, & N. Reynolds (Eds.). *Researching IT in education: Theory, practice and future direction* (pp. 142-149). USA and Canada: Routledge.

Dede, C. (2008). Theoretical perspectives influencing the use of iformation technology in teaching and learning. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 43-62). New York: Springer Science.

Dexter, S. (2008). Leadership for IT in schools. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 507-519). New York: Springer Science.

Doering, A., Beach, R., & O'Brien, C. (2007). Infusing multi-modal tools and literacies into an English education program. *English Education, 40*(1), 41-60.

Doering, A., & Veletsianos, G. (2007). Multi-scaffolding learning environment: An analysis of scaffolding and its impact on cognitive load and problem-solving ability. *Journal of Educational Computing Research, 37*(2), 107-129.

Downes, T., Fluck, A., Gibbons, P., Leonard, R., Matthews, C., Oliver, R., Vickers, M., & Williams, M. (2001). *Making better connections: Models of teacher professional development for the integration of information and*

communication technology into classroom practice. Canberra: Commonwealth of Australia.

Drent, M., & Meelissen, M. (2008). Which factors obstruct or stimulate teacher educators to use ICT innovatively? *Computers and Education, 51*, 187-199.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development, 53*(4), 25-39.

Ertmer, P. A., Ottenbreit-Leftwich, A., & York, C. (2006). Exemplary technology-using teachers: Perceptions of factors influencing success. *Journal of Computing in Teacher Education, 23*(2), 55–61.

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research in Technology Education, 42*(3). 255-284.

Finger, G., Russell, G., Mamieson-Proctor, R., & Russell, N. (2007). *Transforming learning with ICT: Making it happen.* Australia: Pearson.

Flick, U. (2009). *An introduction to qualitative research* (4th ed.). Los Angeles: Sage.

Given, L. M. (Ed.). (2008). *The SAGE encyclopaedia of qualitative research methods*, Los Angeles: Sage Publication Inc.

Given, L. M., & Saumure, K. (2008). Trustworthiness. In L. M. Given (Ed.), *The SAGE encyclopaedia of qualitative research methods* (pp. 895-896), Los Angeles: Sage Publication Inc.

Goktas, Y., Yildirim, S., & Yildirim, Z. (2009). Main Barriers and Possible Enablers of ICTs Integration into Pre-service Teacher Education Programs. *Educational Technology & Society*, *12* (1), 193–204.

Gough-Jones, V., J. (2008). *Girls perceptions of secondary school specialist computer courses: A case study.* Unpublished master's thesis, Christchurch College of Education, Christchurch, New Zealand.

Hawkridge, D. (1990). Who needs computers in schools, and why? *Computers and Education, 15*(1-3), 1-6.

Hennessy, S., Ruthven, K., & Brindley, S. (2005). Teacher perspectives on integrating ICT into subject teaching: Commitment, constraints, caution, and change. *Journal of Curriculum Studies, 37*, 155–192.

Hesse-Biber, & Nagy, S. (2010). *Mixed methods research: Merging theory with practice,* New York: Guilford Press.

Hew, K. F., & Brush, T. (2007). Integrating technology into K–12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research and Development, 55*, 223–252.

Hinostroza, J. E., Labbe, C., Lopez, L., & Iost, H. (2008). Traditional and emerging IT applications for learning. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 81-96). New York: Springer Science.

Hoque, M. F. (2002). The IT scenario in Bangladesh: A development perspective. *Media Asia, 29*(4), 234-237.

Hoque, S. M. S., & Alam, S. M. S. (2010). The role of information and communication technologies in delivering higher education: A case study of Bangladesh. *International Education Studies, 3*(2), 97-101.

Hughes, J. (2005). The role of teacher knowledge and learning experiences in forming technology-integrated pedagogy. *Journal of Technology and Teacher Education, 13,* 277-302.

Ingec, S. K. (2009). Analysing Concept Maps as an Assessment Tool in Teaching Physics and Comparison with the Achievement Tests, *International Journal of Science Education*, *31*(14), 1897-1915.

Integrate. (2011a). In *Cambridge Online Dictionaries.* Retrieved from http://dictionary.cambridge.org/dictionary/british/integrate?q=integrate

Integrate. (2011b). In *Merriam-Webster Online Dictionaries.* Retrieved from http://www.merriam-webster.com/dictionary/integrate

Jane, B., & Peg, L. (2003). What about ICT in special education? Special educators evaluate information and communication technology as a learning tool. *European Journal of Special Needs Education. 18*, 71-87.

Jensen, D. (2008a). Confirmability. In L. M. Given (Ed.), *The SAGE encyclopaedia of qualitative research methods* (p. 112), Los Angeles: Sage Publication Inc.

Jensen, D. (2008b). Credibility. In L. M. Given (Ed.), *The SAGE encyclopaedia of qualitative research methods* (pp. 138-139), Los Angeles: Sage Publication Inc.

Jensen, D. (2008c). Transferability. In L. M. Given (Ed.), *The SAGE encyclopaedia of qualitative research methods* (p. 890), Los Angeles: Sage Publication Inc.

John, P. (2005). The sacred and the profane: subject sub-culture, pdeagogical practice and teachers' perceptions of the classroom uses of ICT, *Educational Review, 57*(4), 471-490.

Jones, A. (1999). Teachers' subject subcultures and curriculum innovation: The example of technology education. In J. Loughran (Ed.), *Researching teaching: Methodologies and practices for understanding pedagogy* (pp. 155-171), London: Falmer Press.

Judson, E. (2006). How teachers integrate technology and their beliefs about learning: Is there a connection? *Journal of Technology and Teacher Education, 14*, 581–597.

Kennewell, S. (2007). *A practical guide to teaching ICT in the secondary school*. London: Routledge.

Koehler, M. J., & Mishra, P. (2008). Introducing TPCK. In American Association of Colleges for Teacher Education (AACTE) Committee on Innovation and Technology (Ed.), *Handbook of technological pedagogical content knowledge (TPCK) for educators* (pp. 3-30). New York: Routledge.

Kop, R., & Bouchard, P. (2011). The role of adult educators in the age of social media. In M. Thomas (Ed.) (2011), *Digital education opportunities for social collaboration,* New York: Palgrave Macmillan.

Koster, B., Brekelmans, M., Korthagen, F., & Wubbels, T. (2005). Quality requirements for teacher educators. *Teaching and Teacher Education, 21* (2), 157–176.

Kozma, R. B. (2008). Comparative analysis of policies for ICT in education. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 1083-1096). New York: Springer Science.

Kvale, S., & Brinkmann, S. (2009). *Interviews: Learning the craft of qualitative research interviewing* (2nd ed.), Los Angeles: Sage Publications.

Law, N., & Plomp, T. (2003). Curriculum and staff development for ICT in education. In T. Plomp, R. E. Anderson, N. Law, & A. Quale (Eds.), *Cross-national information and communication technology policies and practices in education* (pp.15-30)*,* USA: Information Age Publishing Inc.

Law, N. (2008). Teacher learning beyond knowledge for pedagogical innovations with ICT. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 425-433). New York: Springer Science.

Li, Q. (2007). Student and teacher views about technology: A tale of two cities? *Journal of Research on Technology in Education, 39*(4), 377-397.

Li, K. M., & Ngan, M. Y. (2009). Learning to teach with information and communication technology in a teacher induction program. *International Journal of Technology in Teaching and Learning*, 5(1), 49–61.

Lichtman, M. (2010). *Qualitative research in education: A user's guide* (2nd ed.). USA: Sage Publication.

Lim, C. P. (2002). A theoretical framework for the study of ICT in schools: a proposal. *British Journal of Educational Technology, 33*(4), 411-421.

Lloyd, M. (2006, November-December). *Towards a definition of the integration of ICT in the classroom*. Paper presented at the Australian Association for Research in Education Conference, Parramatta, NSW.

Looi, C., Lim, W., & Chen, W. (2008). Communities of practive for continuing professional development in the twenty-first century. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 489-505). New York: Springer Science.

Mayer, R. E. (2009). *Multimedia learning* (2nd ed.), New York: Cambridge University Press.

McDougall, A. (2008). Models and practices in teacher education programs for teaching with and about IT. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 461-474). New York: Springer Science.

McGrail, E. (2005). Teachers, technology, and change: English teachers' perspectives. *Journal of Technology and teacher education, 13*(1), 5-24.

Mears, C. L. (2009). *Interviewing for education and social science research: The gateway approach,* New York: Palgrave Macmillan.

Merriam, S. B. (1998). *Qualitative research and case study applications in education* (2nd ed.). San Francisco, California: Jossey-Bass Inc.

Merriam, S. B., Caffarella, R. S., & Baumgartner, L. M. (2007). *Learning in adulthood: A comprehensive guide* (3rd ed.)*,* San Francisco: Jossy-Bass.

Ministry of Education of Bangladesh. (2005). *The Bachelor of Education Curriculum-2005,* Dhaka: Ministry of Education.

Ministry of Education of Bangladesh. (2010). *Bangladesh National Education Policy-2010,* Dhaka: Ministry of Education.

Ministry of Education of New Zealand. (2003). *Digital horizons: Learning through ICT,* Wellington: Ministry of Education.

Ministry of Education of New Zealand. (2007). *The New Zealand Curriculum,* Wellington: Ministry of Education.

Ministry of Science and Information and Communication Technology of Bangladesh (2009). *National Policy of Information and Communication Technology ,* Dhaka: Ministry of Science and Information and Communication Technology.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A new framework for teacher knowledge. *Teachers College Record. 108*(6), 1017–1054.

Moonen, J. (2008). Evolution of IT and related educational policies in international organisations. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 1071-1082). New York: Springer Science.

Morgan, D. L., & Guevara, H. (2008). Cultural context. In L. M. Given (Ed.), *The SAGE encyclopaedia of qualitative research methods* (pp. 181-182), Los Angeles: Sage Publication Inc.

Mueller, J., Wood, E., Willoughby, T., Ross, C., & Specht, J. (2008). Identifying discriminating variables between teachers who fully integrate computers and teachers with limited integration. *Computers and Education, 51*, 1523–1537.

Murray, J., & Male, T. (2005). Becoming a teacher educator: evidence from the field. *Teaching and Teacher Education, 21* (2), 125–142.

O'Sullivan, M. C. (2010). Educating the teacher educator: A Ugandan case study, *International Journal of Educational Development, 30*(4), 377-387.

Ottenbreit-Leftwich, A. T. (2007). Expert technology-using teachers: Visions, strategies, and development. Unpublished doctoral dissertation. Purdue University, West Lafayette.

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research, 63* (3), 307-332.

Pearson, J. (2003). Information and communications technologies and teacher education in Australia. *Technology, Pedagogy and Education, 12,* 39–58.

Peck, K., & Sprenger, K. (2008b). One-to-one educational computing: Ten lessons for successful implementation. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 935-941). New York: Springer Science.

Peeraer, J., & Petegem, P. V. (2011). ICT in teacher education in an emerging developing country: Vietnam's baseline situation at the start of 'The Year of ICT'. *Computers and Education, 56,* 974-982.

Pennycook, A. (1998). *English and the discourses of colonialism*, London: Routledge.

Piper, D. (2003). The relationship between leadership, self-efficacy, computer experience, attitudes, and teachers' implementation of computers in the classroom. In C. Crawford, D. Willis, R. Carlsen, I. Gibson, K. McFerrin, J. Price, & R. Weber (Eds.), *Proceedings of the Society for Information Technology in Teacher Education* (pp. 1057–1060). Chesapeake, VA: AACE.

Pouezevara, S. L., & Khan, R. (2007). *Learning communities enabled by mobile technology: A case study of school-based, in-service secondary teacher training in rural Bangladesh* (Research report no. ADB TA No. 6278-REG). Retrieved from Asian Development Bank website: www.adb.org/Documents/Reports/Consultant/39035-REG/appendix11.pdf

Putnam, R. T., & Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher, 29*(1), 4–15.

Roblyer, M. D., & Doering, A. H. (2010). *Integrating educational technology into teaching* (5th ed.). New York: Allyn & Bacon.

Rogers, E. (2004). *Diffusion of innovation.* Ney York: The Free Press.

Romeo, G. (2008). Information and communication technologies in education. In n. Yelland, G. A. Neal, & E. Dakich (Eds.), *Rethinking education with ICT* (pp. 203-222), Rotterdam: Sense Publishers.

Romeo, G., Russell, G. (2010). Why 'what works' is not enough for information technology in education. In A. Murnane, A. Jones, & N. Reynolds (Eds.). *Researching IT in education: Theory, practice and future direction* (pp. 142-149). USA and Canada: Routledge.

Rothbauer. P. M. (2008). Triangulation. In L. M. Given (Ed.), *The SAGE encyclopaedia of qualitative research methods* (pp. 892-894), Los Angeles: Sage Publication Inc.

Salahuddin, A.N.M. & Chowdhury, M. A. A. (2010). Colonial epistemology in education and reappropriateing schooling in the age of globalization. *Teacher's World, 35-36,* 101-111, Dhaka: University of Dhaka Press.

Shah, S.Y. (1995). *Indian Adult Education: A Historical Perspective.* New Delhi: Directorate of Adult Education.

Shohel, M. M. C., & Power, T. (2010). Introducing mobile technology for enhancing teaching and learning in Bangladesh: Teacher perspectives, *Open Learning: The Journal of Open, Distance and e-Learning, 25*(3), 201-215.

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4–14.

Silverman, D. (2010). *Doing qualitative research* (3rd ed.). Los Angeles: sage.

Somekh, B. (2008). Factors affecting teachers' pedagogical adoption of ICT. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 449-460). New York: Springer Science.

Swennen, A., & Klink, M. V. D. (Eds.) (2009). *Becoming a teacher educator: Theory and practice for teacher educators.* New York: Springer Science.

Thomas, L. G., & Knezek, D. G. (2008). Information, communications, and educational technology standards for students, teachers and school leaders. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 333-348). New York: Springer Science.

Tusting, K., & Barton, D. (2006). *Models of adult learning: A literature review,* UK: Niance.

Twining, P. (2008). Framing IT use to enhance educational impact on a school-wide basis. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. 555-577). New York: Springer Science.

Voogt, J. (2008). IT and Curriculum Processes: Dilemmas and Challenges. In J. Voogt, & G. Knezek (Eds.). *International handbook of information*

technology in primary and secondary education (pp. 117-132). New York: Springer Science.

Voogt, J., & Knezek, G. (2008). IT in primary and secondary education: Emerging issues. In J. Voogt, & G. Knezek (Eds.). *International handbook of information technology in primary and secondary education* (pp. xxix-xlii). New York: Springer Science.

Whitehouse, P. L., Breit, L. A., McCloskey, E. M., Ketelhut, D. J., & Dede, C. (2006). An overview of current findings from empirical research on online teacher professional development. In C. Dede (Ed). *Online professional development for teachers: Emerging models and methods* (pp. 13-29). Cambridge, MA: Harvard Education Press.

Willis, J. W. (2007). *Foundations of qualitative research: Interpretive and critical approaches.* Thousand Oaks: SAGE Publications.

Witz, K., Goodwin, D., Hart, R., & Thomas, H. (2001). An essentialist methodology in education-related research using in-depth interviews. *Journal of Curriculum Studies 33*(2), pp. 195–227.

Wood, E., Mueller, J., Teena, W., Specht, J., & Deyoung, T. (2005). Teachers' perceptions: Barriers and supports to using technology in the classroom. Education, *Communication and Information, 5*(2), 183–206.

Wozney, L., Venkatesh, V., & Abrami, P. C. (2006). Implementing computer technologies: Teachers' perceptions and practices. *Journal of Technology and Teacher Education, 14*, 173–207.

Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Thousand Oaks, CA: Sage Publications.

Zembylas, M., & Vrasidas, C. (2005). Globalization, information and communication technologies, and the prospect of a 'global village': promises of inclusion or electronic colonization? *Journal of Curriculum Studies, 27*, 65-83.

Zhao, Y., Pugh, K., Sheldo, S., & Byers, J. (2002). Conditions for classroom technology innovations. *Teachers College Record, 104,* 482-515.

College of Education

School of Literacies and Arts in Education

Tel: +64 3 343 9606, Fax: +64 343 7790

UC
UNIVERSITY OF
CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Information Sheet for the Principal of TTC

Research Title: Understanding Teacher Educators' Perspectives of Information and

Communication Technology (ICT) Education

My name is Md. Ahasanul Arefin Chowdhury. I am a M.Ed. student at the College of Education, University of Canterbury. I am conducting a research study that investigates teacher educators' perceptions of the Teaching ICT in Education course in the B.Ed. program in Bangladesh. This study will provide me with an overview of ICT education in the B.Ed. program which includes the pedagogy of technology, and the barriers and enablers that might face the educators in their practices. Results of this research might help the decision makers in Bangladesh to understand the real situation of Teaching ICT in Education as a separate subject in the B.Ed. program.

I would like to invite two educators from your institution to be a participant in my research. Their participation will contribute to developing my understanding of ICT Education in the B.Ed. program, and I believe that their participation will also be useful for them in providing an opportunity to reflect on their professional work. Their involvement in this study will include two interviews and two observations. Firstly, I will interview each of them for 40 to 45 minutes. During the interview I will ask them some questions regarding my research topic and we will discuss these questions in order to understand their perceptions of ICT education in your institution. Next, I will conduct two non-intrusive observations in two of their classes in order to provide the basis for interpretation of data obtained from the interview. During the observation, I will sit at the back of the room in their class and will not interfere in their activities. Finally, I will interview them again for 40 to 45 minutes, and this time we will discuss their classroom activities to interpret their experiences and understandings with a view to address my research objectives.

The interview will be recorded and they may ask to stop recording at any time. They will be provided with a copy of the interview transcript for reviewing and changing if they wish. All information they provide will be treated in the strictest confidence, and they will remain anonymous. Any data that can identify them or your institution will not be given to any other researcher or agency. During the observation, I will take notes about the classroom activities. If they prefer me not to take notes, I am happy not to do so.

Their participation is completely voluntary. They have the right to withdraw from the study at any time by contacting me directly, and they will not be penalized for it. If they withdraw, I will use my best endeavours to remove any of the information relating to them from the

project, including any final publication, provided that this remains practically achievable. There is no potential risk or hazard in their participation in this study.

All information they provide will be treated in the strictest confidence, and they along with their institution will remain anonymous. Pseudonyms will be used in place of real names. Any data that can identify them will not be given to any other researcher or agency. Only I and my supervisors will have access to these data.

As required by the policy of University of Canterbury, at the completion of the study all information which includes raw data collected will be retained in a secured stored place for five years, after which time it will be destroyed.

The results of the study may be submitted for publication to national or international journals or presented at educational conferences. They can ask for additional information or results from this study any time. I will provide them the summary of results.

Please contact me (arefin.chowdhury@pg.canterbury.ac.nz) if you have any other queries or concerns about the project. I can be reached by phone on +88 01711466960 (in Bangladesh) or +643 02 10392471 (in New Zealand. You can also contact Mr Md. Nuzrul Islam, Joint Secretary & Project Director, TQI-SEP (Ph: 956-2228, nazrul@tqi-sep.org), or my supervisors Julie Mackey (julie.mackey@canterbury.ac.nz) and Dr. Donna Morrow (donna.morrow@canterbury.ac.nz) for any queries regarding this study. If you have any concerns or complaints about this research, please contact The Chair, Educational Research Human Ethics Committee (ERHEC), University of Canterbury (see details below).

Thank you for your consideration of this research project.

Md. Ahasanul Arefin Chowdhury (arefin.chowdhury@pg.canterbury.ac.nz)

This project has received ethical approval from the University of Canterbury, Educational Research Human Ethics Committee. Complaints may be addressed to :
Dr. Mere Skerret (mere.skerrett@canterbury.ac.nz)
The Chair, Educational Research Human Ethics Committee (ERHEC)
College of Education, University of Canterbury,
Phone: +64 3 3458225   Internal Phone: 44225

College of Education

School of Literacies and Arts in Education

Tel: +64 3 343 9606, Fax: +64 343 7790

UC
UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Consent Form for the Principal, TTC

Research Title: Understanding Teacher Educators' Perspectives of Information and Communication Technology (ICT) Education

I understand the aims and purposes of the research study undertaken by **Md. Ahasanul Arefin Chowdhury.**

I have read the information provided about this research and understand that the participation of the teacher educators from my institution in this research is voluntary. They will be interviewed by the researcher. They will also be observed on two occasions in their classroom practices. They can withdraw themselves any time from this study if they wish, and they will not be penalized for it. If they want to withdraw, the researcher will remove all information they provided.

I also understand that there is no potential risk or hazard in their participation in this study.

I am assured that their given information will be kept confidential and the findings of this research will not identify their name or the name of the institution.

I understand that all data will be destroyed after five years, and the participants will receive a copy of the findings of this study.

I am informed that the results of the study may be submitted for publication to national or international journals or presented at educational conferences.

 I have read the information sheet and consent form. I give my approval for educators from this institution to participate in the study.

I am assured that if any information is required then I can contact the researcher (Arefin Chowdhury, arefin.chowdhury@pg.conaterbury.ac.nz) or Mr Md. Nuzrul Islam (Joint Secretary & Project Director, TQI-SEP, Ph: 956-2228, nazrul@tqi-sep.org), or the researcher's supervisors Julie Mackey (julie.mackey@canterbury.ac.nz) and Dr. Donna Morrow (donna.morrow@canterbury.ac.nz). If I have any concern or complaint, please contact the Chair of the Educational Research Human Ethics Committee (ERHEC), University of Canterbury.

Name: . . . .

Signed: . . . .

Date: . . . .

Please return this form in the stamped and addressed envelope provided

College of Education

School of Literacies and Arts in Education

Tel: +64 3 343 9606, Fax: +64 343 7790

UC
UNIVERSITY OF
CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Information Sheet for the Participants

Research Title: Understanding Teacher Educators' Perspectives of Information and Communication Technology (ICT) Education

My name is Md. Ahasanul Arefin Chowdhury. I am a M.Ed. student at the College of Education, University of Canterbury. I am conducting a research study that investigates teacher educators' perceptions of the Teaching ICT in Education course in the B.Ed. program in Bangladesh. This study will provide me with an overview of ICT education in the B.Ed. program which includes the pedagogy of technology, and the barriers and enablers that might face the educators in their practices. Results of this research might help the decision makers in Bangladesh to understand the real situation of Teaching ICT in Education as a separate subject in the B.Ed. program.

I would like to invite you to be a participant in my research. Your participation will contribute to developing my understanding of ICT Education in the B.Ed. program, and I believe that your participation will be useful for you in providing an opportunity to reflect on your professional work. Your involvement in this study will include two interviews and two observations. Firstly, I will interview you for 40 to 45 minutes. During the interview I will ask you some questions regarding my research topic and we will discuss these questions in order to understand your perceptions of ICT education in your institution. Next, I will conduct two non-intrusive observations in two of your classes in order to provide the basis for interpretation of data obtained from the interview. During the observation, I will sit at the back of the room in your class and will not interfere in your activities. Finally, I will interview you again for 40 to 45 minutes, and this time we will discuss your classroom activities to interpret your experiences and understandings with a view to address my research objectives.

The interview will be recorded and you may ask to stop recording at any time. You will be provided with a copy of the interview transcript for reviewing and changing if you wish. All information you provide will be treated in the strictest confidence, and you will remain anonymous. Any data that can identify you will not be given to any other researcher or agency. During the observation, I will take notes about the classroom activities. If you prefer me not to take notes, I am happy not to do so.

Your participation is completely voluntary. You have the right to withdraw from the study at any time by contacting me directly, and you will not be penalized for it. If you withdraw, I will use my best endeavours to remove any of the information relating to you from the

project, including any final publication, provided that this remains practically achievable. There is no potential risk or hazard in your participation in this study.

All information you provide will be treated in the strictest confidence, and you will remain anonymous. Pseudonyms will be used in place of real names. Any data that can identify you will not be given to any other researcher or agency. Only I and my supervisors will have access to these data.

As required by the policy of University of Canterbury, at the completion of the study all information which includes raw data collected will be retained in a secured stored place for five years, after which time it will be destroyed.

The results of the study may be submitted for publication to national or international journals or presented at educational conferences. You can ask for additional information or results from this study any time. I will provide you the summary of results.

Please contact me (arefin.chowdhury@pg.canterbury.ac.nz) if you have any other queries or concerns about the project. I can be reached by phone on +88 01711466960 (in Bangladesh) or +643 02 10392471 (in New Zealand. You can also contact Mr Md. Nuzrul Islam, Joint Secretary & Project Director, TQI-SEP (Ph: 956-2228, nazrul@tqi-sep.org), or my supervisors Julie Mackey (julie.mackey@canterbury.ac.nz) and Dr. Donna Morrow (donna.morrow@canterbury.ac.nz) for any queries regarding this study. If you have any concerns or complaints about this research, please contact The Chair, Educational Research Human Ethics Committee (ERHEC), University of Canterbury (see details bellow).

Thank you for your consideration of this research project.

Md. Ahasanul Arefin Chowdhury (arefin.chowdhury@pg.canterbury.ac.nz)

This project has received ethical approval from the University of Canterbury, Educational Research Human Ethics Committee. Complaints may be addressed to :

Dr. Mere Skerrett (mere.skerrett@canterbury.ac.nz)
The Chair, Educational Research Human Ethics Committee (ERHEC)
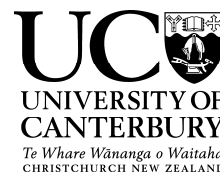College of Education, University of Canterbury , Phone: +64 3 3458225   Internal Phone: 44225

College of Education

School of Literacies and Arts in Education

Tel: +64 3 343 9606, Fax: +64 343 7790

UC
UNIVERSITY OF
CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Participant Consent Form

Research Title: Understanding Teacher Educators' Perspectives of Information and
Communication Technology (ICT) Education

I understand the aims and purposes of the research study undertaken by **Md. Ahasanul Arefin Chowdhury.**

The study has been explained to me and I understand the information that has been given to me on the information sheet. I have had all my questions answered to my satisfaction.
I am aware that my participation is entirely voluntary. I can withdraw from the study at any time and I do not have to give any reason for withdrawing. I am assured that there is no potential risk or hazard in my participation in this study.

I understand that my involvement will include responding to two interviews each with duration of approximately 40 minutes. I also understand that I will be observed on two occasions in my classroom practice. The interviews will be recorded and I can ask the recording to be stopped any time. I will be provided with a copy of the interview transcript to check accuracy.

I realize that all information will be treated in the strictest confidence and that my participation will remain anonymous and no information that could identify me or my institution will be given to other researchers or agencies. My given information will be locked in a secure facility at the University of Canterbury where it will be destroyed after five years.

I understand that within these restrictions, the findings may be submitted for publication to national or international journals or presented at educational conferences. I am informed that I will be provided the summary of results, and I can request a copy of the study.
I am assured that if any information is required then I can contact the researcher (Arefin Chowdhury, arefin.chowdhury@pg.conaterbury.ac.nz) or Mr Md. Nuzrul Islam (Joint Secretary & Project Director, TQI-SEP, Ph: 956-2228, nazrul@tqi-sep.org), or the researcher's supervisors Julie Mackey (julie.mackey@canterbury.ac.nz) and Dr. Donna Morrow (donna.morrow@canterbury.ac.nz). If I have any concern or complaint, I can contact to the Chair of the Educational Research Human Ethics Committee (ERHEC), University of Canterbury.

I have read the information sheet and consent form. I agree to participate in the study.

Name: . . . .

Signed: . . . .

Date: . . . .

Please return this form to the researcher (Arefin Chowdhury) in the stamped and addressed envelope provided

This project has received ethical approval from the University of Canterbury, Educational Research Human Ethics Committee.

Complaints may be addressed to:
The Chair, Educational Research Human Ethics Committee
College of Education, University of Canterbury
Phone: +64 3 3458225

Appendix – E

Interview Schedule

Background Questions

1. Please tell me about your career history. (academic background, major area of study, professional experiences)
2. Which course(s)/subject(s) do you teach in the B.Ed. classes?
   Why? – follow up probing question.
3. How did you learn about ICT (or develop ICT skills and understanding)?

Exploration of Teacher's Existing Ideas about Teaching ICT in Education

1. What does ICT mean to you personally? Why?
2. What was your initial response when you first heard about teaching ICT in B.Ed. program?
3. What do, you think, ICT mean in teacher education program?
4. Can you describe some of the teaching practices you use when teaching ICT in B.Ed. classes?
5. Tell me how those approaches are similar or different to other courses?
6. (a). Are there things you would like to be doing differently?
   (b). What prevents you from doing that?
   (c). What would encourage or enable you to do this?
7. How would you describe the ideal ICT lesson?
8. Do you think ICT should be a compulsory or elective or optional subject in B.Ed. curriculum? Why?
9. What do you think the trainee teachers should be learning in about ICT in the B.Ed. curriculum?

Implementing ICT in the Classroom

1. What do you think about the ICT course in the B.Ed. curriculum in Bangladesh?

2. How do you feel about implementing the ICT curriculum in the classroom? Why?

3. Tell me about your planning strategies for implementing ICT in the classroom? How closely do you follow the Teachers manual and resources provided?

4. What do you see are the key issues in implementing the ICT curriculum in the classroom? Why are these issues for you? Do you think these would be issues for other teachers?

5. Are there any other aspects you would like to tell me about?

Thank you for your kind participation in this study.