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UNIVERSITY OF SOUTHAMPTON

FACULTY OF SOCIAL AND HUMAN SCIENCES

Southampton Education School

**TECHNOLOGY ENHANCED TEACHER-LEARNING IN RURAL BANGLADESH :
A CRITICAL REALIST INQUIRY WITH SECONDARY
TEACHERS OF ENGLISH**

by

Md Golam Jamil

Thesis for the degree of Doctor of Philosophy

May 2015

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UNIVERSITY OF SOUTHAMPTON

ABSTRACT

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TECHNOLOGY ENHANCED TEACHER-LEARNING IN RURAL BANGLADESH: A CRITICAL REALIST INQUIRY WITH SECONDARY TEACHERS OF ENGLISH

by Md Golam Jamil

In this thesis I explore the feasibility of technology enhanced teacher-learning approaches in rural Bangladesh. The secondary teachers of English are my research focus and, apart from them, the core stakeholders include the head teachers and the local teacher trainers. My research questions cover specific inquiries on the learning culture of these teachers, their attitudes about the application of technology in teacher-learning, and realistic pedagogical and management procedures for operationalising technology enhanced teacher-learning in rural Bangladesh. In my investigation I follow the critical realist and mixed-method research approaches by addressing the psychological, social, educational and technological perspectives of the stakeholders. Based on an extensive literature review on learning, pedagogy and technological interventions in professional development, I propose that the post-constructivist approaches (I use this term to refer to social constructivism and connectivism) are appropriate for the teacher-learning programmes for rural Bangladeshi teachers. The approaches are also compatible to various technological interventions. I initially design a technology enhanced teacher-learning framework emphasising the applications of teachers' experiences and reflections which, based on my research findings, extends to the applied form by incorporating the management, application of teacher-learning in teaching, and monitoring procedures. For collecting the research data I conduct a questionnaire-based survey and a series of six workshop-led focus group discussion sessions in a rural district of Bangladesh. In the process I emphasise the inclusion of different stakeholders and their higher participation to gain relevant indigenous knowledge representing realistic findings. The collected research data and their analysis provide useful baseline information particularly about the learning culture of the stakeholders and their perceptions about technology enhanced teacher-learning approaches. It also provides practical guidelines on the effective and sustainable approaches of technology enhanced teacher-learning in rural Bangladesh context. I expect that the learning from this research would help design and implement effective technology enhanced teacher-learning schemes for rural Bangladesh and, at the same time, provide guidelines to operationalise similar professional development programmes for the teachers of other subjects of other institutional levels representing different educational contexts.

Supervised by: Dr Martin Dyke and Dr John Schulz

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DECLARATION OF AUTHORSHIP

I, Md Golam Jamil, declare that this PhD thesis entitled ‘technology enhanced teacher-learning in rural Bangladesh: a critical realist inquiry with secondary teachers of English’ is my own, and the work has been generated by me as the result of my own original research. I confirm that:

- this work was done wholly in candidature for the PhD research degree at this University;
- where I have consulted the published work of others, this is always clearly attributed;
- where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
- I have acknowledged all main sources of help;
- where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
- none of this work has been published before submission.

Signed:

Date:.....

Acknowledgements

This doctoral research is the culmination of a great educational journey with many people and organisations. I take this opportunity to express my gratitude to some of them.

First and foremost, I would like to thank my PhD supervisors Dr Martin Dyke and Dr John Schulz. I am greatly indebted to Martin for being a tremendous mentor for me. Without his prudent views and unreserved support this thesis would not have been possible. I am ever grateful to John for expanding my vision and skills of research.

My special appreciation is for all the research participants of Netrakona in Bangladesh, my research assistant Shimul Milkey, and all BRAC Education Programme staff who helped me in the fieldwork and data collection activities.

I offer my enduring gratitude to University of Southampton, UK, and BRAC University, Bangladesh, for providing me this research opportunity. I am grateful to University of Southampton for granting me the Vice Chancellor's research scholarship and Southampton Education School award. BRAC University, particularly its Chairman Sir Fazle Hasan Abed and the Institute of Languages' Director Lady Sarwat Abed, generously funded my maintenance in UK. I extend my deepest thanks to Southampton University's Humanities department for providing me a teaching job which has been an invaluable professional experience and financial support. I am grateful to the Charles Wallace Bangladesh Trust for granting me their educational bursary, and the Worldwide University Network for providing me the Visiting Researcher Fellowship to work with Professor Kyle Peck at Penn State University, USA. I am enlightened by Professor Peck's wisdom, simplicity and progressiveness.

Words are not enough to express gratitude to my parents and mother-in-law who have endless love, prayers and care for me. Special thanks are owed to my lovely wife Shuchita who has been with me all these years and took all the pain so that I can concentrate on my studies. A special mention for Safir, my son, for giving me happiness even in difficulties and hard time.

Finally, I am grateful to Allah, the creator, the Lord of majesty and bounty.

Dedication

to baba, ma, amma, shuchi and safir ...

Operational Definitions and Abbreviations

Teacher-learning

Professional learning required for teachers to enhance and re-enforce content and pedagogic knowledge and skills for improved teaching performances. The term covers the general features of ‘teacher education’ and ‘teacher training’, and can be gained both at pre- and in-service stages of the teaching profession.

Teachers of English (commonly known as ‘English teachers’ in Bangladesh)

The teachers who generally teach English (both language and literature). In the secondary schools of Bangladesh there are no official posts of subject-based teachers. Therefore, English teachers of these schools are not dedicated to teach English subject only, they also have to teach other subjects.

Rural Bangladeshi private secondary schools

The schools which generally provide education from level VI to X, and are situated outside the municipality areas, and are not directly funded and operated by the Bangladesh government’s education departments.

English Language Teaching or ELT

The term refers to the processes, approaches and strategies of English language learning and teaching mainly in an ESL (English as a Second Language) or an EFL (English as a Foreign Language) context. It also includes the domain of English language teaching related theories and practices.

Information and communication technology (ICT)

The term ICT or the Information and communication technology is used to refer to the modern electronic communication tools such as telephones, computers, the Internet, wireless signals and audio-visual instruments. It covers all digital devices and systems that can electronically transmit, store, manipulate or retrieve information in audio, visual or text format.

Chapter 1: The field of inquiry

1.1 Preface

Numerous research findings (discussed elaborately with evidences in Chapter 4 and 5) report various benefits of technology enhanced teacher-learning. However, these optimistic claims are questionable for their overgeneralisation and incompatibility with the practical conditions of disparate educational contexts (discussed in Section 1.3 of this chapter). In this thesis, I address this problem and try to overcome the limitations of traditional research methodologies for studying technology enhanced teacher-learning approaches in the context of rural Bangladesh.

In my study I explore the suitability of various technology enhanced teacher-learning strategies with a focus on technology, pedagogy, society and workplace issues in a critical and realistic manner. Whereas rural Bangladesh, the context, receives the central attention in the thesis; the teachers who teach English at rural secondary schools act the role of the major sources of experiences and reflections in the venture of knowledge creation. By following a critical realist and mixed-method research approach I gain research data from both the observable and unobservable sources which are providing the reliable baselines for initiating any technology enhanced teacher-learning schemes in rural Bangladesh. Additionally, they are contributing the guidelines for any relevant futuristic schemes that can improve the personal, professional and social lives of the marginalised teacher community of this part of the world.

As soon as my research journey begins, I will be found surfing the existing knowledge particularly the concepts and practical evidence on learning and teacher-learning issues in relation to technological innovations (elaborated in Chapter 3, 4 and 5). While the exploration continues, I will be seen visiting schools in a rural District of Bangladesh and working with the teachers to explore the research questions (explained in Chapter 6 with data collection procedures). To conduct this research I travelled with a set of tablet computers and a few wireless hotspot modems in my rucksack to bring the Internet to

places where the reach of the online connectivity is limited. This experiment of learning using tablet computers across the local mobile phone network became successful and offered a potential approach for delivering online learning to remote locations. The scheme also enabled my academic supervisors to meet and work directly with the teachers of rural Bangladesh.

Here I should admit that this thesis is not only my effort to accomplish some conventional objectives of academia, this is also an outcome of my pursuit where I value my attachment to the 'vulnerable' teachers of rural Bangladesh and hope to see positive changes in their lives and profession (please refer to Chapter 2 where I describe the state of the rural Bangladeshi school teachers and my personal attachment to them).

1.2 Technology enhanced teacher-learning: what it offers

In this present world of globalisation the use of technology in education is an important catalyst for improving teaching and learning practices (Beetham & Sharpe, 2013; Voogt, Tilya, & van den Akker, 2009; Williams, Coles, Wilson, Richardson, & Tuson, 2000). Technology, more specifically Information and Communication Technology (ICT), plays an important role in generating, disseminating and networking various forms of thoughts, work, and information (Castells, 1996; Urry, 2003) which consequently provide abundant learning opportunities to various stakeholders (Ainsworth, Bibby, & Wood, 1997; Fredriksson, Gajek, & Jedeskog, 2009; Katz, 2005; Mellar et al., 2007; Papert, 1997). As teachers and teaching require professional knowledge through continuous learning (Cochran-Smith & Lytle, 1999; Finley, Marble, Copeland, & Ferguson, 2000; Hirsch, Koppich, & Knapp, 1998), integration of technology is therefore useful in teacher development schemes (Lawless & Pellegrino, 2007).

Research findings (for example, Brouwer, Ekimova, Jasinska, Van Gastel, & Virgailaite-Meckauskaite, 2009; Dilworth et al., 2012; Lofstrom & Nevgi, 2008; Volman, 2005) show that technology supplies powerful learning experiences and brings qualitative changes in professional practices of teachers and teacher educators. Additionally, it is capable of constructing professional knowledge and skills through collaboration, negotiation and reflection in

active, supportive and authentic learning contexts (Brown, Collins, & Duguid, 1989; Jonassen, Peck, & Wilson, 1999). In this relation, research findings (for example, Horn & Little, 2010; Jackson & Bruegmann, 2009; Vescio, Ross, & Adams, 2008) show that positive changes occur in teachers' professional capabilities when they learn collectively and alongside their regular classroom practices. Therefore, a number of researchers (such as Banks, Moon, & Wolfenden, 2009) and education development organisations (such as UNESCO, 2008, 2012b) recommend technology supported and school-based professional development schemes as viable approaches for teacher development. The US Department of Education in their official website provides the following optimistic view regarding the use of technology in learning.

Technology ushers in fundamental structural changes that can be integral to achieving significant improvements in productivity. Used to support both teaching and learning, technology infuses classrooms with digital learning tools, such as computers and hand held devices; expands course offerings, experiences, and learning materials; supports learning 24 hours a day, 7 days a week; builds 21st century skills; increases student engagement and motivation; and accelerates learning. Technology also has the power to transform teaching by ushering in a new model of connected teaching. This model links teachers to their students and to professional content, resources, and systems to help them improve their own instruction and personalize learning ("Use of Technology in Teaching and Learning," 2013).

However, in reality, the integration of technology in learning practices may be experienced as a 'wicked problem [because of many]... incomplete, contradictory, and changing requirements' (Koehler & Mishra, 2008, p. 10). This is because the outcomes of any technology enhanced education are dependent on factors like socio-cultural settings (Tu & McIsaac, 2002), users' view-points (Paraskeva, Bouta, & Papagianni, 2008; Rogers, 2003), workplace conditions (Baylor & Ritchie, 2002; Tondeur, Keer, Braak, & Valcke, 2008), and the types of curriculum and instruction (Coates & Humphreys, 2001; Herrington & Oliver, 1999). Additionally, learners' motivation and preferences about the use of technology in learning, and their cognitive styles and

interpersonal behaviours (Kanuka & Nocente, 2003) along with their technology relevant conceptual knowledge (Piccoli, Ahmad, & Ives, 2001) are active while they learn. Moreover, the list of these guiding variables and their role in any technology enhanced learning may vary from context to context. Research evidence (for example, the review of 150 distance education programmes in sub-Saharan Africa), indicates that in many educational contexts technology enhanced learning approaches (such as online or Web-based learning) are not reliable and consistent for socio-economic, cultural and administrative reasons (Leary & Berge, 2006; Perraton, 2000). Besides, the weaknesses of learning contents, technological designs, and the applied pedagogical approaches also limit the success of this type of learning (Mishra & Koehler, 2006; Rienties & Townsend, 2012; Ziegenfuss & Lawler, 2008). While designing suitable technology enhanced learning approaches for any social and educational contexts it is therefore important to address the relevant personal, social, and workplace related factors.

1.3 Challenges of technology enhanced teacher-learning in rural Bangladesh

Presently Bangladesh is prioritising the use of technology in the education sector. The country's first National Education Policy, released in 2010, emphasises the adaptation of Information and Communication Technology (ICT) 'in educational process at every level' (Ministry of Education Ministry of Education, 2012, p. 9). In 2013, the government made ICT education compulsory in secondary education level, and by 2010 equipped 58.89 % secondary schools with computers as part of this process (Bangladesh Bureau of Educational Information and BANBEIS, 2010). However, in most of the schools in Bangladesh technology or ICT is still a subject to study only; not a medium for teaching and learning. In fact, technology-based learning is a new concept here and thus technology enhanced teacher development is a recent phenomenon. Yet, to date, I can mention three significant educational projects namely BRAC's (Building Resources Across Borders, a non-government organisation) Computer Aided Learning Programme (started in 2004), Mobile technology supported e-Teacher Training component of the government's Teaching Quality Improvement in Secondary Education project (started in 2006), and English in Action project (UK government funded, and started in

2009) where technology has been used for improving teaching and learning experiences in schools. These projects, except the e-Teacher Training component, are student focused and they offer the strategies and benefits to achieve various student learning objectives (BRAC, 2013; Pouezevara & Khan, 2007; Shohel & Banks, 2012).

Based on the outcomes of the above projects, and by reviewing the research findings of the similar teacher-learning approaches in global contexts, I realise the advantageous roles of technology in teaching and learning. Consequently, I consider technology enhanced learning approaches effective for the professional development of Bangladeshi teachers. I expect that these teachers can be educated and trained via the use of various electronic media (such as video/audio tape, computer, the Internet and mobile phone) which would 'improve the quality of [their] learning by facilitating access to resources and services as well as remote exchanges and collaboration' (Qvortrup, 2006, p. 17). I also claim that the facilities of technology such as data storing, updating and disseminating among users via the Internet (Rosenberg, 2001) would enable effective collaboration among them for sharing their educational knowledge and skills in an 'open, flexible, and distributed learning environment' (Khan, 2005, p. 33). The use of technology for teacher-learning also seems suitable for rural Bangladesh context as it is easily accessible to distant and differently abled participants (Chen & Dahlman, 2004), and can reduce teacher training and development related cost (at least 60% as calculated by Kejak & Ortmann, 2003). Moreover, this type of technology driven approach can help vulnerable rural Bangladeshi teachers raise their voice against all kinds of disparity and contribute to the overall development of the country (Bruck & Roth, 2013).

I however find technology enhanced teacher-learning approaches problematic and unreliable as the perceived benefits appear as overgeneralised, ambitious, and not entirely compatible in the practical situations of dissimilar educational contexts.

I observe that the traditional research on technology enhanced learning, which is often restricted to the operationalization of technology and the performances of a limited number of participants in a controlled learning

environment, do not provide any comprehensive and transferable research findings. Research evidence (for example, Alvarez, Guasch, & Espasa, 2009) confirms that, although the use of technology in teacher education has been widely experimented within Australia, Europe and the US; still no large-scale programmes are evident. Moreover, in most of these research projects on technological innovation teachers are involved as research subjects only not as advice-givers or decision makers, which sometimes makes the research findings undependable in practical educational contexts (Means, 1994). After all, in the traditional technology enhanced teaching/ learning related research the attachment of socio-historical and political settings, which is required for the stable change in education, is almost absent. I also notice that, while technology is accepted for educational developments in many developed countries, it is rejected or greatly challenged in many developing countries (Bose, 2003; Kozma & Vota, 2014).

The existing technology enhanced teacher development models and the outcomes of their applications raise a question whether, or to what extent they are transferable to other educational settings where different socio-economic and geo- political conditions, diverse professional preferences and practices, and different states of technological orientations exist. This problem intensifies further as research-findings show that in many rural areas of developing countries the adaptation of technology in educational activities create several difficulties. According to Lewins,

In many educational systems in developing countries, the losers in the change process are those clients on the margins of the existing system. Rural children and teachers in isolated, under-resourced, and neglected schools, with many unqualified teachers and little access to information, are those least prepared for the change (Lewins, 1991, p. 16).

In addition to the above problems, there are challenges in ensuring the sustainability of technology enhanced learning as most of the research findings do not propose any long term policies. The perception that technology itself can bring reforms in learning practices is also misleading (Vrasidas & McIsaac, 2001). Moreover, most of the technology enhanced learning often lacks the discussion on the procedures of providing the on-going support, both on technology and pedagogy, to the users for their continuing and constructive

professional learning (Llorens, Salanova, & Grau, 2002). To overcome these limitations it is therefore essential to ensure sustainable technological adaptation strategies and suitable reforms in the curriculum and policy (Joint Information Systems Committee, 2009).

1.4 Research focus and boundaries

By acknowledging the limitations of the traditional research methodologies for studying technological innovations in education, and to ensure the reliability of the research findings and their sustainability in a large scale technology enhanced learning intervention, in this thesis, I emphasised the aspects and factors (such as personal, social and technological) relevant to rural Bangladeshi teachers' professional learning and development. For understanding these elements and for establishing a theoretical and evidence-based research ground I conducted an extensive literature review on the theories and practices of learning, and also on teacher development related technological innovations. While constructing the research methodology I particularly studied technology related preferences, skills, professional learning networks, learning needs, availability of technological facilities, pedagogical approaches and operational procedures of technology enhanced teacher-learning. The Figure 1.1 below summarises my key considerations in this regard.

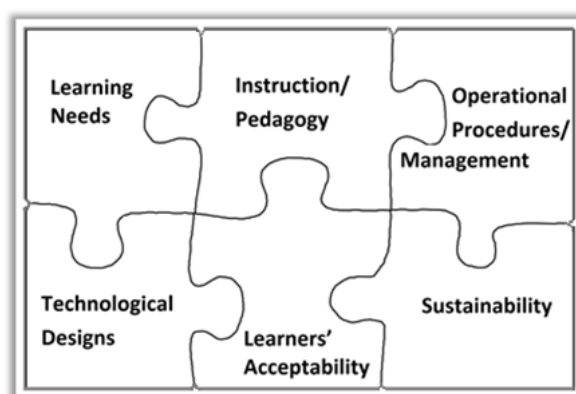


Figure 1.1: Considerations for technology enhanced teacher-learning research

It is important to mention that, for a context-specific and community-focused investigation I chose the teachers of English working in rural Bangladeshi secondary schools as my research subjects. The rationale behind selecting the

rural context is that it contains above 70% of the total population of the country (World Bank, 2012) and the socio-economic conditions of this part is more disadvantaged (Haque & Islam, 2012). Moreover, the numbers of schools and teachers in rural areas are not adequate, and because of the different socio-economic situations (such as living conditions, school environment and teachers' quality) the state of teaching and learning is poor (Haq & Islam, 2005). Furthermore, I particularly selected the teachers of English because they are vulnerable professionals who suffer from the lack of required English proficiencies and language teaching skills (please refer to Chapter 2 for my discussion on the overall state of the rural secondary schools and the teachers of English).

1.5 Research questions

To investigate the social and educational contexts of rural Bangladesh and to explore the feasibility of technology enhanced teacher-learning for the professional development of the secondary teachers of English, first, I reviewed the major concepts of learning and their theoretical paradigms. Then, I compared my findings with a number of technology enhanced teacher-learning pedagogies and their applications in teacher development schemes. This however raised questions of adjustability and sustainability of these approaches/models of learning in the social and educational contexts of rural Bangladesh. I therefore considered the following overarching aim and the research questions for my investigation.

a) Overarching aim

The aim of my research is to explore the following overarching question:

What are the realistic technology enhanced teacher-learning approaches that provide effective and sustainable professional development opportunities to rural Bangladeshi secondary teachers of English?

Here, 'realistic' is a navigating term which directs to the ideas of context-friendliness of the technology enhanced teacher-learning strategies and the practicality of their implementation procedures by addressing adaptability, user satisfaction, sustainability and 'affordances'. By the term 'affordances'

(introduced by Gibson, 1979) I refer to the 'perceived and actual properties' (as mentioned by Norman, 1988) along with different applications of technology.

b) Research themes and questions

To explore the overarching research question I examined the following three thematic areas and eleven sub-questions for an empirical investigation.

Theme 1: learning culture

- a) How do secondary English teachers of rural Bangladesh prefer to receive professional learning?
- b) What professional knowledge and skill areas do they need to develop?
- c) Who are connected to their professional learning processes?
- d) What personal and work-place related advantages do they receive while engaging in professional learning?
- e) What personal and work-place related challenges do they face while engaging in professional learning?

Theme 2: attitudes and affordances

- a) What is the present state of technology in the learning and professional development of the rural Bangladeshi secondary English teachers?
- b) What is the attitude of the teachers towards the use of technology in learning?
- c) What forms of technological interventions do they consider motivating, engaging and productive for professional learning?

Theme 3: pedagogy and management

- a) What pedagogical approaches of technology enhanced teacher-learning do the teachers consider feasible for their professional learning? Why do they think so?

- b) What pedagogical approaches of technology enhanced teacher-learning schemes do the school administrators and teacher educators consider effective and sustainable for teacher-learning? Why do they think so?
- c) What administrative and management procedures do they consider essential for implementing any technology enhanced teacher-learning schemes? Why do they think so?

1.6 Approaches of investigation

To explore the research questions I applied the critical realist and mixed-method research approaches in this thesis (please refer to Section 6.4 and 6.5 of Chapter 6 for the detailed definitions and features of these two approaches). The study also contains the features of community-focused, inclusive and participatory investigation (discussed elaborately in Section 6.5 of Chapter 6).

Through critical realism, the philosophical base of my research, I amalgamated varied angles of visions of the psychological, social and educational perspectives of the research area in order to realise various objects of the research context, experiences of the participants, and the social structures that influence and operate the context. I however kept my focus in these studies on the context-friendliness (in terms of practicality, user satisfaction and sustainability) of technology enhanced professional learning strategies for the English teachers of rural Bangladeshi secondary schools.

In my investigation I included various stakeholders (such as English teachers, head teachers and teacher educators) and ensured their participation. I also followed the mixed-method approach of research for evaluating the research participants and the target context both qualitatively and quantitatively. In this regard, I conducted a questionnaire-based survey to understand the personal, social, educational and technological circumstances of the target teachers and their professional learning network and community. At the same time, by acknowledging the need for combining expert-driven and evidence-based information with the experiences of the stakeholders and their indigenous knowledge, I facilitated a series of six focus group discussion sessions. I combined these sessions with interactive workshops involving technology for learning purposes and tried to ensure that these are participatory where

consultation and co-operation are the driven forces in constructing knowledge (please refer to Chapter 6 for the detailed discussion on the research approaches, designing of data collection instruments, and their administering procedures).

1.7 Thesis structure

I divide this thesis into the following nine chapters under five themes namely Research Background and Introduction, Literature Review, Research Methodology, Data Reporting, and Discussion and Conclusion.

Chapter 1 and 2: Research Background and Introduction

In Chapter 1 I provide a brief description of the research problem, research focus, research questions and the research approaches of my thesis.

In Chapter 2 I describe the educational context along with my personal attachment to the research area.

Chapter 3, 4 and 5: Literature Review

In Chapter 3 I review various learning theories. Here I particularly focus on adult learning and teacher development related issues.

In Chapter 4 I explore the implications of the use of technology in teacher-learning. Based on my findings of this chapter, and also of Chapter 3, I construct a theoretical framework for technology enhanced teacher-learning in rural Bangladesh.

In Chapter 5 I study the applications and outcomes of technology enhanced teacher-learning pedagogies in global contexts.

Chapter 6: Research Methodology

In Chapter 6 I analyse my findings from the literature review and propose a methodology for investigating my research questions in rural Bangladesh context. Here I suggest a set of research tools and techniques for data collection and explain the rationale for choosing these with references to validity and reliability issues. Additionally, I explain my data reporting and analysis procedures in this chapter.

Chapter 7 and 8: Data Reporting

I report my research data in Chapter 7 and Chapter 8.

In Chapter 7 I present my survey data following quantitative data reporting techniques.

Then, in Chapter 8 I present the focus group data in qualitative data reporting format.

Chapter 9: Discussion and Conclusion

In this final chapter I analyse my datasets and critically discuss the findings. I also list my recommendations on technology enhanced teacher-learning approaches for rural Bangladeshi secondary teachers of English and suggest the future research directions as part of the concluding remarks.

Chapter 2: Research context and researcher

2.1 Setting the scene

Since life means growth, a living creature lives as truly and positively at one stage as at another, with the same intrinsic fullness and the same absolute claims. Hence education means the enterprise of supplying the conditions which insure growth, adequacy of life, irrespective of age (Dewey, 1926, p. 61).

Dewey's thought on education as the vehicle for the change in human life is further explained through its various contributions such as enhancing equality (Aghion, Caroli, & García-Peñalosa, 1999), economic growth (Gylfason, 2001), and democratisation (Barro, 1997). Besides, education performs as a 'great equalizer of the conditions of man' (Horace Mann, cited by Cremin, 1957, p. 87) by supplying opportunities for manipulating circumstances, facilitating confidence, and creating options for development (UNESCO, 1997). Yet, educational outcomes mostly depend on the performances of teachers as they play the key parts in educational activities which subsequently bring changes in societies and in states (Darling-Hammond, 2006; Liberman & Miller, 2000; UNESCO, 2012b).

The teachers' role however is diverse as teaching, the principal professional responsibility of teachers, is a 'complex work that looks deceptively simple' (Grossman, Hammerness, & McDonald, 2009, p. 12). Teachers have to take realistic decisions for the benefits of their learners; and are expected to be aware of learning differences, cultural impact, and the availability of knowledge sources (Darling-Hammond & Bransford, 2005). Conceptually, they need to possess adequate knowledge about learning processes and knowledge building strategies (Elmore, 1996); and also about curriculum, teaching materials, classroom management techniques and assessment policies (Grossman, Smagorinsky, & Valencia, 1999). To fulfil these demands teachers require adequate preparations and continuous learning practices supported by their surrounding social settings and conditions along with the educational culture of academic institutions (Newmann & Wehlage, 1995). However, many

teachers are not able to accomplish all these requirements for various reasons. For example, in Bangladesh, most secondary school teachers live and work in impoverished social and work-place conditions which restrict them in achieving essential professional qualities.

Bangladesh, situated in South Asia, has 1,47,570 square kilometres land area with a vast population of above one hundred and forty million (BANBEIS, 2011) making it the ninth most densely populated country (World Bank, 2011). 43.3% of the population here are extremely poor as their daily income is less than a US dollar (*The Millennium Development Goals: Bangladesh Progress Report'2012*, 2013). Conversely, the enrolment rate in the primary education was 98.7 % in 2011 and the completion rate of this stage was 79.5 % (*The Millennium Development Goals: Bangladesh Progress Report'2012*, 2013), which together demonstrates an overall positive attitude towards education by people from all walks of life. From this I understand that a high amount of expenditure, resources and people are involved in the country's education sector, particularly in the primary and secondary school levels. However, the quality of teaching and learning is still not high and the number of teachers in schools is inadequate to operate educational activities properly (Ahmed, Nath, Hossain, & Kalam, 2006; Nath & Chowdhury, 2009; UNESCO, 2012b).

2.2 Educational context and English language teaching in Bangladesh

The literacy rate in Bangladesh is low (59.82 % adult literacy, according to BBS, 2011b), but the government of the country is committed to ensure 'Education for All' by 2015 which is one of the major objectives of the Millennium Development Goals (Sharmin & Roy, 2011). The country is already successful in ensuring high rates of students' access to education (*The Millennium Development Goals: Bangladesh Progress Report'2012*, 2013) and, according to UNESCO (2012a), the Gross Enrolment Ratio (GER) in primary schools in 2009 was 93%, and 47% in secondary schools in 2002. However, the overall quality of teachers, teaching, and learning is not satisfactory (Ahmed et al., 2006; Nath et al., 2008). About 63% lower secondary school teachers do not meet the required teaching qualifications (UNESCO, 2006), and the majority part of the primary and the secondary teachers lack the required subject knowledge and

teaching skills (Nath & Chowdhury, 2009). Moreover, there is the negative impact in education of poor infrastructural facilities, corruption, political unrest, and rapid advancement of technology (Akbar, 2005).

To better understand the current state of education in Bangladesh I describe the country's education systems and the states of the school teachers in the following sections (Section 2.2.1, 2.2.2 and 2.2.3). To ensure the relevance with my research focus of this thesis I however keep my discussion limited to the situations of the English teachers and their teaching only.

2.2.1 Education system

In Bangladesh, the formal education system is structured with three major streams: General, Technical-vocational and Madrasha education (Ministry of Education, 2012). The General education stream is the mainstream where students study pure and applied science, humanity, business and social-science subjects. The technical-vocational stream provides skill-based and job oriented short-term education for students willing to work in the fields of agriculture, engineering and medicine. The Madrasha education, the third one, emphasises religious studies, but follows the same core courses as of the general stream.

Under the above three streams there are three types of educational institution categorised and named according to the levels of education they provide. Table 2.1, based on the data provided by Bangladesh's Ministry of Education (2012), lists these educational levels and streams along with the ranges of students' age.

Table 2.1: Streams and levels of education in Bangladesh

Age	Grade/ level	General	Technical- vocational	Madrashah (government recognised)
3-5	Not given	Pre-primary schools	Nil	Nil
6-10	I-V	Primary schools	Nil	Ebtedayee Madrasha
11-15	VI-X	Secondary schools	Vocational schools	Dakhil Madrasha
16-17	XI-XII	Higher secondary schools/ colleges	Diploma institutions	Alim Madrasha
18+	XIII-XX	Universities and Colleges (general and technical)	Technical Universities	Fazil Madrasha and Kamil Madrasha

Students can choose any stream to study up to level X at relevant type of institution, but from level XI onwards it is restricted as the previous education becomes one of the criteria for the admission in a particular type of higher educational institution. All these three types of institute are government recognised, and they are operated by separate government departments. Furthermore, according to the sources of funding and types of management body, the educational institutions are of two categories: government and private. The government institutions are entirely funded and operated by the government ministry and education departments whereas the private institutions are run by government recognised school/ college management committees, and are partly financed and monitored by the government. In Bangladesh, most of the secondary schools are private and situated in rural areas. The following record (Table 2.2) of Bangladesh Bureau of Educational Information and Statistics (BANBEIS, 2010) provides the data on this.

Table 2.2: Status of Bangladesh's secondary educational institutions and teachers

Institution and teacher types	Secondary Schools	Dakhil Madrasah	Technical-vocational
Number of secondary educational institutions (both government and private)	15,329	6,660	1,194
Number of secondary teachers (both government and private)	1,83,639	64,791	13,879
Number of rural secondary private institutions and their percentage	15,214 (99.25 %)	6,060 (90.99 %)	583 (48.83 %)
Number of rural secondary private teachers and their percentage	1,57,549 (85.79 %)	58,812 (90.77 %)	6,754 (48.66 %)

Here I want to emphasise that the rural private secondary schools of Bangladesh and their teachers are my research focus. The reason for this selection is the significance of this type of school in the overall education sector of the country. The primary education is compulsory here and consequently there is a high rate of student admission in the secondary schools. Besides, this phase of education is important for the students, teachers and guardians as the chances of availing competitive higher secondary and tertiary level education in the country greatly depend on the achievements at this stage. Therefore, the quality of education of the

secondary schools, more specifically the rural private secondary schools, determines the overall educational standard of the country.

2.2.2 State of English teachers

In Bangladesh, most of the secondary schools are situated in rural areas and more than ninety per cent of these are private (BANBEIS, 2010). For becoming a teacher at these schools an applicant has to have fourteen years of formal education, and there is no requirement of any pre- or in-service training. Only a few short-length teacher training schemes, offered by the government departments and a few non-government organisations, are the options for these teachers to learn professional and pedagogical components. English training programmes generally contain multiple objectives (such as teachers' English language skills, content knowledge and teaching skills improvement) within a single training module, and they are generally focused to the common needs only. The Directorate of Secondary and Higher Education (DSHE) of the country mainly looks after the administrative matters of these teacher training programmes and they do not have active tools to monitor and evaluate the impact of the schemes.

After adopting the Communicative Language Teaching or CLT (discussed further in Section 2.2.3) approach in the secondary education in 2001, about 11,737 secondary school teachers have received a thirteen-day CLT training from the government programmes (DSHE, 2004), and 17,714 teachers of 2,044 schools from BRAC, a non-government organisation (BRAC, 2007). Besides, a small number of English teachers have received short English teaching courses and workshops from the private organisations such as Bangladesh English Language Teachers' Association (BELTA) and UK Bangladesh Education Trust (UKBET). Since 2008 the Bangladesh government has been running a nine-year project called English in Action (EIA), funded by the UK government for English teaching/learning quality improvement. Although the principle aim of these teacher training activities is to improve the overall English teaching quality so that both teachers and students undergo better learning experiences; the schemes do not seem adequate and thus the English teachers, particularly in rural areas, still fail to show expected teaching performances (EIA, 2009; Hamid & Baldauf, 2008).

In reality, most rural Bangladeshi secondary teachers live in poor socio-economic conditions and receive limited professional facilities. They struggle with their little earnings (Asadullah, 2006; Thornton, 2006) and consequently engage most of their personal time in giving private tuition (Latif & Johanson, 2000). Additionally, they are assigned for many non-teaching responsibilities by the government such as election monitoring, special day processions and relief operations (Chaudhury, Hammer, Kremer, Muralidharan, & Rogers, 2004). Many teachers also face severe professional difficulties because of their poor academic backgrounds and lack of professional training (both pre- and in-service) on professional pedagogy (Ahmed et al., 2006). Besides, rural secondary schools in Bangladesh suffer from the shortage of teachers and the absence of subject-based teaching. As a result, the teachers have to teach different subjects and they cannot concentrate and expertise on a particular subject area. Moreover, as the common consequences of globalisation, these teachers face challenges of changing educational conditions (Elliott, 2004) and frequent cultural shifts (Gordon, 2005). Therefore, there is a crucial need for on-going professional development practices among these vulnerable English teachers (Walsh et al., 2013).

2.2.3 State of English teaching

Being part of the history of British colonisation Bangladesh has inherited an elongated tradition of English teaching and learning at educational institutions. Until the 1970s the medium of education at tertiary level was English, but that tradition faced hindrance by the nationalist move of the then government in the 1980s which declared Bangla, the mother tongue, as the only medium for all educational and official purposes. As a result, English became an optional subject and most of the present teachers of secondary schools, who were students during that period, were able to escape this 'difficult-to-pass' subject. However, English is now compulsory again at all levels of main-stream education in Bangladesh (Hossain & Tollefson, 2007). For the last two decades all political parties in power have been emphasizing English learning at educational institutions and have initiated several projects (such as the English Language Teaching Improvement Project and English in Action programme) for ensuring this objective. In 2001, Communicative Language Teaching (CLT) was adapted in the English curriculum at the secondary and higher secondary

school levels. The aim of this teaching/learning approach is to provide various task-based English activities such as pictures, dialogues and diagrams, so that students can develop their four basic language skills (listening, speaking, reading and writing) in English through active participation (National Curriculum and Textbook Board, 2013). However, the objectives have not been achieved sufficiently (Hamid & Baldauf, 2008) for a number of reasons. For example, Bangladesh is a mono-lingual country as Bangla is spoken everywhere. English is a foreign language (FL) here having very limited social usage. As a result, the scope of practising English is limited to formal educational settings only. As secondary school teachers generally do not possess a modest educational background, and the training they receive has minimal practical impact in their teaching; the expected result by CLT has not been achieved yet. Secondly, most of the teachers learned English via Grammar Translation Method (Hasan & Akhand, 2009) and they do not know the learning processes of foreign language learners which is an essential element to develop effective teaching skills (Golebiowska, 1985). Thirdly, the teachers are not involved in the designing of any lessons which is a required experience for achieving productive teaching outcomes (Kadepurkar, 2008). As a consequence of these all the state of English teachers and their teaching at secondary schools in Bangladesh is very poor (Chowdhury & Le Ha, 2008; EIA, 2009; Hamid & Baldauf, 2008; Rahman, 1991), and therefore there is a strong need for English teacher development in the country.

2.3 Technology readiness for learning and development

Bangladesh, a least developed country (LDC), is affected by extreme poverty, and social and economic inequalities. The country also lacks adequate technological modernisation in the developmental processes including the field of education (Raihan & Han, 2013; UNESCO, 2012a). According to the World Bank (2002), the economy and human development of the country could have developed more if it took effective measures for educational development.

However, during the last two decades the poverty situation, adult literacy, and life expectancy rates have improved (BBS, 2011a, 2011b). Similarly, the state of Information and Communication Technology (ICT) facilities and their usage have increased to a higher level (Overseas Development ODI, 2010) which has

been creating opportunities to use technology to advance the country's overall education scenario.

2.3.1 Existing ICT facilities

Bangladesh ranked 150th among 188 countries in the E-government development ranking in 2012 which reflects its poor state of 'networked readiness' and infrastructural facilities (BBS & SID, 2013). The 'Teledensity' (the number of telephone connections per hundred individuals) of the country is about 32 with 1.48 fixed telephone (or land phone) subscriptions in 2013 (BTRC, 2013). Two thirds of the population still does not have access to electricity (*Bangladesh Country Paper: Supply, Retention, Preparation and Career-long Development of Teachers in E-9 Countries*, 2008). However, despite poor electricity supply and high cost of computers the numbers of the Internet Service Providers (ISPs) and Cyber Cafes have increased significantly in recent years (Rahman, 2004), and the Internet browsing habit among various learners has also improved (Pathan & Hassan, 2005).

However, there is not enough available data on the usage of ICT in Bangladesh, particularly in rural areas. Yet, by comparing the use of fixed phones, mobile phones and the Internet in 2011 among different countries (presented in the following Figure 2.1) a general understanding on this can be achieved. The graph is based on the statistics of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP, 2013).

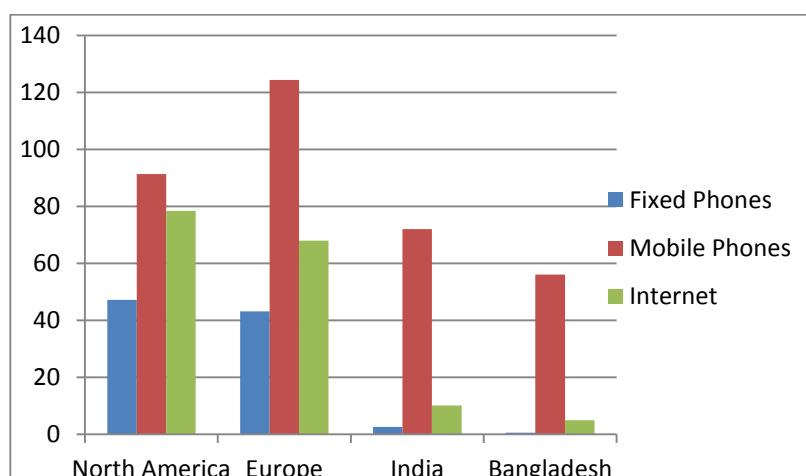


Figure 2.1: Global picture of the use of fixed phones, mobile phones and the Internet (in percentages of total population)

The data of the Figure 2.1 confirms that there is a high growth of mobile phones in developing countries including Bangladesh (Rahman, Abdullah, Haroon, & Tooheen, 2013; Sridhar & Sridhar, 2007).

Presently, most of Bangladesh's land area is covered by mobile phone network whereas six mobile phone companies namely Grameenphone, Robi, Banglalink, Citycell, Teletalk and Airtel are operating their services (Rahman et al., 2013). Grameenphone has more than 50 million users, the highest number in the country, and its network coverage is around 99% of the country's population (Grameenphone, 2015). Other operators also have similar network coverage and a high number of customers. For example, in 2015, the network coverage of Citycell is 89.6% (Citycell, 2015) and the number of users of Banglalink is about 30.9 million (Banglalink, 2015). All these mobile phone operators provide the Internet facilities via their telephone network and since 2013 four of these have been providing higher speed 3G (Third Generation mobile phone network) facilities to their customers.

Because of the greater network coverage and the availability of cheap telephone sets, the use of mobile phones is high in rural Bangladesh. There is the higher use of mobile phones and television, and the limited use of fixed phones, radio, computer and the Internet by the following findings in Figure 2.2, based on the Household Income and Expenditure Survey, 2010, and conducted by Bangladesh Bureau of Statistics (BBS); and Figure 2.3 based on the Socio-Economic and Demographic Report 2011 (BBS, 2011a; "Population and Housing Census 2011," 2012).

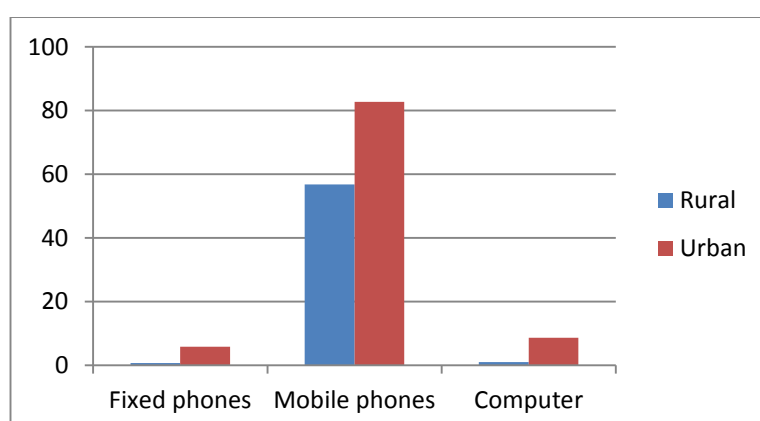


Figure 2.2: Use of phones and computers in urban and rural areas in Bangladesh (in percentages of total population)

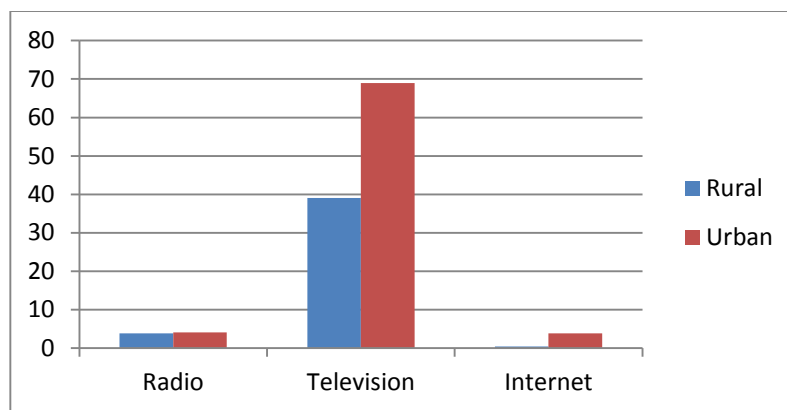


Figure 2.3: Use of radio, television and the Internet in urban and rural areas of Bangladesh (in percentages of total population)

In addition to the available mobile communication facilities in Bangladesh, since 2008 two WiMAX (Worldwide Interoperability for Microwave Access) providers, Banglalion Communications Limited and Augere Wireless Broadband (Bangladesh) Limited or QUBEE, have been operating in a few districts of the country, and in 2013 Bangladesh Telecommunication Regulatory Commission (BTRC) decided to approve two more similar licences (Mamun, 2013). Recently WiMAX is becoming more popular to the Internet users in the country because of its enhanced data rate of 100 Mbps (Patra, Patra, Alam, & Sobhan, 2012). Moreover, this technology can cover around 30-50 miles which shows its potential in supplying required technology enhanced learning facilities (Rahman et al., 2013).

2.3.2 Technology enhanced learning schemes

The use of technology and electronic media for economic development and poverty reduction is not new in Bangladesh. Mobile phone, for example, was used in the Village Pay Phone (VPP) scheme of Grameen Bank for poverty reduction (Aminuzzaman, Baldersheim, & Jamil, 2002). In a similar fashion, since the beginning of the new millennium, there is a growing interest in technology enhanced learning in the education sector of the country (Pathan & Hassan, 2005). However, this type of education can be traced back in 1956 when microwave broadcasting through wireless channel began to operate opening the opportunity to disseminate educational components through technology (Patra, Alam, & Sobhan, 2010). The country had its first main frame computer in 1965 at Atomic Energy Centre in Dhaka (SDNP, 2010). In 1996 the

first VSAT (Very Small Aperture Terminal) was set-up for providing the Internet facilities (Masud & Murshed, 2006). However, using personal computers has become popular and affordable to general people since 1998 when the government made it tax free and there was a significant price drop in the international computer market (Patra et al., 2010).

In 2009 Bangladesh government released its National Information and Communication Technology (ICT) Policy where ICT integration strategies are suggested in every sector including education ("National Information and Communication Technology (ICT) Policy ", 2011). The policy indicates the clear objective of enhancing students' computer literacy and ICT related research and development abilities. It also recommends for developing ICT infrastructures and introducing ICT courses at primary, secondary and tertiary levels of education, and in vocational and training programmes.

Although, just after the independence in 1971, Bangladesh initiated a number of educational schemes for capacity building in digital technology; a comprehensive planning on ICT and its use did not appear until 2008, the year when the government declared the vision of 'digital Bangladesh'. The aims of this vision are to bring rural and urban areas of the country under high-speed Internet coverage which, according to Chen, Kang, Xing, Lee, and Tong (2008), is essential for socio-economic changes including improved educational facilities. As a result of the government's priority and a number of non-government organisations' initiatives technological innovations have started becoming a practice in some educational institutions. However, the use of technology is still limited as supplementary teaching materials (Raihan & Han, 2013). By reviewing the following historical development of the use of technology for educational purposes its present state in Bangladesh can be realised.

1962 Bangladesh's Education Directorate distributed about 200 radio receivers to a number of educational institutions. Later, as a continuation of this initiative the directorate established an Audio-Visual Cell which transformed into the Audio-Visual Education Centre (AVEC) in 1962 (BOU, 2013).

- 1978 School Broadcasting Programme (SBP), a radio broadcasting-based distance learning project, began. As an outcome of the scheme a new distance learning institution named National Institute of Educational Media and Technology (NIEMT) started its operation in 1983 which later transformed into Bangladesh Institute of Distance Education (BIDE) in 1985 (BOU, 2013; Islam & Selim, 2006).
- 1992 Bangladesh Open University (BOU), the only full-fledged university dedicated to distance learning, commenced its journey with the aim to reach the remote and working people of the country by using modern information and communication technology including print media, audio cassette, radio and television (Sultana & Sultana, 2010). In 2010-11 .4 million students enrolled in 19 formal programmes and studied at 1106 Study Centres (BOU, 2013).
- 2004 BRAC, a non-government organisation introduced Computer Aided Learning (CAL) project in seven secondary schools. As part of the project it developed animation-based and interactive education software to teach English, Mathematics and General Sciences books of the national curriculum through interesting and motivating learning activities (Billah, 2013). Later, this project extended to more schools as its impact on teacher-student relationship; teaching quality; learners' engagement and technological orientation had been found positive (Sharmin & Roy, 2011).
- 2006 e-Teacher Training component of the Teaching Quality Improvement in Secondary Education (TQI-SE) project used mobile technology to support the secondary school teachers who were unable to attend its 14-day in-service continuous professional development (CPD) scheme (2005-2011). Under this project, the respective schools of the participating teachers were given 'smartphones' and the training materials were posted to the trainee teachers. The teachers found the approach suitable in rural Bangladesh, particularly for improving classroom practices (Pouezevara & Khan, 2007).
- 2008 In order to improve English learning and teaching through systematic, engaging and enjoyable learning environment at primary and secondary schools; English in Action (EIA), a nine year project,

started using new mobile technologies, particularly iPods, across Bangladesh (Shohel & Banks, 2010; Shohel & Shrestha, 2010). The piloting phase ran during 2009 to 2010 where teachers received iPods with battery-powered speakers for playing podcasts and audio materials designed by EIA along with their regular lessons in classroom. The project has been applying a school-based professional development (SBPD) model for English teachers' continuing professional development (CPD) through supporting them both in the school and beyond, and with new learning materials and activities (Shaheen, Walsh, Power, & Burton, 2013).

2.4 Research evidence and their value in this research

Education is the major pre-requisite for the development of Bangladesh. The country has a vast number of educational institutions involving a high number of teachers. However, the overall performance of these teachers, particularly those who teach English, is not satisfactory and the traditional teacher development schemes are often not convenient and fruitful for the teachers and their workplaces. Yet, as part of the global trend, technology enhanced approaches for teaching and learning have emerged in the country, and the students are experiencing these in limited scales. Researchers (such as Pouezevara & Khan, 2007) have found these learning schemes in the country beneficial as these seem sustainable and cost effective. However, any similar approach for learning for teachers is still not available in the country and therefore sufficient practical evidence showing the advantages and challenges of these with local Bangladeshi teachers does not exist. It is therefore not easy to evaluate the suitability and the benefits of any technology enhanced learning approaches for the teachers of Bangladesh. Even it is not known to what extent the rural Bangladeshi teachers afford this approach in their personal and professional lives for developing 'collaboration' (Thornton, 2006) and 'collegiality' (Little, 1990), two major requirements of professionalism, through community partnership (Quartz, 2003) and 'common political values' (Reich, 2002). Moreover, it is unclear what types of content and instructional method are convenient and effective for their professional capacity building. Furthermore, because of the unconventionality of this approach there is the

fear that a number of rural teachers who are not technology friendly may become confused and demotivated and will gradually be excluded from the remaining teacher community who are more competent in using technology (Karasavvidis, 2009; Nes & Stromstad, 2003).

In Bangladesh the availability of the research findings on the use of technology in teaching and learning, particularly for teachers of English, is limited. As a result, there is an absence of sufficient guidelines (in terms of technology, pedagogy and programme implementation procedures) for any suitable technology enhanced professional learning approaches for these rural teachers. Moreover, there is a lack of knowledge on the possibilities for adjusting technology supported professional learning schemes in the personal, social and professional lives of the beneficiaries. I therefore consider this research important to explore the professional development aspects of rural Bangladeshi teachers, and also to critically evaluate the practicality of technology enhanced learning approaches for them. After all, I believe that this research is able to investigate the learning culture (including professional learning preferences, learning needs and learning networks) and the social perspectives of the rural Bangladeshi teachers of English. These together promises of a holistic investigation of the technology enhanced learning approaches for teachers of English in rural Bangladesh.

2.5 My personal attachment and motivation

Designing training materials and at the same time facilitating training sessions and observing their impact in practical field are ideal opportunities for any education professional to understand training procedures and their implications holistically. While working as a teacher trainer of English in BRAC, a non-government development organisation, I gained this experience through attending professional development activities in rural Bangladesh. During 2003 to 2005 I stayed at BRAC's different training centres at different places of Bangladesh and facilitated residential English training programmes for more than sixty batches of English teachers, each containing about twenty five participants. I, along with my colleagues, conducted training sessions during the days, attended relaxed evening meetings, and often spent a few voluntary extra hours at night discussing obscure pedagogical issues, or simply about our lives. Consequently, I recognised that my personal attachment to the

trainee rural teachers (whom I describe as a 'vulnerable' and 'underprivileged' social class) extended beyond any professional relationship. The very different stories of these teachers' teaching experiences in fact provided me the scope and encouragement (or planted the 'seeds of ideas'; as termed by Whitehead, 1967) to be a part of their professional growth. This motivation later received a clearer direction when I was preparing the computer assisted English lessons for BRAC's 'Computer Aided Learning (CAL)' project during 2005 to 2011.

Working in the CAL project supplied me with new insights about teacher-learning, specifically the possibilities of technological interventions for continuing professional development of rural teachers. My understanding later took a wider shape while I reviewed the relevant literature at the initial stage of my doctoral studies. As I was born and educated in Bangladesh, my personal experiences of learning and the observations of educational settings in the country also helped me during the entire process.

In this thesis for two specific reasons I chose the rural secondary teachers of English as my research participants. Firstly, I am a teacher trainer and training material developer of English subject, and thus professionally connected to the rural Bangladeshi secondary teachers of English. Secondly, my educational and research backgrounds are in the field of English Language Teaching (ELT).

Chapter 3: Learning theories and teacher development

3.1 Introduction

Teacher-learning (or learning of teachers) is crucial for teaching performances and professional development of teachers (Hargreaves & Fullan, 2012; Vermunt & Endedijk, 2011). Teaching is 'situated' or context-oriented (Phelan & Sumsion, 2008) and, at the same time, 'on-going and dynamic' (Flores & Day, 2006). Teachers therefore need to gain up-to-date knowledge on the subject matter they teach and understand how their teaching content connects across fields and the life of their students (Shulman, 1987). Beyond the formal education perspectives, learning is inevitable for teaching professionals in constructing the knowledge-based and cohesive community, and for the emancipation of humanity. For the success and survival in teaching profession, continual learning is therefore vital for teachers (Darling-Hammond, 2008).

Although learning is important for teachers, describing it, particularly its factors and processes, is not straightforward. In the case of teacher-learning various professional and adult learning issues are involved which makes the task more intricate. A comprehensive and systematic theoretical review is therefore essential to understand learning and also the teacher-learning issues.

3.2 Why theories?

... theory not only provides ways to see and understand what already has happened or is happening, but is also a means to 'envision' new worlds and new ways to work (Harasim, 2012, p. 4).

[However,] ... we tend to conduct life based on many theories that are below the level of conscious thought and accepted without examination. But, being conscious of theories and subjecting them to examination is essential because they are particularly important to change and learning (Berger, 2000; cited by Nichols, 2003, p. 1).

In this thesis I explore technology enhanced teacher-learning approaches for rural Bangladeshi teachers which demand the understanding of learning, teacher development, and technology enhanced learning related theories and concepts. Through theories it is possible to realise what learning is; how, where and for whom it happens; what are the barriers to it, and how these barriers can be overcome. Theorising learning or learning instructions, particularly for the case of adults (here, for teachers), is however problematic as it requires clear purposes and real life implications (Vygotsky, 1978). Yet, a review of learning theories can provide the vocabulary and concepts of learning (Hill, 2002), help understand 'the facts of nature' of learning or teaching (Hilgard & Bower, 1966), and allow the investigation of 'what a phenomenon is and how it works' (Torraco, 1997). I, similar to the thought of Skinner (1968), however do not expect that all theories would carry equal strengths in terms of their clarity, acceptability and application; some might even be misleading and wasteful.

I consider the formulation or explanation of any theory generally successful when 'the process of understanding and the process of the actual production or discovery [of that theory] are very much alike' (Popper & Eccles, 1977, p. 46). However, in the case of learning this task is complicated because of the absence of its universally accepted definition suggesting to specific boundaries for valid theoretical discussions (Shuell, 1986). Additionally, learning involves both human (internal) and social (external) factors in its processes (Illeris, 2009) which requires explanations from scientific, philosophical, psychological, and even socio-cultural points of views. Defining adult learning is also problematic as, according to theorists (such as Knowles, 1973), their learning features are different from that of children. Adult learning is greatly 'self-directed', 'experience' focused, and driven by suitable 'orientation', sufficient 'motivation', personal 'readiness', and the conscious 'need to know' (Knowles, Holton, & Swanson, 2005). Therefore, describing these multifaceted features by learning theories involve complex but flexible approaches.

Through reviewing the common learning theories, particularly which are related to adults and professionals like teachers, in this chapter I describe learning from several theoretical and conceptual perspectives. I also review the learning paradigms to comprehend the interpretations of learning processes (both internal and environmental) along with the diversity and characteristics

of involved factors (again both internal and environmental). Moreover, by emphasizing the adult learning viewpoints I discuss these concepts and theories in relation to teacher development perspectives, the focus of my thesis.

3.3 Common concepts of learning

Although the history of theoretical approaches to learning is old, the scientific studies on this begun just one hundred years ago (Mowrer & Klein, 2001). Since then, many changes have emerged in understanding and explaining the learning and its processes. Learning has been claimed as genetic inheritance (Bowles & Gintis, 1976), as transformation of experience (Dewey, 1949; Kant, 1781), as 'a result of repeated practice' (Flaherty, 1985, p. 7), as cultural adaptation and accumulation of information and skills (Flaherty, 1985), as the 'change in the mechanisms of behaviour' (Domjan, 1998, p. 13) or simply as people's ability to imitate (Flaherty, 1985). Eventually, these concepts have been accepted or modified or challenged in the course of time (Case, 1996). In the last fifty years there has been an increasing recognition of learning as the active and social process (Ball & Wells, 2009). As a result, the cognitive and experiential aspects of learning are now acknowledged (Rogers & Freiberg, 1994), and it is believed that learning cannot happen autonomously, rather it requires 'cultural apprenticeship' which allows a learner to feel and work with others involving the tools and procedures of any relevant communities (Vygotsky, 1978). Merriam, Caffarella and Baumgartner summarise learning as

... a process that brings together cognitive, emotional, and environmental influences and experience for acquiring, enhancing or making changes in one's knowledge, skills, values and world views (Merriam, Caffarella, & Baumgartner, 2007, p. 277).

Illeris (2007, p. 3) provides a multifaceted definition of learning and terms this as 'a process that in living organisms leads to permanent capacity change and which is not solely due to biological maturation or ageing'. However, one of the most comprehensive definitions of human learning has been composed by Jarvis who acknowledges the active role of both internal and external conditions in his description.

Human learning is the combination of processes throughout a lifetime whereby the whole person-body (genetic, physical and biological) and mind (knowledge, skills, attitudes, values, emotions, beliefs and senses)-experiences social situations, the perceived content of which is then transformed cognitively, emotively or practically (or through any combination) and integrated into the individual person's biography resulting in a continually changing (or more experienced) person (Jarvis, 2009, p. 25).

Although Jarvis's definition of learning proposes a comprehensive set of processes, still its individual developmental stages, active factors and conditions (both of human and external environment) require further explanations. In the following sections I discuss the factors and conditions involved in human learning, and the individual developments of learning or learning phases within greater learning processes, by referring to a number of learning theories.

3.3.1 Factors and conditions

There are several factors and conditions (both internal and external) involved in learning processes. In this regard, Illeris (2009) mentions the roles of internal conditions and environmental influences whereas various psychologists and educationists explain the association of learning facets and enablers. I elaborate these aspects below.

a) Learning facets

'Inputs', 'memory', 'schema', 'imagery', 'mental model' and 'cognitive styles' are significant facets of learning processes. 'Inputs' or Information supplies clues to learners and form perceptions about any entities or concepts (Gibson, 1977). Therefore, Aristotle terms learning as the transformation of information into knowledge (cited by Dyke, Conole, Ravenscroft, & de Freitas, 2006). The gaining, storing, and processing of information to learning is determined by 'memory' (Schunk, 2012) which is generally constructed upon facts, and it stores information for short or long term (Miller, 1956). 'Memory' can be transformed into 'schema' which is able to recall and comprehend the past, can create different thinking and learning patterns, and cause cultural differences in cognition processes (Bartlett, 1958; Quinn & Holland, 1987).

Learners can also perceive things which they have not practically experienced through 'imagery' or 'guided experience' (Zwaan, 2004). Psychologists (such as Reiser, Garing, & Young, 1994) claim that adults, compared to children, are more capable of constructing imagery.

Learners' 'mental models' (or basic structures of thinking) and 'cognitive styles' (also known as learning or intellectual styles) process the gained information including 'objects, states of affairs, sequences of events, the way the world is, and the social and psychological actions of daily life' (Johnson-Laird, 1983, p. 397); control the problem-solving and reasoning processes (Holland, Holyoak, Nisbett, & Thagard, 1986; Shipman & Shipman, 1985); and contribute to gaining skills and expertise in any particular areas (Schumacher & Czerwinski, 1992). With a few exceptions (such as Kubes, 1998) most researchers (for example, Allinson & Hayes, 2000; Kember & Gow, 1991) claim that culture actively shapes the 'mental models' and 'cognitive styles' of learners.

b) Internal conditions

The state of 'attention', 'attitude', 'creativity' and 'anxiety' of learners play important roles in their learning. Through 'attention' (similar to 'arousal' and 'curiosity') they select particular information from their personal experiences and events (such as sights, sounds, tastes and smells), process those cognitively, and construct perceptions (Padmala & Pessoa, 2008; Schunk, 2012). While 'attitude' or personal beliefs guide learners' actions (Schunk, 2012), 'creativity' explores facts, problems and solutions (VanGundy, 1987). However, if the learning context and the systems become fearful or demanding, learners feel anxious (Connolly, Simpson, & Petty, 2006; Mandler, 1984). 'Anxiety' is caused by various biological and psychological factors, particularly the emotional or behavioural ones (Smith, 2009), and harms the cognitive functions such as memory, attention, and problem-solving capabilities of learners (Sieber, O'Neil, & Tobias, 1977). According to Chansky (2004), 'anxiety' is more common in adults due to their higher levels of concerns. Researchers (such as Dornyei & Csizer, 2002; Rahimpour, 1990; Sternberg, 1999) propose that learners' attention, positive attitude and creativity should be ensured for attaining effective learning, and this can be

done by motivations and rewards. Additionally, in friendly and supportive learning conditions and social structures learners become more attentive and creative (Amabile, 1983; Maddux & Galinsky, 2009).

c) Environmental influences

... human learning is pervasively shaped according to normative cultural expectations. Such expectations are extremely diverse and they change historically (Engestrom & Sannino, 2012, p. 46).

The individual identity of learners and their cognitive abilities are inseparably connected to their social and cultural conditions (Adler & Proctor, 2007; Nasir & Hand, 2006). In learning the role of the 'context' (such as society, culture and history) and 'external conditions' (experience, social interaction, communication styles, cultural characteristics and educational activities) are therefore important (Jonassen & Land, 2000; Lave & Wenger, 1991). The influence of social and cultural environments on formal education is stated by Bruner as 'how one conceives of education we have finally come to recognize, is a function of how one conceives of the culture and its aims, professed and otherwise' (Bruner, 1996, pp. IX-X).

Cultural tools, such as artefacts, language, symbols and social conventions influence learners' cognitive processes and consequently guide their learning achievements (Saxe, 1999; Wertsch, 1998). Cooperation and assistance (technically which are termed as 'scaffolding') also have the impact on people's learning (Benson, 1997; Wood, Bruner, & Ross, 1976). Besides, learners form schemata (which shape their beliefs, strategies, and attitudes) through experiences which are generally based on learning conditions such as learning actions, community features and relationship with others (Bourdieu, 1977; Engestrom, Miettinen, & Punamaki, 1999). Moreover, as the pedagogies 'lie at the heart of day-to-day learning' in a formal educational setting (UNESCO, 2004, p. 7), culturally relevant and society driven curriculum and instructions are essential for effective learning (Cunningham, Corprew, & Becker, 2009; Ladson-Billings, 1995).

d) Enablers

Various internal (such as self-efficacy, motivation and learning strategies) and external (such as instruction, feedback and rewards) conditions enhance the speed and quantity of learning which can be termed as enablers.

Firstly, self-efficacy is the belief in one's personal capacity to plan and accomplish any work (Bandura, 1995). This influences the psychology, attitudes, behaviours, abilities, skills and motivation of people, and in the case of learning it determines their learning outcomes (Bandura, 1977). Then, motivation or the eagerness to achieve any learning outcomes enhance the cognitive processing and drives learners to achieve their target (DuBrin, 2012; Schiefele, 2009). Again, learners' learning strategies are often influenced by their behaviours which help them process inputs or information to produce learning (Pintrich, Smith, Garcia, & McKeachie, 1991; Vermunt, 1992).

In formal education, the forms and limits of learning are also shaped by instructions or pedagogical approaches. Pedagogies affect the relationship between learners and teachers and control their teaching and learning motivations (Petrie, Hamilton, King, & Pavan, 2006). In contemporary teaching/learning pedagogies there is the rise of learner-centeredness and critical thinking practices which offer many effective approaches for knowledge building and skills gaining (Moon, 2008; Thompson, 2013). The role of feedback in pedagogies is also acknowledged as helpful in formulating and evaluating any learning outcomes (Molloy & Boud, 2014).

3.3.2 Processes

There is a tradition of describing processes in social science studies, and consequently a wide range of process theories have been developed on learning. These theories generally describe the common sequences, actions and events of learning, and show the mechanisms that cause their systematic transition (Vayda, McCay, & Eghenter, 1991). Researchers (such as Engestrom & Sannino, 2012, p. 46; Norman, 1982; Oser & Baeriswyl, 2001) however criticise their prescriptive nature and argue that learning happens through diverse processes and their different modes not only occur in particular sequences but also co-occur. Moreover, various cognitive, emotional and social

abilities such as time (Carroll, 1963), strategies (O' Neil, 1978), sequencing of instruction or inputs (Van Patten, Chao, & Reigeluth, 1986), and learners' personal learning preferences or 'multiple intelligences' (Gardner, 1999) shape the nature of the learning processes. It is therefore important to involve these associated factors in the discussion of learning processes.

Researchers hold different views and analysis on learning processes. Although their individual claims do not offer complete definitions, the collective knowledge can help realise that learning processes are

- logical, sequential and meaningful
- experience-based and continuous
- collective and action-driven

These aspects are briefly discussed below to better understand the overall learning processes.

a) Learning process: logical, sequential and meaningful

Learning is the meaning making and logical understanding formation process (Oakley, 2004). According to Piaget (1923, 26), it happens in three stages namely assimilation (gathering of new experiences and interpreting those according to existing mental structures), accommodation (revisiting and evaluating existing cognitive experiences), and equilibration (changing and adjusting existing cognitive experiences). By referring to children's learning he, in his 'cognitive development stages' model, elaborates the age-bound and systematic developmental stages of learning. Although Piaget's concept can be criticised for its fixed stages where early stages of learning do not recognise the role of context and external influences, it endorses the increasing role of external factors in the learning of adults and experienced learners. In terms of meaningfulness, Rumelhart and Norman (1978) describe three qualitatively different learning phases (or modes) namely Accretion, Structuring, and Knowledge Building which happen sequentially. Among the three learning phases Accretion is the most common learning mode, Structuring is vital for conceptualisation and schemata formation, and Tuning is a slow process which requires repetitions and continuous practice (Norman, 1982).

b) Learning process: experience-based and continuous

Learning is the process where learners connect observations and reflections with personal experiences and transform those into knowledge (Kolb, 1984). Kolb adds that this cycle consists of four learning stages namely concrete experience, reflective observation, abstract conceptualization, and active experimentation where learning can begin from any of the stages. Through the Learning Styles Inventory model (Kolb, 1984) he also describes four learning conditions such as assimilation (when learning is accomplished along with understanding relevant theories), convergence (when theories are applied in learning), accommodation (when learning occurs through experiencing), and divergence (when learning happens through observation and analysis). Because of the emphasis on the use of experiences and reflections, Kolb's experiential learning cycle is usable in educational practices; and consequently this approach has already been applied extensively in contemporary teaching and learning schemes, particularly with adult learners (Healey & Jenkins, 2000; Kulturel-Konak, D'Allegro, & Dickinson, 2011). More recently, Wells (1999) proposed a spiral of knowing model where 'information', 'knowledge building', 'experience' and 'understanding' develop in a continuous process.

c) Learning process: collective and action-driven

This view considers that learning conveys contextual meanings (Nonaka & Takeuchi, 1995, p. 21). Knowledge is first created individually (this is named as tacit knowledge which is not transferrable) and later takes an organisational shape (this is named as explicit knowledge which can be transferred or communicated with others). According to Nonaka and Takeuchi, tacit knowledge is difficult to express, but explicit knowledge can be meaningfully communicated through speaking and writing. Therefore, in the educational settings dialogues and active socialisation, which mean communication and interaction, are essential for developing explicit knowledge. However, while socialising or being active collectively, various cultural factors such as norms, tradition and social patterns determine the learning outcomes.

According to 'activity theory' (based on the concepts of Bahtkin, 1986; Latour, 2005; Leont'ev, 1978; Vygotsky, 1978), during the learning processes learners mediate in social circumstances (both with people and the systems); work in

community; and learn through networks, interactions and dialogues. By proposing five principles of this theory Engestrom (1999) argues that learning processes involve a hierarchical structure, object-orientedness, characteristics of internalisation and externalisation, mediation and various developmental aspects.

3.4 Learning paradigms and educational perspectives

Since the beginning of the 20th century there has been the emergence of a number of theoretical approaches for interpreting learning, particularly its factors and processes. These schools of thoughts have also been influencing the formal educational philosophies and actions by suggesting various learning strategies and their implementation policies.

I divide the implications of the historical development of the learning paradigms (or the schools of thought related to learning) on education in two broad phases namely traditional and contemporary paradigms. This historical division can help discuss how the learning concepts are shifting from the personal to social, learning to learners, and individual to collective forms.

3.4.1 Traditional paradigms and their implications in education

Diachronically behaviourism, cognitivism, and constructivism are traditional paradigms of learning theories. Mayer (2003) metaphorically defines these through three types of practical action namely the constructivist paradigm of learning as building a structure, the cognitivist paradigm as adding files to a shelf, and the behaviourist one as consolidating the connection. Generally, behaviourism defines learning as ‘the result of objective experience’, cognitivism as ‘the mental processing of information’, and constructivism as ‘subjectively constructed’ outcomes (Lowerison, Cote, & Lavoie, 2008). In the following section, the implications of these three paradigms in formal education are discussed.

a) Behaviourist approach

Behaviourism emerged in 1900s and is the earliest paradigm of learning theories. This school of thought appeared as easy to comprehend and influenced the later paradigms such as cognitivism and constructivism.

Behaviourist theorists mainly discuss the biological phenomena through observable evidence such as human 'behaviours' as the outcome of learning. According to this school of thought, repetition and reinforcement of inputs or interventions, a trial and error process, lead to 'habit formation' which is vital for learning (Hull, 1943; Pavlov, 1927; Thorndike, 1914). This paradigm states a number of behavioural outcomes such as 'positive reinforcement', 'positive punishment', 'negative reinforcement', and 'negative punishment' (Skinner, 1938). It prioritises the role of the drive or the need for learning (Hull, 1943).

Educational practices during most of the 20th century had been ruled by behaviourist concepts. One of the reasons for its greater acceptance was its unique approach of defining learning without explaining any internal states of learners. As a result, the behaviourist pedagogies were mostly prescriptive and focused to specific learning goals (Lowerison et al., 2008). However, this approach can be criticised for its focus on rote learning which does not encourage understanding and allows learners to achieve only the lower-order skills (Bloom, 1965; Weigel, 2002).

b) Cognitivist approach

The cognitivist theories of learning developed in a great deal in 1950s with the influence of the emergence of cognitive sciences. In the later stage this approach began referring to other domains of knowledge such as anthropology, psychology, linguistics, education, and computer sciences. Primarily, this learning paradigm emerged as an extension of behaviourism, but their major difference is that behaviourism does not recognise the role of mind in converting stimulus or inputs to responses whereas cognitivism considers the mind as the processor (like a computer) of inputs to produce outputs (Harasim, 2012). Cognitivism also describes learning as a complex process that happens during the time of receiving, storing, or retrieving information (Marshall, 1998). However, the ability for information processing or cognitive development is biological and it is changeable according to age levels (Piaget, 1923, 26). The context, culture and activities are also important in the cognition and learning processes (Hutchins, 1995; Lave, 1988). Cognitive paradigm gained a significant extension when Vygotsky (1978), in his 'social development theory', explained cognition beyond mental or internal

processes, and claimed that social interaction is a vital requirement in the development of cognition.

In contemporary formal educational scenario the applications of cognitive pedagogies are wide-spread. Through this paradigm it is realised that learners have individual learning approaches which they can adapt and change according to their learning needs. They also have a natural tendency to find uniformity among opinions and beliefs they come across (Festinger, 1957). Additionally, it is believed that learners gain knowledge when they reuse their schemata or prior information (Byrnes, 1996), add new information to memory (Smith & Ragan, 2005), create long-term memory by explanations and practice (Byrnes, 1996), and modify those through contextual variables (Spiro, Coulson, Feltovich, & Anderson, 1988). Cognitivist approaches of teaching and learning can be challenged for a number of reasons. Firstly, learners' cognitive involvement in learning is difficult and lengthy (Driscoll, 2005), thus the approach is not convenient when educational instructions are linear or hierarchical (Wilson, Jonassen, & Cole, 1993). Moreover, in some cases the information disseminated by teachers is not meaningful and easy to internalise by learners (Brown et al., 1989).

c) Constructivist approach

The constructivist paradigm of learning is newer in educational context, but its ideas of constructing individual understanding while discussing and interacting can be traced back to the time of Socrates. About two hundred years ago Kant (1781) added a new dimension to this as he discussed the role of environmental stimuli in shaping learners' understanding about the world. Later, Dewey (1916), Piaget (1923, 26) and Bruner (1966) initiated the contemporary concepts of constructivism which were extended by the ideas of Vygotsky's social phenomena (Vygotsky, 1978) and Kolb's experiential learning (Kolb, 1984). According to this school of thought, learning is an active process which involves people in constructing ideas using existing or previous knowledge, and provides them with chances to test and revise their 'hypotheses' by acting and receiving treatment within society and the world (Piaget, 1923, 26). In this regard, culture has an influential role in the learning process (Bruner, 1996).

In formal education a variety of constructivist learning curriculum and instructional approaches have been applied. Consequently, collaboration, social negotiation, problem-solving, higher-order thinking skills, deep understanding have received the importance in several educational contexts Murphy (1997). Woolfolk portrays an ideal educational situation through the following constructivist interpretation.

... [while learning] students actively construct their own knowledge: the mind of the student mediates input from the outside world to determine what the student will learn. Learning is active mental work, not passive reception of teaching (Woolfolk, 1993, p. 485).

In a constructivist learning environment learning achievements however are dependent on learners' capacity to investigate, analyse and evaluate information through personalising the knowledge (Phillips, Wells, Ice, Curtis, & Kennedy, 2008). This is why constructivist approach of learning requires flexibility and adaptability to the learning needs of learners (Jonassen, Howland, Marra, & Crismond, 2008).

3.4.2 Contemporary paradigms and changing conceptions of learning

For the last three decades there has been a constant focus on social and cultural aspects in learning theories (Mufti & Peace, 2012). As a result, the roles of social patterns, cultural trends, historical factors, language and group activities in learning processes are recognised (Ernest, 1998; Gredler, 1997; Prawat & Floden, 1994; Vygotsky, 1987). It is also considered that the experiences and reflections shape people's knowledge, attitudes, skills, beliefs and emotions (Jarvis, 2004; Kolb, 1984; Laurillard, 1993) whereas social activities, particularly through interactions with the influences of their surrounding environment, create meanings (Rogoff, 1990).

Here, I discuss three post-constructivist learning paradigms namely social constructivism, social construction, and connectivism which I distinguish as the contemporary paradigms of learning.

a) Social constructivism and social construction

The concepts of social constructivism began to emerge in the 1990s during the time of the rapid growth of information and communication technology (Bondarouk, 2006). Theories of Bandura, Bruner and Vygotsky have greatly contributed to the development of this school of thought (Bandura, 1971, 1977, 1986, 1995; Bruner, 1966, 1986, 1990; Vygotsky, 1978, 1986, 1987). According to social constructivism, learning is both an individual and social process where learners' behavioural and cognitive changes happen through the influences of environmental factors such as society, culture, experiences, habits, knowledge and preferences (Bondarouk, 2006; Schwandt, 2003; Ward, Huckstep, & Tsakanikos, 2006). Conversely, social construction theories claim that learning is an idea generating and meaning formation process via the relationship between human, society and environmental objects (Crotty, 1998). While social constructivism acknowledges that people cognitively create meanings from social interactions and experiences, social constructionism explains how learning occurs from environmental objects (Young & Collin, 2004). Despite the focus on learners and learning objects, a number of theorists (such as Charmaz, 2006) propose to consider these two terms interchangeably and commonly as 'constructivism'. Besides, the new views about 'construction' as a shared and collective cognition process and the involvement of learners' 'intentionality' (such as emotion, goal, and belief) in learning help identify the similarity among social constructivist and social constructionist concepts (Collin, 2002).

Based on the concepts of social constructivism and social constructionism the learning activities and their nature in formal education can be interpreted. Firstly, according to the social constructivist theories it is realised that collaborative, problem-solving, and cognitive methods are effective for learning (Schunk, 2012; Tinio, 2002). It is also acknowledged that there is the need for involving various learning strategies and approaches, knowledge types, perceptions and ideas in learnings processes (Phillips et al., 2008). Additionally, it is believed that learning happens when learners are autonomous and social contributions are present (Bruner, 1986, 1990). In this regard Lave and Wenger (1991) propose the concept of 'communities of practice', an ideal social constructivist learning environment where learning or knowledge building happens through practising the above elements within

social organisations. Secondly, with the help of social constructionist theories it is established that knowledge is created, not discovered, by the mind (Hammersley, 1992; Harel & Papert, 1991; Schwandt, 2003). In the educational context the humanistic and group-based learning activities are therefore found to be more effective (Steedman, 2000). It is also recognised that learner-directed (Cagiltay, Yildirim, & Aksu, 2006), observation-based (Murphy, Dingwall, Greatbatch, Parker, & Watson, 1998), language driven (Burr, 1995) and conversational (Berger & Luckmann, 1991) pedagogies are effective for knowledge construction.

b) Connectivism

Connectivism, the newest learning paradigm, combines various theories to explain educational aspects involving information and communication technologies (Strong & Hutchins, 2009). There is a debate whether this should be considered as a pedagogical approach, not a theory, because of its limitations to explain learning processes in a holistic manner (Verhagen, 2006; cited by Bell, 2011; Goodyear, 2001; Kop & Hill, 2008). Besides, theorists (such as Mufti & Peace, 2012) argue that the existing theoretical paradigms are sufficiently capable to interpret connectivism although it illustrates learning within organisational and technology supported environments.

I consider connectivism as an emerging learning paradigm for its unique interpretations of the learning processes in connected (both technology supported and without the use of technology) learning environments. It explains 'distributed knowledge' or the co-construction of ideas within the networked (such as family, society and workplace) learning situations (Kop & Hill, 2008). Connectivism is therefore precisely suitable to interpret learning in the digital age (Downes, 2007; Siemens, 2004, 2006a, 2006b, 2006c).

Siemens (2004, 2006a, 2006b, 2006c) outlines the following educational perspectives of connectivism including the contexts of technology enhanced learning.

- Learning and knowing are the continuous and current practice. A successful learner, based on his/her diversity of opinions, recognizes patterns of concepts, fields and ideas to make senses.

- Decision-making is the key to learning. Learners change their learning decisions (for example, choosing any learning objectives or meanings of information) due to any shifts of learning environment and/or decision making strategies.
- Learning is a process which links information sources from various 'networks' such as learning community, social connection and personal relationship. Even, learning and knowledge can be created and facilitated through non-human appliances.

3.4.3 Paradigm shift and new approaches of educational practices

In the historical development of learning theories the successive paradigms have accepted and extended the concepts of the former ones. However, there is a gradual but clear shift in interpreting learning, particularly its factors and processes. The contemporary paradigms such as social constructivism, constructionism and connectivism provide various new ideas which were not clearly discussed in the earlier ones. For example, while the traditional theories focus on the behavioural and cognitive aspects of learning, contemporary theories discuss the role of experiences, the influences of the external environment, and the connection of these influences with learners' thinking and meaning making processes. Similarly, these new learning theories shift their emphasis from personal to social and collective experiences, and also on the role of individuality, in learning production.

Consequently, in the present educational context there is a strong influence of the new learning theories (Kintsch, 2009) which is shifting the traditional self-paced and repetitive action based learning activities to participation-centred, reflective and collaborative learning practices (Anderson, Annand, & Wark, 2005; Jonassen, Howland, Moore, & Marra, 2003). Jonassen (1999), described in Table 3.1, shows how the learning pedagogies have moved from product to process concepts, and how learners and learning situations are receiving more priorities in contemporary educational practices.

Table 3.1: Change in pedagogical approaches

Behaviourist pedagogies	Cognitivist pedagogies	Constructivist pedagogies
Learning is the behavioural change. Education is passive and teacher-centred where teachers supply ideas and information, collect responses, and provide feedback.	Learning is knowledge gaining. Education is active, but teacher-centred where teachers' roles are to help learners improve new ideas and information through involving experience and prior knowledge.	Learning is knowledge construction. Education is active and learner-centred where teachers assist learners through using scaffolding and dialogues.

Although there are several highly potential learning opportunities in constructivist pedagogies, they often contain complex and disorganized instructional procedures (Bowers, 2005; Meyer, 2009). The post-constructivist learning theories namely social constructivism, constructionism and connectivism can help overcome these challenges as they are more focused on the educational interpretations. Post-constructivism endorses the importance of social, learner-centred, collaborative, experience-based and reflective learning processes. Additionally, it emphasises how and in what conditions learners learn along with the roles of context in the process. For exploring suitable learning strategies for the teachers of rural Bangladesh, which is the focus of my research, I therefore consider post-constructivism as the practical and benefiting approach to describe relevant teacher-learning issues.

3.5 Post-constructivist approaches of education in adult learning and teacher development

Teachers are adults and their professional development is greatly related to their professional knowledge. In the case of effective teacher-learning it is important to consider two major aspects: teachers as 'adult' and 'professional' learners.

a) Teachers as adult learners

Researchers (for example, Knowles, 1980) claim that the learning approaches of adults are in many aspects different from those of children. The opponents

(such as Brookfield, 1995; Pratt, 1993) however criticise this as an incomplete and unclear assumption. Yet, I identify various unique features of the adult learners and their learning approaches.

Generally, adult learners possess independent self-concepts and aptitudes to direct their personal learning (Knowles, 1989). Therefore, they often try to be autonomous and self-directed (Lieb, 1991) and remain eager to implement their personal learning in practical fields (Fidishun, 2000). Besides, these learners are generally motivated and task-oriented (Merriam & Caffarella, 1999). By referring to the uniqueness of adult learners and their learning approaches Merriam and Caffarella (1999, p. 272) mention that these learners are more problem-centred than subject-centred, and they have vast experiences which are rich resources for learning. The researchers add that adult learners are significantly connected to their social roles and are often motivated to learn by internal factors rather than external ones.

b) Teachers as professional learners

As professionals teachers are required to gain knowledge on various aspects of their profession such as,

- pedagogical approaches and their objectives (Labaree, 2000)
- procedures to enhance the learning experiences of students (Timperley, 2011)
- techniques of engaging psychological factors with organisational and leadership components (Geijsel, Sleegers, Stoel, & Krüger, 2009)
- strategies to include complex and analytical skills in teaching (Greeno, 2003)
- self-assessment methods and skills (Palardy & Rumberger, 2008)

To accomplish the above criteria teacher-learning also needs to contain the following qualities:

- a focus on the profession (Fullan, 2007)
- motivation, vision and practice (Shulman & Shulman, 2004)

- a blend between theoretical knowledge and practical experiences (Brunstad, 2007)
- active and collective participation (Birman, Desimone, Porter, & Garet, 2000)
- critical reflections and multiple approaches of knowing and learning (Schapiro, 2003)
- use of personal experiences (Fidishun, 2000; Tweedell, 2000)
- continuity (Darling-Hammond & Richardson, 2009)

The features of meaningful learning (see Figure 3.1), suggested by Jonassen et al. (1999), address most of the above qualities of effective teacher-learning.

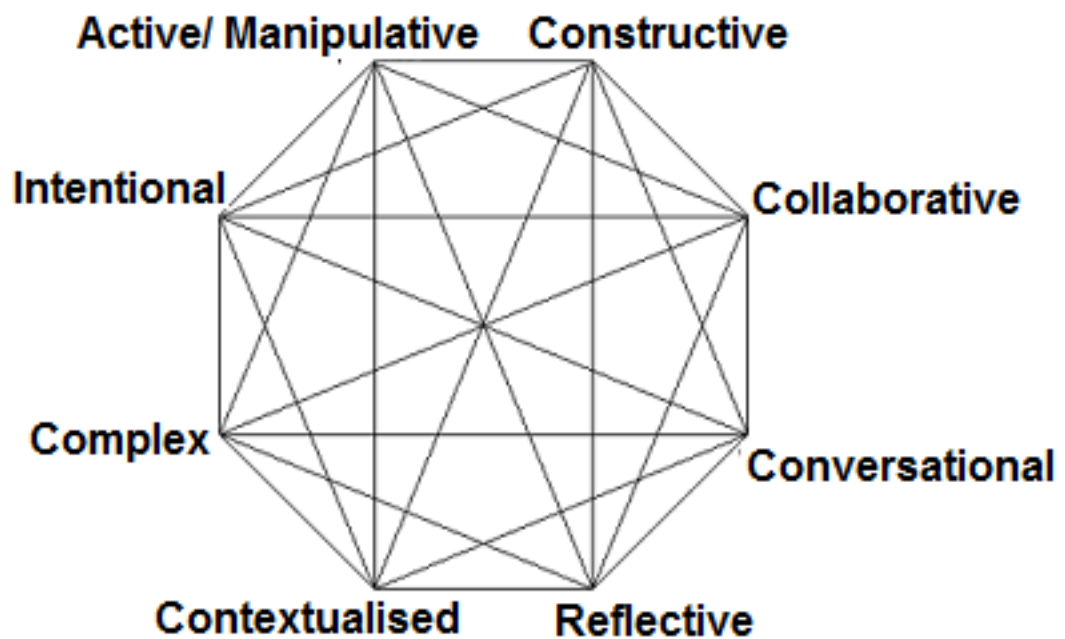


Figure 3.1: Features of meaningful learning (Jonassen et al., 1999)

The features refer to various adult and professional learning issues, and summarises the pedagogical components of effective teacher-learning schemes. Based on the review of the literature I can also add a number of aspects such as motivation, experience and the use of multiple learning approaches to this list.

3.5.1 Post-constructivist approaches of teacher-learning

Post-constructivist approaches to education are relevant to the areas and requirements of effective teacher-learning. According to the previous discussions, the approaches involve participating teachers' personalisation in learning activities, and, at the same time, establish their autonomy, scope for knowledge construction and reflection through ensuring collaboration within diversity. This learner-centeredness of the approaches consequently allows inquiry, communication, collaboration and reflection in teacher-learning (Lambert & McCombs, 1998; Laurillard, 2002). The approaches are also capable of helping participating teachers construct the democratic learning environment which is favourable for using 'uncertainty' and 'conflict', two elements required for the positive growth of learning (Prawat & Floden, 1994). Besides, these are feasible in bringing positive changes among teachers in their profession related perceptions and actions, and also in thinking and reflecting critically (Jones & Carter, 2007; Savery & Duffy, 2001). Moreover, the post-constructivist features are suitable for various teacher-learning instructions. For example, real-life examples can be used in 'case-based learning' (Herreid, 1997), explanations and understanding of problems can be emphasised in 'inquiry-based learning' (Edelson, Gordin, & Pea, 1999), problems can be solved in 'discovery' and 'problem-based' learning (Mayer, 2004), and practical knowledge can be gained through investigating in 'project-based learning' (Polman, 2000).

Despite various advantages, post-constructivist teacher-learning approaches may create a number of challenges too. For example, they may overlook the social and cultural blend within the teachers' individual learning processes (Nelson, 2007), may not include clear learning objectives and reliable learning assessing tools (Dick, 1992), and may ignore the needs for supplying essential basic knowledge (Molenda, 1991). Moreover, as these educational approaches are new, teachers may often find these difficult to follow (Barron et al., 1998).

However, by ensuring careful planning and realistic implementation strategies the challenges of post-constructivist approaches of teacher-learning can be overcome. First of all, it is essential to interpret teacher-learning through the aspects of adult and professional learning (Lerner, 2002). To do this participants' reflections and discussions should be involved in the learning

process by properly addressing their thinking, experiences, values, behaviours and the communication abilities (Bowers, 2005). It is also important to consider the 'environmental context' such as workplace conditions, social structure and educational facilities (Magnusson & Allen, 1983). Moreover, the contributions of life-phases, developmental stages and aging in the professional learning journey cannot be ignored (Cross, 1981). Furthermore, if technology is involved in this kind of learning processes, which is an increasing interest in modern educational practices and also the key element of this thesis, it is vital to re-examine the procedures and impacts of teaching/learning activities (or pedagogies). The reason for this consideration is that in a technology-enhanced learning environment learners experience new dimensions of learning environment, learning processing and learning outcomes (Collis, 2002). In short, to study the post-constructivist approaches of teacher-learning multiple aspects including psychological, social and educational perspectives of adult and professional learning should be engaged.

3.6 Findings from the review and their implications in my research

The literature review of this chapter provides a range of useful conceptions about learning with the necessary discussion on the issues of adult and professional learners. These help identify the types of learning that rural Bangladeshi teachers should improve for their professional development and the procedures they should follow in their on-going learning practices. The findings are summarised below.

- a) Learning contains a wider meaning. It is an experience-based, meaningful, action-driven, collective and continuous process. It involves cognitive actions, visible performances, personal engagement and social cohesion where learners' understanding, knowledge and skills are considered as learning outcomes.
- b) In the learning process a number of personal and environmental factors such as information, thinking, attitude, creativity, anxiety, learning approaches, learning culture and experiences are involved. Surrounding

environment, learning strategies and motivation can enable these factors for improved learning experiences and achievements.

- c) Post-constructivist views (namely social constructivism, constructionism and connectivism) of education are more comprehensive, applicable and effective than the traditional ones. They however include most of the traditional learning concepts in their interpretations. These approaches emphasise the need for learner-centeredness, inquiry, collaboration, and the use of experiences and reflections in learning instructions; and are suitable for adult learning and professional development such as teacher-learning.

After reviewing the learning theories the roles of learning factors and processes, and also the natures of adult and professional learners have become more comprehensible. This understanding is essential for exploring the forms, procedures and outcomes of teacher-learning, the focus of my thesis, particularly when technology is involved in the process. I however need to explain whether theoretically or in practice technology enhanced learning is different from traditional learning or knowledge gaining. Moreover, it is essential to explore the factors involved in technology enhanced learning and their influence on learners, specifically on adults and professionals. In the next chapter (Chapter 4) I address these issues and propose a theoretical framework for researching technology enhanced teacher-learning approaches in rural Bangladesh context.

Chapter 4: Teacher-learning in a technological age

4.1 Introduction

In this globalised world the involvement of technology is inevitable in learning activities. The benefit of this in teacher-learning is also reported in various research findings (as shown by Fitzgerald et al., 2007). Researchers and educational practitioners have tested the capabilities of technological interventions in supplying credible learning experiences and utilising those for improving existing teaching practices (Brouwer et al., 2009). The use of technology in teaching and learning also contributes to the change of teachers' perceptions and actions (Laurillard, 2002; OECD, 2009). However, the integration of technology in learning practices, particularly with teachers, poses a threat of inconsistencies and changing requirements (as described by Koehler & Mishra, 2008) which create various learning related difficulties. It is therefore important to explore suitable technological tools and their efficient utilization for educating teachers in effective manners. As learning is defined from several aspects and through various factors (explained in Chapter 3), the learning theories are also needed to be compared with the emerging technology enhanced learning conceptions for understanding the role of technology in learning processes. Researchers (such as Dyke, Conole, Ravenscroft, & Freitas, 2007; Protheroe, 2004) claim that learning theories can be successfully implemented in technology-enhanced learning practices, and particularly with the adults and professional learners.

In this chapter I explore various forms, approaches and principal features of technology enhanced learning; and link those with learning theories. Then, by combining the learning theories and technology enhanced learning conceptions I propose a theoretical framework on technology enhanced teacher-learning which guided the research methodology of my thesis (detailed in Chapter 6).

4.2 Technology in education: forms and applications

Various names and terms for different technology enhanced teaching and learning approaches are evident in contemporary educational literature and practices. In most cases these terms signify the nature of particular instructional types such as what and how technology is used in a learning scheme, and how the learners are engaged to achieve some certain learning objectives. Some of the common terms used for technology enhanced learning are 'computer assisted learning' (CAL) or 'computer based training (CBT), web-based training (WBT), 'networked learning', and 'online- or Internet-based learning'. Although a single term is defined differently in different places, the following definitions can be consulted for achieving a general understanding of those.

Computer assisted learning or **CAL** is 'the learning procedures and environments facilitated through computers' (Schitteck, Mattheos, Lyon, & Attstrom, 2001, p. 93). The approach is mainly interaction-based, and the term is equivalent to 'computer aided learning' (CAL), 'computer based instruction' (CBI), and 'computer aided instruction' (CAI).

Web-based training or **WBT** involves electronic hardware and software to deliver educational training to learners through their computers via the Internet or World Wide Web (Rossett, 2001).

Networked learning is a certain type of 'learning in which information and communications technology (ICT) is used to promote connections: between one learner and other learners; between learners and tutors; between a learning community and its learning resources' (Goodyear, Asensio, Jones, Hodgson, & Steeples, 2003, p. 18).

Online learning 'takes place partially or entirely over the Internet [and] excludes purely print-based correspondence education, broadcast television or radio, videoconferencing, videocassettes, and stand-alone educational software programs that do not have a significant Internet-based instructional component' (Means, Toyama, Murphy, Bakia, & Jones, 2010, p. 9).

By analysing the above terms I realise that each of these individually covers partial options of technology such as the use of computers with or without the Internet. However, taking advantage of the rapid developments of Information and Communication Technology (ICT) tools and the greater expansion of the Internet, recently technology supported teaching and learning approaches have gained greater options in providing learners more control over personal learning experiences. For example, contemporary technology-based learning schemes can provide learners with various selections of 'learning sequence, pace of learning, time, and often media, allowing them to tailor their experiences to meet their personal learning objectives to manage access to e-learning materials, consensus on technical standardization, and methods for peer review...' (Jethro, Grace, & Thomas, 2012, p. 73). Because of the wide variety of technological tools and instructional approaches, an umbrella definition is required to be coined which can refer to an inclusive approach, and be sensitive to contextual differences, learners and the learning variations. In fact, this approach of referring to multiple concepts and knowledge areas within a single terminology is not new in the studies of social sciences, for example, psychology (Eagly & Chaiken, 2007). Consequently, two terms namely 'e-learning' and 'technology-enhanced learning' (TEL) are commonly used to refer to the greater scope and procedures of technology-enabled teaching and learning. Besides, 'blended learning', a new approach of education, has also emerged which 'combines e-learning technology with traditional instructor-led training, where, for example, a lecture or demonstration is supplemented by an online tutorial' (Jethro et al., 2012, p. 74).

4.2.1 Electronic learning (e-learning)

Electronic learning or 'e-learning' is possibly the most frequently used terminology referring to technology supported various learning approaches. Although the inception of this term, along with the associated concepts, is only fifteen years old (since 1997 as mentioned by Cross, 2004), its theoretical developments and practical applications have already experienced a rapid and extensive growth. However, the origin of the concepts related to e-learning is embedded with the increasing discussion and utilization of information and communication technology (ICT) for educational purposes in the 1990s, and their impact in shifting the traditional educational ideologies to a cost

effective, time flexible, learner autonomous, creative, and collaborative learning opportunities in later period (Bourner & Flowers, 1997).

According to the literature, at its primary stage e-learning related concepts were restricted to a limited number of technological usage and a few learning strategies. For example, Rosenberg (2001) considered this type of learning as the use of the Internet technologies which only supply various learning options to increase learners' knowledge and performances within a 'networked' learning environment using the Internet. However, within a few years this concept was redefined and more learning options were included within the e-learning concept. For example, Manville (2003) discussed how e-learning can contain non-electronic learning materials, simulations, synchronous and asynchronous learning activities within individual and collaborative learning formats. Additionally, he mentioned the possibilities of promoting mentoring and informal learning within a learning community. In later years, e-learning began to be explained from greater perspectives and consequently its content types, processes, and lesson delivery structures were highlighted (for example, Aldrich, 2004). Sangra, Vlachopoulos, and Cabrera (2012) analysed an extensive number of definitions of e-learning and categorise those under 'technology-driven', 'delivery-system-oriented', 'communication-oriented' and 'educational-paradigm-oriented' types. Based on these categories they proposed the following holistic definition.

E-learning is an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction and that facilitates the adoption of new ways of understanding and developing learning (Sangra et al., 2012, p. 152).

4.2.2 Technology enhanced learning (TEL)

The overall concepts of 'technology enhanced learning' or TEL are similar to the notions and ideas of e-learning. Although these two terms are used alternatively, the term TEL refers to all types of learning and teaching activities where technology is used to any extent. As technology supported teaching and learning contain varied forms (Bates & Poole, 2003), the term TEL considers

maximum number of approaches and refers to divergent aspects of learning aims, procedures, and outcomes.

By acknowledging the wide scope of using various technological options and different instructional procedures the Technology Enhanced Learning Committee of the University of Texas at Austin provides the following general definition of TEL.

Technology enhanced learning leverages technology to maximize learning within an environment of sound course design that can offer students the options of time, place, and pace and emphasizes different learning styles (University of Texas at Austin, 2004, p. 6).

The committee however admits that ‘there is no one definition for the look or feel of a technology enhanced course’ (p. 6). This statement endorses the flexibility and adaptability of technology enhanced learning in dissimilar contexts, unique educational circumstances, and varied learning demands.

The Memorandum of Understanding for the Campus Saskatchewan partnership, cited in the Review of the Technology Enhanced Learning (TEL) Action Plan Final Report submitted by EKOS research Associates, explains the characteristics and comprehensive nature of TEL.

[TEL contains] ... a variety of information and communications technologies to provide flexible, high quality learning opportunities for both on and off-campus students. Technologies include, for example, the Internet and Web based applications, video and audio conferencing, CD-ROMS, videotapes and interactive television.... Technology enhanced learning can be used to offer wholly ‘virtual’ online opportunities, can be multi-mode, employing a combination of technologies, or can be integrated with traditional classroom instruction or independent study courses (EKOS, 2005, p. 2).

Based on the considerations of learning aims and pedagogical procedures the US Department of Education (referred by Means et al., 2010, pp. 3-4) reports the following three important characteristics of TEL.

- a) Firstly, TEL can be classified according to its educational objectives, for example, whether its approaches are intended to replace traditional face-to-face teaching/ learning or to complement the traditional approach. To decide its objectives an online programme may consider a number of practical factors such as cost effectiveness, inclusiveness, and the learners' learning outcomes.
- b) Secondly, the nature of learning experiences is another aspect to categorise TEL approaches. For example, TEL learners partake in various types of technology-supported learning activity and gain different types of learning experience such as 'active learning', 'interactive learning', and 'expository learning'. However, in many cases students undergo the mixture of different types of learning experience.
- c) Thirdly, with the consideration of the conditions of 'time' and 'place' TEL activities can be divided as 'synchronous' or 'asynchronous' modes. Synchronous mode of learning refers to a real time instructional situation in a physical or virtual learning environment. In contrast, asynchronous mode means that there is a time difference between the instruction delivery and the learners' participation or responses.

In this thesis, I refer to technology enhanced learning or TEL as an umbrella term which denotes different approaches of technology supported learning. Here, TEL represents all the names and their meanings of technology supported learning, partially or as a whole, and their objectives, instructional designs, technological tools, and operational procedures.

4.2.3 Applications of TEL in teacher-learning

Rather than being passive recipients of mass consumer culture, the Net Gen spends time searching, reading, scrutinising, authenticating, collaborating and organising... (Tapscott & Williams, 2006, p. 47)

Although Tapscott and Williams' depiction of the use of technology in present time seems overgeneralised, it cannot be denied that the mentioned facilities of technology are greatly available and operational in different spheres of modern lifestyles. Recently, the use of social networks, mainly through the Internet, has become an influential medium for interaction and communication

among the members of various learning communities. In such technology enhanced learning environments learners can participate and collaborate online and in networks to learn with their peers (Luppicipini, 2007; McConnell, 2006; Pascu, 2008). The benefits of being engaged in such learning communities and the learning through collaborative activities are also available for the teaching professionals. For example, in a technology enhanced learning environment teachers can

- gain systematic and critical views of education (Vescio et al., 2008)
- share good teaching and learning practices (Avalos, 2011)
- receive authentic and personalised learning (Duncan-Howell, 2010)
- develop group/ organisational skills (Seddon & Postlethwaite, 2007; Stahl, 2005)
- foster a sense of community (McMillan & Chavis, 1986)

4.3 Technology enhanced learning: the theoretical base

I find the major learning theories and paradigms (described in Chapter 3) welcoming and adjustable to technology enhanced learning environments (the claim is also supported by Ally, 2004; Dyke et al., 2007; Protheroe, 2004). However, since the 1990s there has been a tendency for a paradigm shift from behaviourist to constructivist approaches in technology enhanced learning where many learning models have been proposed to keep pace with the theoretical developments and their applications in educational practices (Jonassen & Reeves, 1996). Yet, the practicality and impact of these learning models have not been extensively tested (Clegg, Hudson, & Steele, 2003; Dyke et al., 2006). Besides the constructivist approaches, I also find the features of post-constructivism (such as social constructivism, social construction and connectivism) suitable and beneficial for teacher-learning. In this regard, in section 4.3.1 and 4.3.2 below, I discuss how constructivist and post-constructivist theories can elucidate the learning environment and learning methods of technology enhanced teacher-learning. Additionally, in section 4.3.3 I provide the theoretical perspectives of three important aspects namely learning environment, instructional methods and contributing factors that influence the technology enhanced teacher-learning.

4.3.1 Learning environment

Technology enhanced learning, specifically for professionals like teachers, requires proper instructional designs and their utilisation to ensure the learning objectives. The approaches necessitate inquiry, communication, collaboration, reflection, democracy, and criticality. According to the observations of constructivist theorists (such as Laurillard, 2002; Lave & Wenger, 1991; Prawat & Floden, 1994) the professional learning environment should be 'inquiry' based and the platform for complex social and experiential understanding. The constructivist models, for instance the 'communities of practice' (Lave and Wenger, 1991) and 'knowledge community' (Harasim, 2012) meet these demands. The concepts of 'communities of practice' explain that this type of educational environment learning occurs through reflections, practice, negotiations and reinforcement of thoughts and actions within a social organisation (Lave & Wenger, 1991). Similarly, a 'knowledge community' facilitates essential professional ideas and transforms those to 'intellectual convergence' and practical applications (Harasim, 2012). The following example of Harasim's 'knowledge community' (in Figure 4.1), which has the similar operational procedures of the 'communities of practice', shows how online collaboration and the use of learners' experiences generate professional learning and implement it in real life situations.

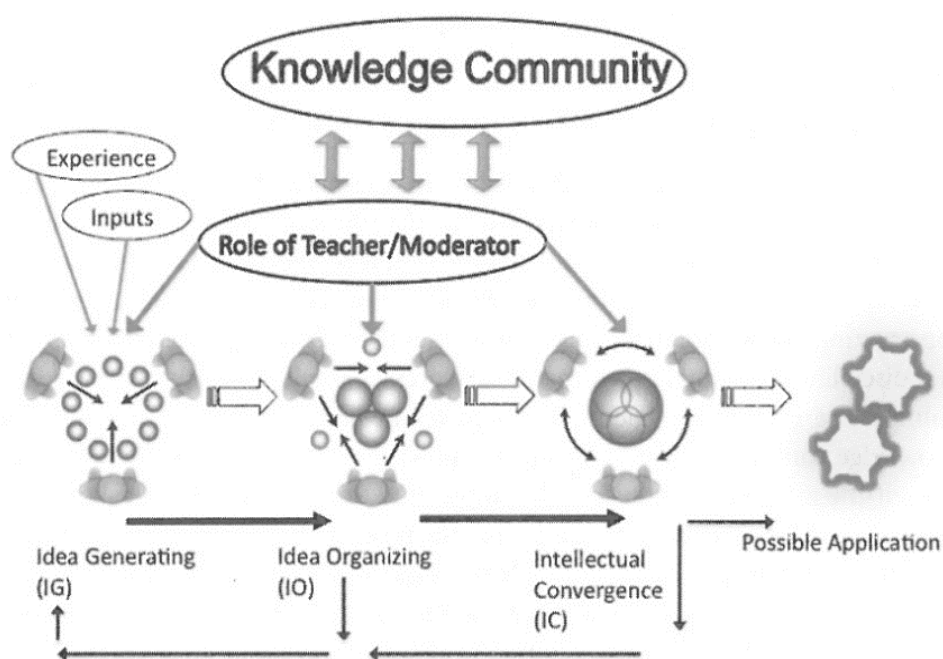


Figure 4.1: Harasim's (2012) online collaborative learning process

‘Communities of practice’ and ‘knowledge community’ can initiate online collaboration among teachers, facilitate active and self-regulated learning opportunities, and thus fulfil the requirements of constructivist and post-constructivist features of learning (Scardamalia & Bereiter, 2006). Besides, the approaches create opportunities for continuing professional development for teachers by supplying them with continuous sources of motivation (Guskey, 2002). At the same time, they are able to assist the teachers in connecting their learning with daily life teaching practices, which ultimately impacts on their students’ learning experiences (Holmes, 2012).

Although the technology enhanced, constructivist and continuing professional development schemes like ‘communities of practice’ or the ‘knowledge community’ promise various advantages to teachers, the results of those are dependent on how the internal factors and external variables of learning are engaged (explained in Section 3.3 of Chapter 3) with the forms of technological intervention. Although theoretically the connection and synergy among these factors and processes in learning are established, the involvement of technology would require further considerations and research on the systematic and realistic designing and implementation of the learning procedures. However, the concern is that ‘currently [technology is]...being applied in too many educational contexts with little apparent understanding of what it might, or should, mean’ (McConnell, 2006, p. 21). It should be realised that the inclusion of technology in teachers’ professional development should not be considered just as ‘an obligatory appendage’ aiming at teaching quality improvement (Grossman, Wineburg, & Woolworth, 2001), rather its designing and implementation should be based on practical circumstances such as learners’ learning needs, workplace situations, state of technological facilities, and the role of the society in the entire learning process.

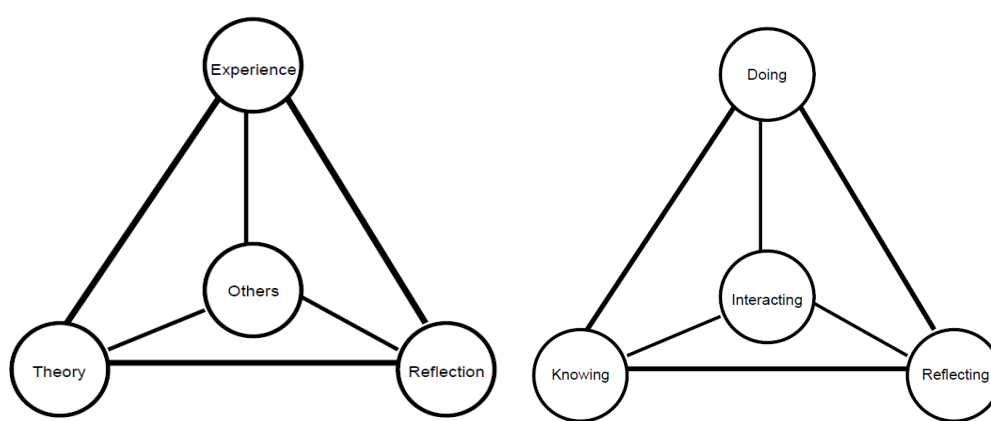
4.3.2 Instructional methods

Besides creating a suitable environment for learning, in a technology enhanced learning situation, technological and instructional designs should also be properly addressed and implemented.

Firstly, in technology enhanced teacher-learning the involvement of experiences and reflections is vital. As ‘learning is the process whereby

knowledge is created through the transformation of experience [and]... knowledge results from the combination of grasping experience and transforming it' (Kolb, 1984, pp. 38- 41), in this fast changing world adapting new information and processing those creatively in professional work demand partaking reflective approaches (Dyke, 2001). Reflections and experiences can not only influence the knowledge levels of the learners, but also change their 'skills and attitudes, values and emotions' (Jarvis, 1995, p. 20).

Educational theorists (such as Jarvis, 1999; Usher, Bryant, & Johnston, 1997) discuss four aspects of learning namely theory, interaction, reflection and practice, which are later modified by Dyke et al. (2006) into three major components (thinking and reflection, experience and activity, conversation and interaction) for structuring and describing technology enhanced learning processes. As social constructivist theories emphasise the influences of context on personalisation, reflections, participation, and scope for collaboration; Dyke et al. acknowledge the effects of context in people's personal and communal reflection processes. They claim that '... reflexivity in the social world is part of stream in which [technology enhanced learning]... flows' (p. 83). The concept of 'reflexivity' takes a comprehensive shape by Dyke (2009) when he emphasises the engagement of experiences, actions and reflections to gain learning. In the following two 'reflexive learning models' he amalgamates the experiential, reflective, and collaborative learning theories in technology enhanced learning.



'reflexive learning' (representation-1)

'reflexive learning' (representation-2)

Figure 4.2: Dyke's (2009) 'reflexive' learning models

According to Dyke, representation-1 describes learning 'as a developmental process that can grow, change and adapt to new situations and pursuits of the learner' (Dyke, 2009, p. 306). Through representation-2 he compares learning with molecules or individual elements that can connect and expand to other learning units in a linear or non-linear manner via knowing, doing, reflecting and interacting. The two models explain the dynamic features of learning.

Dyke's 'reflexive learning' models provide useful guidelines on technology enhanced teacher-learning instructions particularly by suggesting to engage learners' experiences, activities and reflections in the interactive learning environment. This also creates the scope to fit the learning components in social and educational contexts by recognising the internal and external aspects of learning along with addressing the requirements of the adults and the professional learners.

4.3.3 Contributing factors

Based on the discussion in Section 4.3.1 and 4.3.2 of this chapter I understand that technology enhanced teacher-learning demands the collaborative and continuing learning environment where experiences and reflections of teachers are used for improving their professional capacity. These aspects of teacher-learning can however be influenced by the following three contributing factors.

a) Acceptance

One of the most important guiding factors of technology enhanced teacher-learning is the teachers' levels of acceptance towards these types of learning approach. In general, according to Ajzen and Fishbein's (1980) Theory of Reasoned Action (TRA), human behaviours on any actions are influenced and guided by their beliefs, skills and attitudes. Davis (1986, 1989), in his Technology Acceptance Model (TAM), claims that technology enhanced learning approaches have the similar features. Through the following TAM model (Figure 4.3) Davis shows how the users' (or learners') confidence and competence regarding the usefulness of technology can increase their eagerness to use technology for learning. This eagerness in fact determines their practical use of technology and consequently the amount of learning they gain.

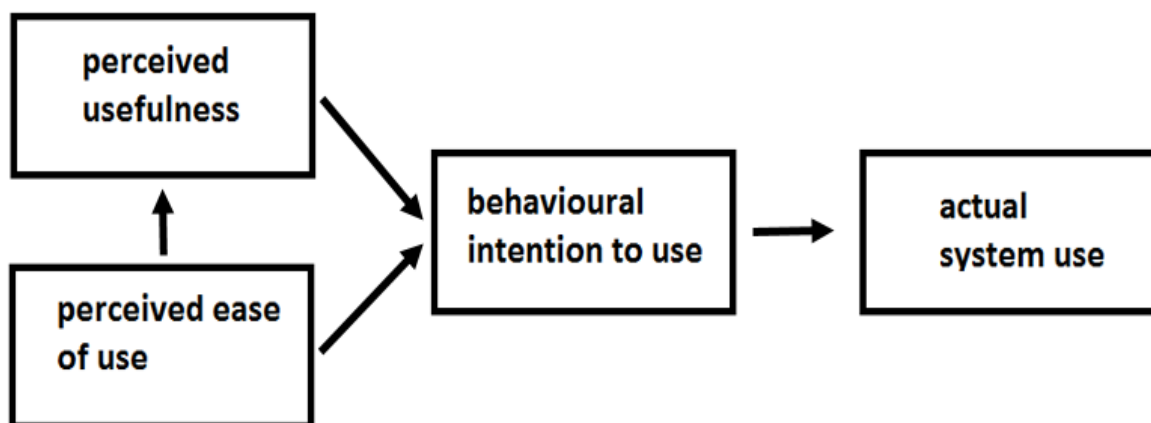


Figure 4.3: Technology Acceptance Model (Davis, 1989)

Moreover, in the case of technology enhanced teacher-learning, the acceptance (or motivation) and the rejection (or anxiety) of any technology or pedagogy may depend on the teachers' professional needs, experience and learning approaches (discussed elaborately in Section 3.5 of Chapter 3).

b) Prior knowledge

The inclusion of technological knowledge is important in technology enhanced teacher-learning. According to Koehler and Mishra (2005, p. 132), technology is a 'knowledge system that comes with its own biases, and affordances that make some technologies more applicable in some situations than others'. In any technology enhanced teacher-learning approaches it is therefore essential to consider the participating teachers' knowledge of technology along with their understanding of pedagogy and the learning content. The technological pedagogical content knowledge (TPACK) framework (developed with the concepts of researchers such as Angeli & Valanides, 2009; Koehler & Mishra, 2005; Margerum-Leys & Marx, 2003) integrates these requirements. The framework is based on Shulman's (1986, 1987) concept of pedagogical content knowledge which was later extended by Koehler & Mishra (2005) by technological knowledge. Archambault and Barnett (2010, p. 1657) provide the following graphic representation of TPACK (Figure 4.4):

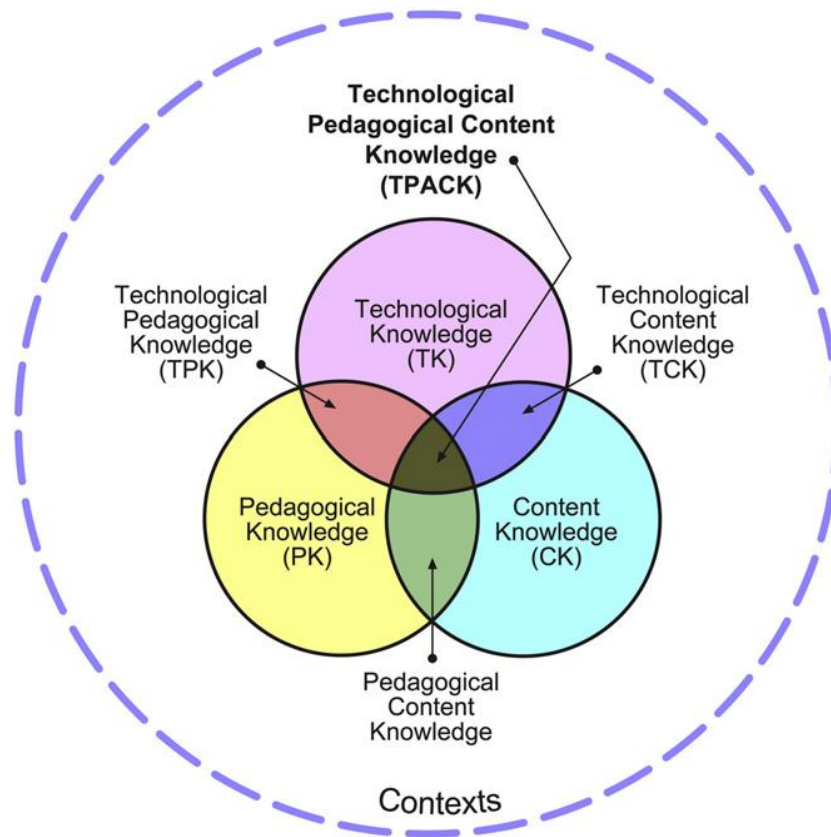


Figure 4.4: Archambault and Barnett's (2010: 1657) graphic representation of TPACK

According to the TPACK framework, in a technology enhanced learning situation learners need to develop the 'sensitivity to the dynamic, transactional relationship between all three components' namely the knowledge of content, technology and pedagogy (Koehler & Mishra, 2005, p. 134).

c) Association

Technology enhanced teacher-learning approaches are effective for constructing knowledge when teachers connect their personal learning approaches to real-life professional practices (Mouza, 2009). Similarly, there is a need for collaboration (Arvaja, 2007; Goodyear & Zenios, 2007) and social learning through adequate support from peers or competent facilitators (McLoughlin & Lee, 2010). According to Picciano (2002), a technology enhanced learning community can effectively fulfil these requirements. Palloff and Pratt's (2007, p. 18) 'elements of community-based online learning' (Figure 4.5) illustrates what a collaborative community of learning can offer in any technology-enhanced professional development scheme.

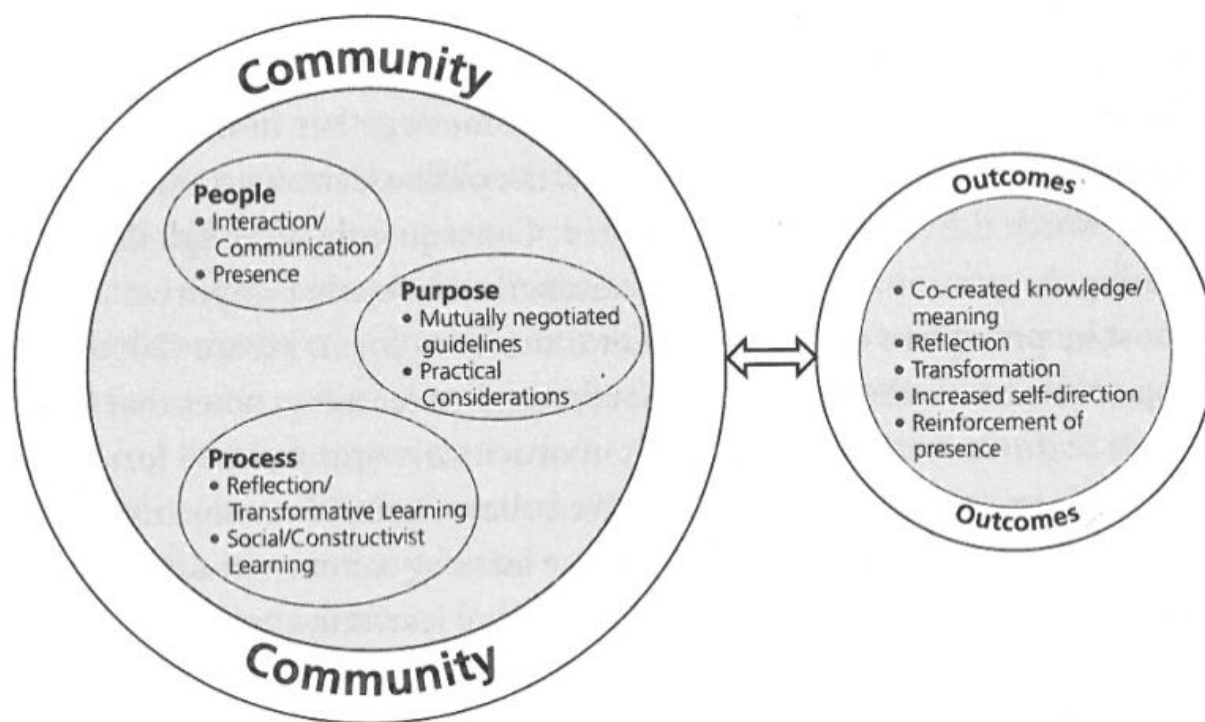


Figure 4.5: Palloff and Pratt's (2007, p.18) 'elements of community-based online learning'

According to Palloff and Pratt, as illustrated in Figure 4.5, for successful collaboration within a learning association or community there is the need for practical interactions, reflections, and negotiations. Warwick, Hennessy, and Mercer (2011, p. 315) however warn that for ensuring these elements the teaching/ learning activities should be evaluated first. For this reason, it is important to explore technology enhanced learning pedagogies for explaining the technology enhanced professional learning community well.

4.4 Technology enhanced teacher-learning framework

Learning is a holistic process of adaptation to the world (Kolb & Kolb, 2005, p. 194).

Based on the critical views of learning and relevant perspectives of the adults and professionals (elaborated in Chapter 3), and the forms and contributions of technology in teacher-learning processes (discussed in the earlier sections of this chapter), I take the following theoretical decisions.

- The general learning theories and paradigms can be used to explain the concepts and theories of technology enhanced learning.
- Teacher-learning is need-based, profession-driven and application-bound. Teachers, who are adults and professional learners, possess the ability of directing their own learning and thus active learning and learner-centeredness are key to this type of learning.
- Teacher-learning, similar to learning of other subjects, is shaped by several personal (for example, thinking, attitude, anxiety and experiences) and environmental (such as learning facilities, learning network and learning culture) variables. The variables are also influenced by pedagogies or learning instructions, learning strategies and learners' motivations.
- Constructivist and post-constructivist (which I term for social constructivism and connectivism) approaches of learning are suitable for technology enhanced teacher-learning schemes. The approaches include social components, experiences and reflections in learning processes. These also provide personalised learning opportunities along with organisational and shared learning skills to learners.
- Technology enhanced teacher-learning is effective when it is collaborative, shared and context-based. Moreover, it provides rich learning outcomes when the participating teachers build learning communities, and reflect and share experiences collaboratively.

Based on these decisions, I propose the following theoretical framework (Figure 4.6) for studying technology enhanced teacher-learning approaches in rural Bangladesh by exploring the research questions of my thesis.

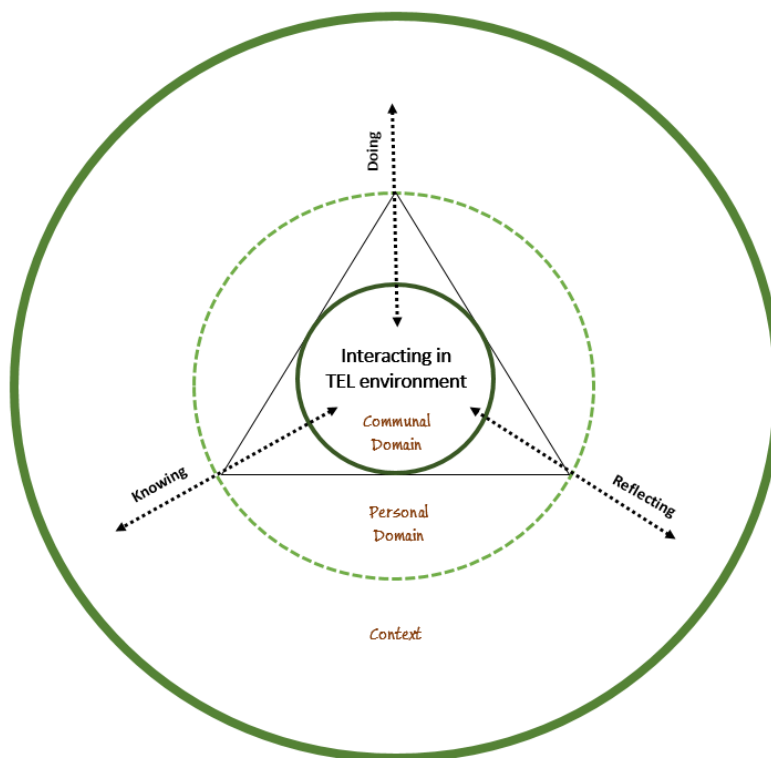


Figure 4.6: Theoretical framework for technology-enhanced teacher-learning

In the framework I address three major aspects of technology enhanced teacher-learning namely the context or the overall learning situation, learners' personal domain or internal aspects of learning, and the communal domain of learning or collaborative learning situations. In the communal domain of learning I propose a technology enhanced learning environment which allows learners to gain information and knowledge, reflect on experiences and ideas, and learn through participation and performances.

4.4.1 Components of framework: a brief description

My proposed theoretical framework involves multiple aspects of technology enhanced teacher-learning (I consider this as critical realist approach of research and explain elaborately in Chapter 6). The framework includes the internal factors and external variables of learners and learning in technology enhanced professional learning schemes. It also illustrates technology enhanced, interactional and collaborative instructional strategies of learning generated through active participation, reflections, and knowledge sharing of the participating teachers.

Here, I discuss these three connected learning domains more elaborately.

Firstly, 'context' or the external variables of the framework denotes various situational and environmental elements which play important roles in learning. These include teachers' professional learning culture, communication styles, job nature and requirements, personal and professional networks, social barriers and support, and institutional incentives or threats. As the focus of my thesis is on technology enhanced teacher-learning approaches, I am also interested to explore the state of technological facilities, their usage and influences on learning in my research context.

Secondly, the 'personal domain' of learning represents learners' internal factors of learning such as their mental characteristics, perceptions and affective factors (for example, curiosity, anxiety, challenge, confidence competence, experience, engagement and control). Theoretically, the use of technology and these factors have influences on each other (explained in Section 4.3.3 of this chapter), and I am therefore keen on exploring how they act while technology is used for professional learning purposes.

Thirdly, the 'communal domain' represents a technology enhanced and collaborative professional learning environment. This is an ideal professional learning situation constructed upon constructivist and post-constructivist views of learning. The environment facilitates the following three aspects of learning.

Knowing involves the gaining of knowledge on relevant subject matters the participating teachers teach, different approaches of teaching they follow in their teaching practices, and the sharing of practical teaching experiences including teaching successes and teaching difficulties.

Doing engages the participants individually and collaboratively in various knowledge gaining activities such as accomplishing and reinforcing diverse learning assignments (for example, case-based discussions and dialogic debates) in a regular basis.

Reflecting is a potential tool for teacher-learning through which participating teachers share and learn from their personal and professional experiences. Reflections are effective for professional growth as they involve participants' cognitive and affective factors for

analysing real life experiences via interaction and collaboration. It is also the source of indirect and persuasive learning.

4.4.2 Relevance to the research questions

The research methodology of my thesis (detailed in Chapter 6) is primarily based on this theoretical framework (Figure 4.6). The framework provides useful guidelines for investigating the personal, social and workplace related situations of rural Bangladeshi secondary teachers of English regarding their adaptation of technological innovations for professional development. In this respect, it shows the requirements of exploring their attitudes and behaviours towards the use of technology for professional learning purposes, and at the same time, the conveniences and difficulties they face while using technological tools. More precisely, the framework mentions the following aspects of technology enhanced teacher-learning which are also the key areas of the research questions of my thesis. Here, in Table 4.1, I summarise the components of the context and the learning domains of my theoretical framework and show their connections to my research questions.

Table 4.1: Theoretical framework and its relationship with the research questions

Components of theoretical framework	Aspects of context and learning-domains	Relationship with research questions
Context	demographic features; state of technological infrastructures; professional learning culture; social barriers and support; professional learning network; learning motivation and facilities (including family and workplace support)	<i>Theme I Question 'c', 'd' and 'e'</i> <i>Theme II Question 'a'</i>
Personal domain	professional learning preferences; perceptions on collaborative learning; attitudes to technology based learning; professional needs	<i>Theme I Question 'a' and 'b'</i> <i>Theme II Question 'b', 'c'</i>
Communal domain	teacher-learning environment; nature of learning activities; and procedures (or pedagogy)	<i>Theme III Question 'a', 'b' and 'c'</i>

4.5 An imagery

An image (Figure 4.7) of a sailing boat may replicate my theoretical framework.

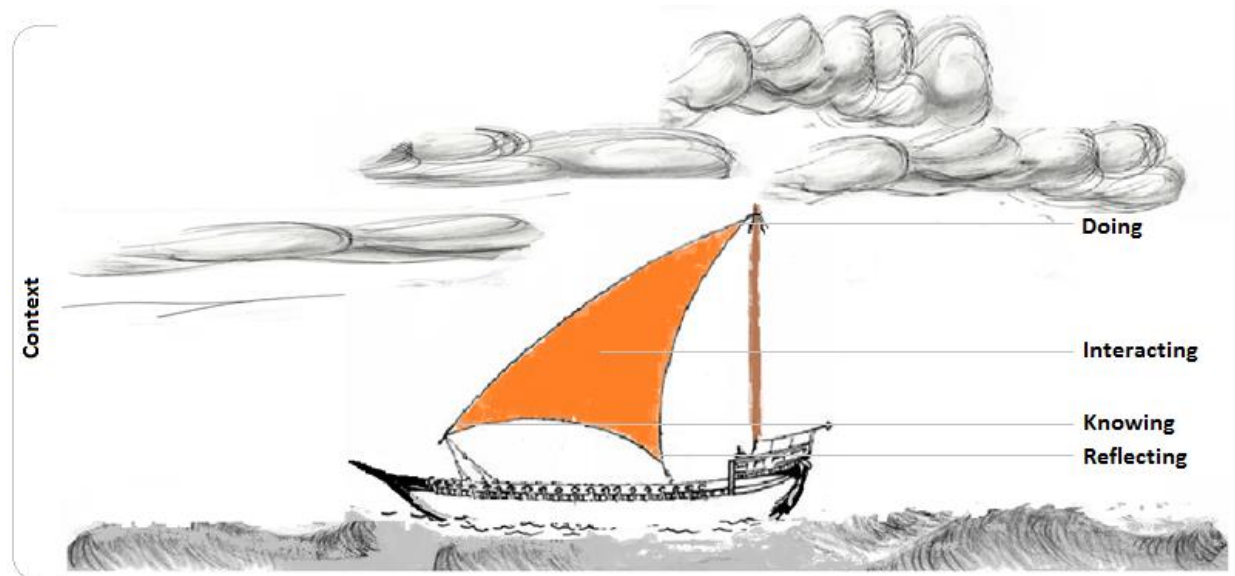


Figure 4.7: An imagery of technology-enhanced teacher-learning

The three edges of the sail (knowing, doing and reflecting) are contributing to the balance of it and helping the favourable wind to create a force (interacting) to move the boat which is constructed with elements such as wood and nails. Here, the environment or the context such as the wind, water and rain are vital for the movement of the boat.

In the image, I see the sail as the manifestation of TEL environment (the communal domain), the boat as the internal factors (personal domain), and the context as the external variables of learning.

Chapter 5: Technology enhanced teacher-learning pedagogies

5.1 Introduction

The concepts of ‘pedagogy’ convey a wide range of educational thoughts and actions (Black & William, 1998; Bruner, 1999). Therefore, ‘identifying a shared understanding of [it] is not immediately straightforward’ (Loveless, DeVoogd, & Bohlin, 2001, p. 64). Generally, pedagogy refers to a conscious knowledge building process where three major agencies namely ‘teachers’, ‘learners’, and the ‘learning’ play individual and intertwining roles (Lusted, 1986). A number of educational experts (for example, Knowles, 1973) consider pedagogy only for children’s learning, and propose alternative pedagogies or instructional approaches such as ‘andragogy’ for the learning of adults. Jarvis (2001) even argues for the need for different pedagogical strategies for teaching to dissimilar adult groups. However, the pedagogical approaches proposed for teaching to adults bear a similar instructional framework suggested for teaching to children (Jank and Meyer, 2006; cited by Larsen, 2012). In fact, these two types of instructional procedure only contain two different categories of teaching/ learning techniques and subject-matters, thus I (similar to the thought of Houle, 1972) do not consider it important to distinguish these as unique patterns of educational or learning processes.

In this chapter I use the term pedagogy as an ‘integral’, ‘general’, ‘complete’, and ‘united’ science (the key words are provided by Savicevic, 2008) of upbringing of the teachers as professionals and continuing learners. I therefore restrict my discussion to the following two areas:

- teacher-learning related pedagogical approaches
- interventions of technology in those pedagogies

My objective of this review is to understand the philosophical concepts of various teacher-learning pedagogies and their educational nature in practical applications (according to the advice of Lovat, 2003). I am interested to see how technology is incorporated in particular types of pedagogy, to what extent

technological adaptations are beneficial, the challenges the participants face while using technology for learning, and their perceptions about the processes. This understanding is essential for investigating the suitable technology enhanced pedagogical approaches for rural Bangladeshi teachers' professional learning including their administrative and management procedures. These aspects are associated with the research questions of my thesis (please refer to 'pedagogy and management', the Theme 3 of the research questions, in Section 1.5 of Chapter 1)

5.1.1 Organisation of the chapter

While studying the literature on various pedagogies I saw a wide variety of approaches that were applied for the teaching and learning within formal educational settings with regular students, particularly young learners. However, in teacher-learning schemes the application of the pedagogies are not wide-ranging. Yet, I identified six major pedagogical approaches for teacher-learning based on two major grounds: firstly, because of their extensive applications in teachers' professional development programmes in different learning contexts around the globe; and secondly, because of their use of technology in teaching/ learning activities. The pedagogical approaches are (in random order):

- Reflection-based
- Problem-based
- Dialogic
- Case-based
- Apprenticeship-based
- Project-based

In my discussion I address the following aspects of the above technology enhanced teacher-learning pedagogies.

- Definitions, concepts, procedures and requirements with specific references to professional development purposes
- Potential advantages and challenges in teacher-learning schemes, particularly, when they are supported by technology
- Exemplary empirical studies and their findings

5.1.2 Three challenges

While reviewing the literature on teacher-learning pedagogies with a focus on the use of technology I faced a number of challenges.

Firstly, although I was keen to report on the empirical studies on technology enhanced teacher-learning, because of the unavailability of evidence I have had to report some studies which did not include teachers. I however reviewed the research work involving similar professionals such as adult students studying education and non-teaching staff of educational institutions such as librarians and managers.

Secondly, although in this chapter I document six types of technology enhanced teacher-learning pedagogy, there are other pedagogies (such as Simulation or Role-based, Anchored instruction, Goal-based Scenarios, and Reciprocal Teaching) mentioned in the literature. I however do not report those because they are not strongly evident in the literature, or the use of technology in those is absent. Yet, I believe that the review of these six pedagogical approaches facilitates sufficient understanding on diverse methods and activities of technology enhanced teacher-learning pedagogies including those which I do not discuss here.

Thirdly, I faced difficulties in naming the pedagogies as I noticed their different names in different literatures. Therefore, the technology enhanced pedagogical approaches in this review are not limited to their particular names only; rather they contain the ideas, methods, and activities of a number of parallel pedagogical approaches. Similarly, in this review, there is a number of comparable pedagogical concepts and actions in different pedagogical descriptions. I recommend that these similarities should be accepted as a common phenomenon of educational thoughts and actions.

5.2 Pedagogical considerations in teacher-learning

Pedagogy is the 'science of the art of teaching' (Gage, 1985), or simply a cultural practice of education (Giroux, 1997). According to Govindasamy, 'pedagogical principles are theories that govern the good practice of teaching (Govindasamy, 2002, p. 289). 'The pedagogy of teacher education' (named by

Loughran, 2006) or teacher-learning pedagogies are different from general teaching/ learning pedagogies and more challenging to administer. According to Fuller and Brown,

... teaching teachers is a bit like trying to repair a speeding automobile in the midst of a bitter argument about how it should be done (Fuller & Brown, 1975, p. 49).

For reviewing the literature on teacher-learning pedagogies in an efficient manner I therefore followed the guidelines mentioned below.

Firstly, according to the recommendation of Alexander (2010), I studied particular teacher-learning pedagogies with detailed descriptions and discourses. In this regard, I consulted with their historical and conceptual developments.

Secondly, I thoroughly reviewed the nature of learning environment of the pedagogies. I considered this important because it provides information about the learning context and the nature of learning experiences (Camp, 1996).

Thirdly, as teachers are adults, professionals, and continuing learners; I employed the critical lens of observation (Freire, 1970a, 1970b; Giroux, 1983) for documenting the pedagogies for them. In the literature I searched-out the backgrounds and learning cultures of the research contexts and the people, their social constructs such as ethnicity, class and the entity as social and communal beings.

5.3 Technological interventions for teacher development

Generally, the use of technology is believed to be beneficial in teacher development initiatives. Fitzgerald et al. narrate how the technological interventions contribute positive changes in different teacher-learning pedagogies.

... technology-enhanced teaching innovations provide problem-centred pedagogies to engage novices in thinking like professionals (Boling, 2007; Merseeth & Lacey, 1993, Utley, 2006). Multimedia cases provide the means to bring dilemma-laden, complex situations of teaching into training programs. Electronic performance support tools and online

discussions within learning communities provide supports for novices to apply, adapt, and evaluate effective instructional processes. These pedagogies allow novices to develop 'case' knowledge for use in ill-defined real world situations (Fitzgerald, Semrau, & Deasy, 1997; Fitzgerald, Wilson, & Semrau, 1997).

Fitzgerald et al. (2007, p. 2)

In addition to the above list, technology-enhanced pedagogies are capable to provide powerful learning experiences for teachers (Lofstrom & Nevgi, 2008) by creating resourceful learning environments with the facilities of 'productivity tools, such as presentation packages, word processors, outlines, ideas processors, spread sheets, graphics packages, music composer and database packages' (Scrimshaw, 1997, p. 102). Additionally, these pedagogies can facilitate the scope for mentoring (Lowther, Inan, Strahl, & Ross, 2008), social learning (Rienties, Brouwer, & Lygo-Baker, 2013), lesson materials preparation skills (Glazer & Hannafin, 2008; Russell, Bebell, O'Dwyer, & O'Connor, 2003), and communication and collaboration opportunities (Russell et al., 2003) to teachers. They can also foster the humanistic learning environment where 'self-development, cooperation, positive communications, and personalization of information' are nurtured (Tomei, 2003, p. 7).

However, the effective design, implementation and adaptation procedures of technology enhanced teacher-learning pedagogies are challenging to accomplish. For example, the planning stage requires suitable approaches and tools to prepare learning tasks, resources and instructional framework (Herrington & Oliver, 2000). Then, the teaching/ learning contents needs the provisions of packaging, managing, storing, and disseminating information among the learners and facilitators in practical and reliable fashion. During the implementation stage the learners need to be able to operate technological tools with confidence and efficiency (Inan & Lowther, 2010; Lim & Khine, 2006). In fact the overall learning programme needs to monitor the learners' accessibility to the technological tools, their familiarity with the rapid change of information dissemination approaches, their wide-ranging learning experiences, abilities to work and reflect together and consciousness about possible risks while using technology for learning (Conole & Dyke, 2004)

5.4 Technology enhanced teacher-learning pedagogies: learning from global experiences

In the following sections I review the concepts, advantages, challenges, and procedures of six major pedagogical approaches of technology enhanced teacher-learning. In my discussion I include examples of empirical studies and the findings for conceptualising their instructional procedures including the use of their experiences and technological tools.

5.4.1 Reflection-based pedagogy

‘Reflection’ commonly refers to the constructive self-examination of behaviours, circumstances, practices, and their outcomes of people or events (Valverde, 1982). It ‘consists of turning a subject over in the mind and giving it serious and constructive consideration’ (Dewey, 1933, p. 3). Through reflections knowledge is constructed upon personal experiences which also include social components and contextual aspects (Grabinger, 1996; Vygotsky, 1978). Reflective practices are also comparable to experiential and situated learning (Osterman & Kottamp, 2004).

Teaching greatly involves reflective practices (Light & Cox, 2001; Schon, 1987), and the ability of teachers to reflect critically on their activities is one of their essential professional qualities (Ng, Lan, & Thye, 2004). Reflections and interactions can supply different views in specific and relevant manners (Sims, 1999) which help teachers find solutions to pedagogical problems and understand learning procedures and students’ expectations (Jonassen et al., 1999). Besides, it can provide them with meta-learning by supplying awareness and control over their learning and associated processes (Biggs, 1999) which also enable them to transmit learning to others through judgments and actions (Shulman & Sykes, 1983). Research findings (such as Snowmn, McCown, & Biehler, 2012) show that reflective practices assist teachers, especially new teachers, to expertise and grow in their profession.

5.4.1.1 Technological interventions and research evidences

Traditionally, reflection-based learning among teachers is generally done with journal writing, reading, and peer feedback (Sockman & Sharma, 2008). Recently the idea of collaborative reflective practices has become popular. As

‘reflective practice involves seeing learning as an interactive process’ (Benson, Hardy, & Maxfield, 2001, p. 85), peer collaborative reflections create an effective opportunity for learners to share their ideas and feedback (Storch, 2005), and at the same time enhance their professional knowledge to a great extent (Manouchehri, 2002). In this regard, technology-supported reflections and interactions can provide wider learning opportunities. Various asynchronous (such as Blogs, Wikis, Online Discussion Forums, and email) and synchronous (such as Instant Messaging and Online Whiteboard) online communication tools can be used for the purpose of reflective practices. For example, online conferences using Electronic Discussion Boards or News Groups can be beneficial for prospective and new teachers in generating pedagogy related conversations and reflections which may subsequently prepare them for their professional responsibilities (Nicholson & Bond, 2003).

Several research findings document the outcomes of technology enhanced reflective teacher-learning schemes. For instance, Hernandez-Ramos (2004) used Blogs and Online Discussions together in a teacher preparation course in the United States where student teachers created their own blogs and posted a number of paragraphs based on the questions and rubrics supplied by the researcher. Additionally, they participated in three ‘timely and insightful’ discussion sessions and shared their critical reflections within a given time limit. A qualitative analysis of the reflections collected from the blogs and discussions revealed that the interaction helped the participants get to know each other, participate more and apply their higher order thinking skills. However, the researcher indicated a concern about the collaborative reflection as it was ‘simultaneously a motivating and threatening resource for students’ because it allowed them to conduct both the relevant educational interactions and pointless social discussions (Hernandez-Ramos, 2004, p. 13). Researcher McCormack conducted a case-study using VoiceThread, a free Web 2.0 hosted service that allows ‘asking questions, making connections, forming opinions and gathering facts’ (McCormack, 2010, p. 161) with twenty five university students participating in the Early Childhood and Special Education programme. The researcher found the use of VoiceThread highly motivating and easy to operate. It enabled participants’ purposeful thinking skills and meaningful learning experiences. McCormack (2010, p. 163) claimed that ‘the application of a digital tool such as VoiceThread can augment, extend and

refine teacher reflection experience by facilitating and structuring the analysis processes'. The study however raised the concern that the inexperience of using a technological tool may hinder the entire learning process, and therefore an easy access to technology and continuous support to users are essential.

Although technology enhanced reflective practices provide many advantages, these are often difficult to achieve. For example, many teachers treat the ICT tools such as blogs or Portfolios as a storehouse of information only, not a learning device (Cottrell, Girvan, & McKenzie, 2002). Some teachers do not feel comfortable in sharing their personal and professional information with peers (Doig, Llisley, McLuckie, & Parsons, 2006), and the reflective writing is challenging for many of them (Moon, 2004). Moreover, technology-enhanced collaborative reflective practices involve many affective factors (Hargreaves, 1990), and thus the participants require confidence (Cranton & Carusetta, 2002), honesty and openness (Benson et al., 2001). Additionally, in technology-enhanced interactions there is an important role of e-moderators or e-tutors whose duties include encouraging students to join and stay in conversations effectively and continuingly (Fauske & Wade, 2003-2004).

5.4.2 Problem-based pedagogy

Problem-based Learning (PBL), developed in the 1960s, is a comparatively new pedagogical approach. Initially, PBL was strongly influenced by Dewey's and Vygotsky's constructivist concepts of gradual, natural and collaborative learning (Petraglia, 1998). Dewey's emphasis on 'doing' (Dewey, 1916) and Vygotsky's ideas on 'problem solving' (Vygotsky, 1978) were later ingrained by Schumann (1978) who initiated the concept of PBL in learning pedagogies through prioritising inquiries. However, the term gained wider popularity through the research of Barrows and Tamblyn (1980) with a group of Canadian medical students, and subsequently many educational institutions started adapting the approach. The basic principle of PBL is to provide learners with problematic questions or situations to put them in a dilemma so that they try to explore the target knowledge and skills, and also the suitable procedures, to solve it (Boud & Feletti, 1991; Gillani, 2006). It often uses real problems and focuses on the need of individuals, encourages the use of prior knowledge through reflections for new knowledge creation, and develop communication

abilities of learners in collaborative manner (Argyle, 1991; Bailey, Curtis, & Nunan, 2001; Kelson & Distlehorst, 2000; Nelson, 1999; White, 2001).

5.4.2.1 Technological interventions and research evidences

Problem-based pedagogy has been applied within various technology-supported environments (Park & Ertmer, 2008) and differently named, such as, 'Computer-mediated PBL' (Lo, 2009) and 'PBL online' (Savin-Baden & Wilkie, 2006). The instructions and learning of this approach can be face-to face and via online which is termed as 'blended PBL' (Graham, 2005). One of the major benefits of this approach is its use of the web for visiting the vast sources of educational information. Besides, the Internet can provide various time and place independent online discussion options (Vrasidas & Mclsaac, 2000), create the scope for electronic distribution of study materials, and offer electronic assessment facilities using questionnaires and the transcripts of online discussions (Donnelly, 2006). Moreover, learners can gain meaningful learning through video clips, pictures and spread sheets in a technology-enhanced PBL (Jonassen et al., 2003).

Several research projects show the benefits and challenges of technology enhanced PBL. Luck and Norton (2004) explored the experiences of Early Years Education and Care Managers in face-to-face and online collaborative PBL activities. The research findings revealed that both the face-to-face and online participants improved their problem-solving, creativity, communication, team-working and self-direction skills. However, the online participants were more collaborative in the process and their improvement of academic literacy skills such as reading comprehension was speedier. Moreover, they expressed the higher level of self-confidence and skills for learning collaboratively. The online participants however mentioned their difficulties in accessing online learning resources. In a separate study Walker et al. (2011) explored technology-enhanced and problem-based teacher development approaches with school teachers in a rural educational context. In that study one group of teachers attended face-to-face workshops and worked on the issues of online learning resource collection and their use in problem-based learning activities for students. The second group first learned about technology and then about PBL pedagogy. Later, they designed PBL activities for their students by using

Instructional Architect (IA), a web-based tool. The findings of the research show that participants' knowledge, experience and confidence in technology integration increased after participating in both of the professional development enactments. The IA usage data show that the participants' students visited IA projects more often which proves the student-centeredness of the PBL scheme. PBL was also found to be motivating to generate deeper and broader discussions. The participating teachers however mentioned the requirement of extended time for accomplishing technology-enhanced PBL activities. Besides, there was a high drop-out in the PBL activities which shows the nature of difficulties of attending this type of learning scheme.

Technology-enhanced PBL is not free from problems and challenges. The nature of this pedagogy appears to be over-ambitious as it requires to integrate explorations, reflections, and critics within common forms of online learning (Savin-Baden, 2000). Additionally, Savin-Baden continues, because of the dissimilarities of this approach with the traditional face-to-face learning there is a risk that many participants may feel the course disjointed, and consequently may take longer time to be familiarised with it. Moreover, in these programmes course materials and the learning contents, supplied as a package or via the web, are separated from the tutor's feedback or tutorial sessions which are comparatively shorter than the previous segment, and are mostly delivered through e-mails or synchronous online conferences (Mason, 1998). This separation of the interrelated activities and the uneven time distribution may impact adversely on the learning. In some technology-enhanced PBL programmes (such as Rendas, Rosado, & Gamboa, 1999) computer simulations are used to enhance learners' practical knowledge and skills in a clinical context. However, this type of activity may not facilitate any opportunity for learners to become creative. After all, in a PBL scheme ensuring adequate resources, proper administrative support, and sufficient preparation time for the learners can be difficult to fulfil (Park & Ertmer, 2007). As PBL is greatly collaborative and investigative, it requires extensive opinions, assumptions and evaluations from its participants. Therefore, for effective use of questions or problems there is the need to engage efficient facilitators who are able to build the 'climate that will foster professional learning or collaboration by crafting communications that support a sense of safety in the discussion areas' (Collison, Erlbaum, Haavind, & Tinker, 2000, p. 30).

5.4.3 Dialogic pedagogy

The tradition of using dialogues as the vehicle for learning is long. For example, the transmission of knowledge from Socrates to Plato, and from Plato to Aristotle was accomplished through dialogic questions and conversations (Plato, 1999). Socratic dialogues were however widely teacher-centred which has changed greatly in contemporary pedagogical thoughts and actions, and consequently become more 'liberatory' or democratic (Shor & Freire, 1987). Dialogues supply learners with languages and ideas (Vygotsky, 1986) and enable them to form shared-meanings (Arnett, 1992; Biesta, 2004; Gadamer, 1982). These also establish their voice (Arnett, 1992; Guilar, 2006) and build discourses with 'situated meanings' of words involving attitudes, behaviours, personal and social values, and beliefs (Gee, 1996). Dialogic pedagogy is therefore suitable for adults who are often motivated by their own learning needs and who want to involve their self-concepts and personal experiences for achieving immediate learning outcomes (Knowles, 1990).

Dialogic pedagogy can be highly effective for teachers. The approach can help them gain knowledge and perspectives of learning activities through sharing insights in critical, reflective and meaning-making manners (Brookfield & Preskill, 2005; Cooper, 1998; Mortimer & Scott, 2003; Putnam & Borko, 2000). Additionally, it can create opportunities to logically think the personal and professional problems along with evaluating future actions (Burbules, 1993). The approach however requires the hermeneutic or dialogic community which can facilitate discussions and conversations in systematic structures (Gadamer, 1982). Besides, the activities of this approach should integrate learners' experiences, reflections and actions in collaborative and balanced discussions (Baker, Jensen, & Kolb, 2002). Moreover, a variety of dialogues such as 'critical dialogue', 'creative dialogue', and 'caring dialogue' are needed to be included for enhancing teachers' professional skills and knowledge (Lipman, 2003; cited by Wegerif, 2007).

5.4.3.1 Technological interventions and research evidences

Technology can work as a catalyst in initiating and facilitating dialogues for learning purposes. The Internet can store and share dialogues among the users (Downes, 2004). By using the Internet and web-based applications

learners can participate in synchronous and asynchronous conversations. Asynchronous cyberspace forums, platforms for dialogic activities, have time and place flexibility where the users can express and share their ideas and opinions at their convenience (Brookfield & Preskill, 2005). Similarly, the computer mediated dialogue (CMD) system, proposed by Mitchell (2003), can enhance critical reflective ability of learners. Through the technology-supported 'conversational' approach, proposed by Laurillard (2002), dialogues can be repetitively used for learning where teachers and learners can improve their 'communicative', 'interactive' and 'adaptive' qualities.

Clegg, Hudson, and Mitchel (2005) in two case studies showed how their research participants (the students and staff of the International Masters programme in e-Learning Multimedia and Consultancy at Sheffield Hallam University, UK) were able to create and share written dialogues in a technology enhanced learning environment. In the first case study the participants provided critical reflections by writing an on-going diary with Digital Media Applications (DMA). Although diaries are generally considered as a personal thing, in this study they were used for shared discussion and open learning purposes. The entries of these on-going diaries revealed that they are capable of enabling participants to evaluate personal responsibilities and actions of learning within a multicultural and virtual dialogic environment. Many participants of the study also acknowledged the need for an on-going discussion and collaboration. In the second case study, the participants shared their reflections through PowerPoint slides via a dedicated 'Blackboard' site using the software called Notes. The findings show that the participants positively accepted technology supported approaches for sharing reflections and opinions and, compared to traditional paper-based version, showed better performance while submitting their work on their e-portfolios. Additionally, the use of technology improved the participants' interaction. The study however recommends to clearly inform the goals of the activity, particularly about creating online dialogues, and to ensure sufficient care while practising critical dialogues. In a separate study Prestridge (2010) explored the role of Australian school teachers in constructing dialogues through an online threaded discussion forum. In the study teachers participated in dialogic discussions and posted their opinions, reflections, and supporting documentation online. By qualitatively analysing these posts the researchers found that the teachers

were able to produce both the collegial and critical forms of discussion in their dialogues. Based on this finding Prestridge claimed that teachers' pedagogical beliefs and practices can be influenced and changed by investigative, reflective, critical, and collegial dialogues via online discussion forums.

5.4.4 Case-based pedagogy

The tradition of case-based instruction in learning is not new (Doyle, 1990; Sykes & Bird, 1992). Cases have been being used for many years for teaching various academic subjects particularly business, medicine, law, and engineering. Christensen and Hansen define the case as 'a partial, historical, clinical study of a situation' (Christensen & Hansen, 1987, p. 27) whereas Shulman refers this as 'well-documented, and richly described events' which can generate context-specific knowledge (Shulman, 1986, p. 11). However, artificially designed simulations and complex professional situations can also be considered as cases which are motivating for successful professional debates and discussions (Kagan, 1993).

Case-based learning is practical and humanistic (Fenstermacher & Richardson, 1991), and it can provide the skills for interpreting contextual circumstances (Cox, 2009; Nath, 2005). This approach engages teachers in conversations (Carter, 1989), improve their skills of observation (Stigler & Hiebert, 1999), systematic thinking (Greenwood & Parkay, 1989) and professional reflections (Richert, 1991). Additionally, it can familiarise them with the complexities of teaching by emphasising social and pedagogical issues which enhances their self-critiquing and higher order skills (Kuntz & Hessler, 1998; Shulman, 1992). Teachers can also gain field experiences and connect teaching related theories and practices through case-based teacher-learning (Carter, 1988; Haley, 2004). The relationship between theoretical understanding and practical experience is in fact vital for enhancing teachers' professional qualities because 'skilful teachers do not operate from a set of principles or theories but rather build, through experience on contextualised situations, multiple strategies for practice' (Merseeth, 1996, p. 24). However, this approach of learning involves a number of limitations in professional development programmes. For example, learners may oversimplify the case materials and thus fail to gain or transfer the needed pedagogical knowledge (Demetriadis, Papadopoulos, Stamelos,

Fischer, & Norton, 2008). Besides, preparing case-based learning instructions can be difficult as it requires careful measures to address the particular themes (Kleinfeld, 1988) which should match the professional learning needs of the targeted professional groups (Shulman & Colbert, 1988; Silverman, Welty, & Lyon, 1992).

5.4.4.1 Technological interventions and research evidences

For the last three decades educators have been using various multimedia tools, particularly interactive videodisks and computer programming in case-based instructions. However, initially the multimedia cases were used mainly for reflective practices. For example, Abell, Bryan, and Anderson (1998) used video cases in an action research study with student teachers for discussing personal theories in use and personal visions regarding teaching, and classroom problems. In the late 1990s Epanchin and Colucci (1999) built a web-based library of teaching related cases which allowed more investigation and learning opportunities. Gerber also developed CASELINK, a virtual environment where multimedia cases are used for professional knowledge dissemination (Gerber, English, & Singer, 1999). Apart from reflections and professional discussions, multimedia cases are unique materials for teacher-learning. Video excerpts, which are 'highly motivating', and 'pedagogical...for promoting learning in the virtual classroom' (Brooke, 2006, p. 146), are effective to train novice teachers (Cannings & Talley, 2003).

There are several instances of technology enhanced and case-based teacher-learning research. Makitalo, Hakkinen, Leinonen, and Jarvela (2002) organised a web-based discussion forum with pre-service teachers and mentors, all based in the universities in the USA and Finland. The participants shared a number of problematic cases which they had encountered in their field training, and posted electronic messages online within ProTo, an asynchronous virtual learning environment. The postings proved that the cases can instigate both the 'progressive' (less frequent feedback and critical reflections) and 'deeper' (more frequent feedback and critical reflections) levels of discussion. Another research, a two-year study with pre- and in-service university teachers, was conducted by Fitzgerald et al. (2007) to explore the processes of implementing technology-enhanced multimedia cases in teacher-learning. Each of the participants worked with at least two cases, such as in the areas of context and

applications, and the findings show a number of benefiting outcomes. For example, through using multimedia case-methods all participants (irrespective of educational levels, course areas, specialisations and professional experiences) received opportunities to learn. Additionally, the multimedia cases were able to generate the interactive and embedded nature of learning where participants went through scaffolding activities and problem-solving inquiries. The research findings however recommend that, to ensure effective learning outcomes there should be the scope for participants to transfer knowledge gained from case-based learning in real life situations.

5.4.5 Apprenticeship-based pedagogy

Throughout most of history, teaching and learning have been based on apprenticeship. Children learned how to speak, grow crops, construct furniture, and make clothes...Even in modern societies; we learn some important things through apprenticeship: we learn our first language from our families, employees learn critical job skills in the first months of a new job, and scientists learn how to conduct world-class research by working side-by-side with senior scientists... (Collins, 2006, p. 47).

In the history of learning, 'prior to the emergence of formal schooling the apprenticeship model was the most common means of educating learners' (Dickey, 2008, p. 507). For professional purposes this is also considered as one of the common approaches for preparing practitioners (Rogoff, 1990). The popularity of this pedagogy is however comparatively a recent phenomenon, and during the last three decades the approach has been applied with a high number of professional groups. Research findings (such as Farmer, Buckmaster, & LeGrand, 1992) claim that professionals across different occupations consider the apprenticeship method helpful for specialised learning and development. Similarly, in the case of teacher-learning this approach can efficiently influence existing teaching practices (Wilson, 2006). Collins (2006) provides a new concept of apprenticeship for professional development as she identifies the traditional models as only focused on 'the specific methods for carrying out tasks in a domain [where]... skills are instrumental to the accomplishment of meaningful real world tasks' (Collins, 2006, p. 78). For gaining higher levels of learning and better performances she

therefore suggests including cognitive knowledge in the apprenticeship approach which she terms 'cognitive apprenticeship' (Collins, Brown, & Newman, 1989).

Generally, the apprenticeship method is capable of facilitating authentic learning experiences for learners (Farnham-Diggory, 1990). This learner-centred approach can successfully draw learners' interest, excitement and motivation (Norman & Spohrer, 1996). Additionally, learners can undergo structured and sequenced learning activities (Collins et al., 1989), and become able to work collaboratively with their masters and co-learners (Palincsar, 1986). Another benefit of this method is that it provides opportunities for scaffolding which helps the learners acquire their target knowledge and skills with the understanding of respective learning processes through 'communicating', 'coaching', and 'eliciting' with instructors and peers (Guzdial, 1995). Moreover, apprenticeship provides the mentoring opportunity which allows 'mentees' or learners to receive 'knowledge, insight, perspective or wisdom' from expert and successful professionals (Reushle, 2011). This consequently supplies them with the necessary confidence, experience and expertise for achieving improved professional outputs (Gardiner, 2005).

There are several challenges in implementing apprenticeship pedagogy in teacher-learning. For example, the approach requires significant contributions from expert supervisors or educators (Krajcik, Blumenfeld, Marx, & Soloway, 1994). The supervisors' or teacher trainers' unrealistic expectations may also hamper the learning (Bullough & Draper, 2004). Moreover, ensuring the standardisation and keeping the regularity of the quality of supervision may become difficult to ensure (Wilson, 2006). To overcome the problems, the apprenticeship model of teacher-learning should maintain a small ratio between teacher trainers and teacher apprentices (Collins, 2006). In order to allow trainee teachers to involve their observation skills and cognitive practices, field experience-enabled apprenticeship can also be an effective method (Simpson, 2006). It is vital that the approach allows frequent interactions with experienced teacher-leaders who can provide coaching and scaffolding facilities to peer teachers (Glazer & Hannafin, 2006).

5.4.5.1 Technological interventions and research evidences

Isolated professional learning experiences alone cannot improve teachers' practical teaching skills (Loucks-Horsley, Hewson, Love, & Stiles, 1998). Therefore, education researchers (such as Brown et al., 1989; Fullan & Stiegelbauer, 1991) suggest for field experience, scaffolding and peer support in situated contexts. In this regard, technology can contribute positively, but the research on this approach with teachers and their professional development is still limited (Alger & Kopcha, 2009).

Various technological tools can benefit the apprenticeship pedagogy. Telecommunication technology, such as web-based tools, can assist teachers through supplying continuous information and scaffolding facilities (Bodzin & Park, 2002). Guzdial (1995) mentions the possibility of 'software-realised scaffolding' which acts as a master, or a teacher, for learning. Electronic Performance Support Systems (EPSS) can help teachers design curricula (McKenney, 2008) and prepare lessons for teaching (Wild, 1998). Similarly, the 'intelligent tutoring system', designed for students at Carnegie Mellon University, USA, can support learners in solving geometry and algebra related problems (Anderson, Corbett, Koedinger, & Pelletier, 2005). Besides, 'simulated apprenticeship' model can be used for working with various web-based multimedia programmes (Reeves, 1993) whereas field-experience stimulating reflections via e-mails can be highly motivating for promoting teachers' deeper reflections (Whipp, 2003).

The benefits of technology enhanced and apprenticeship-based teacher-learning have been tested by many researchers. Liu (2005) explored a three-phase (named as Modelling-Observing, Scaffolding-Practicing and Guiding-Generalizing) web-based cognitive apprenticeship model with a group comprising of both expert and pre-service teachers. In the training the participants constructed primary concepts using multimedia, used a technological scheme called Instructional Planning Assisting System (IPASS) for learning collaboratively via online interactions, and finally wrote reflections on their experiences of designing and demonstrating instructional plans. Liu found that the web-based cognitive apprenticeship group demonstrated positive attitudes towards instructional planning, performed better in

demonstrating instructions for teaching, and significantly achieved their learning objectives. Dickey (2008) also conducted a qualitative study with the teachers participating in the Integrating Technology and Education Practicum (I-TEP), a one-semester web- based technology integration course. In the course a cognitive apprenticeship method of learning was incorporated with a number of model lesson plans and text-based instructional materials. The course supplied digital videos and flash animation supported 'Over My Shoulder' (OMS) series for providing modelling to the trainee teachers. The series explained the common problems and mistakes of trouble-shooting by teachers while they design and create learning media. Besides working with the provided lesson materials, trainee teachers also responded and reflected on their personal learning experiences in blogs, and after each module they described how they had achieved new skills on the use of technology. The findings of the research show that the teachers considered the modelling and coaching elements of the cognitive apprenticeship method helpful for understanding the course materials and for developing technology skills. They also found the OMS videos and text-based materials effective for scaffolding and for receiving necessary orientation about the various methods of technology integration. Additionally, they admitted that the method had provided greater autonomy as they gradually started reducing their dependency on the provided learning materials. However, with regard to the role of the teacher educator, some participants raised the point that coaching and assistance should be timely and specific.

5.4.6 Project-based pedagogy

Project-based pedagogy is known by different names such as 'project-oriented approach' (Carter & Thomas, 1986), 'project-based learning' (Peterson & Myer, 1995), and 'project approach' (Diffily, 1996). The features of John Dewey's 'learning by doing' and 'problem-based teaching methods' are strongly evident in all of these (Brubacher, 1947), and the constructivist ideologies (such as Harel & Papert, 1991; Vygotsky, 1978) are also linked to the approaches. Krajcik et al. summarise the nature and procedures of project-based pedagogy in the following statement.

[Through project-based learning]...students pursue solutions to authentic problems by asking and refining questions, debating ideas, making

predictions, designing plans and/ or experiments, gathering information, collecting and analysing data, drawing conclusions, and communicating their ideas and findings to others (Krajcik et al., 1994, p. 483).

Project-based pedagogy can facilitate various effective learning opportunities such as collaboration (Gultekin, 2007) and critical investigation (Kafai & Resnick, 1996). One of the major strengths of this approach is its ability to engage learners in the goal-based practical learning (Dionne & Horth, 1994). Besides, it can create the scope for active learning (Helle, Tynjala, & Olkinuora, 2006), disciplined inquiry (Levstik & Barton, 2001) and cognition (Blumenfeld et al., 1991). It can prepare professionals with the knowledge of future workplaces and practices (Worden, 1991) providing deeper understanding of contents or subject-matters (Ladewski, Krajcik, & Harvey, 1994) along with decision making and management skills (Gardner, 1999; Vithal, Christiansen, & Skovsmose, 1995).

However, like other instructional methods, project-based pedagogy has various challenges. Collis, Andernach, and van Diepen (1996); cited by Collis (1997), warn that in the project-based pedagogy ensuring the participants' continuous access to information and managing their contributions are problematic. Besides, this approach is highly learner-cantered (Moursund, 1998) and therefore requires participants' adequate preparation and responsibilities (Worthy, 2000). Additionally, time management, self-motivation and independent learning are some of the challenging aspects of this pedagogy (Gulbahar & Tinmaz, 2006).

5.4.6.1 Technological interventions and research evidences

Researchers and educators have applied various technology enhanced learning approaches in project-based instructions in different educational settings. For example; Williams, Hemstreet, Liu, and Smith (1998) used a 'packaged' approach with video-based stories for creating case ideas among seventh grade science students in their project work. 'Collis (1996) also implemented the 'Online or Tele Learning' mode involving the Internet, online conferencing and email correspondences in the educational projects conducted by a number of university students. However, the research evidence of the technology-enhanced and project-based pedagogy in teacher-learning is still limited. Yet,

by evaluating the outcomes of this approach with different student groups its benefits in teacher-learning can be assumed.

In research with pre- and in-service teachers Lou and MacGregor (2004) found several benefits of the technology enhanced and project-based professional learning pedagogy. The teachers were divided into small groups and used the Blackboard course management system to collaborate and accomplish 'authentic project-based learning tasks' within and outside the groups via virtual chat, threaded discussion forums and drop box. The researchers reported that the postings of online dialogues instigated positive online collaboration within the groups, and also initiated a fair competition among the groups to produce better learning. The researchers also identified the importance of mentoring to focus on the targeted learning goals and to provide critical thinking opportunities to the participants. Chang, Wong, and Chang (2011) also designed a framework for project-based e-learning (through using the Blog and Mobile devices such as cell phones) and tested it with a number of Taiwanese university students. Although the model was implemented by university students, it showed its benefits in teacher-learning. The researchers explained the approach as highly capable of creating the scope of 'participation', 'application', 'communication', 'analysis', 'synthesis', and 'collaboration' among learners. The participants of the study however reported their difficulties in uploading and downloading data because of the limited speed of the wireless Internet connection.

To gain effective outcomes for project-based teacher-learning pedagogy the technological interventions need to be carefully planned and implemented. For example, the pedagogy should have the facilities of using data sources with frequent accessibility (Szyperski & Ventre, 1993). Additionally, the Internet, database, hypertext and LAN technology can ensure the improved results (Ryan & Koschmann, 1994). In this regard, two specially designed technological tools can be helpful which are the 'intelligent tutor' (an interactive software used by McManus & Aiken, 1995) and WebQuest, an inquiry-oriented web-based tool (can be accessed via www.webquest.org). The tools are able to supply useful learning resources and collaboration opportunities for the participants of technology enhanced project-based pedagogy (Simina & Hamel, 2005).

5.5 Conclusion: placing global experiences into local context

The literature review in this chapter presents the comprehensive features of six pedagogical approaches where technology was used for the professional learning and development. The practical evidence, mostly from the field of education, shows the natures and types of different technological intervention (such as technological tools, roles of participants and trainers) along with their challenges and advantages. These findings are helpful to answer the ‘pedagogy and management’ theme of my research questions (provided in Section 1.5 of Chapter 1). However, for evaluating the transferability of these global experiences in rural Bangladesh, which is the context of my thesis, I endorse the importance of accomplishing the following tasks.

- a) To educate the teachers and other stakeholders of teacher-learning (such as head teachers and teacher trainers) of rural Bangladeshi schools about the nature, advantages and challenges of various technology enhanced teacher-learning pedagogies so that they can contribute in deciding the effective and sustainable pedagogical approaches for their professional learning and development.
- b) To provide the stakeholders of rural Bangladesh with the experiences of using technological devices and programmes (such as computers, the Internet and online programmes) for professional learning. These hands-on experiences would help them advise the researchers, policy makers and administrators of technology enhanced teacher-learning in deciding realistic technological interventions for rural Bangladeshi teachers.

In the research methodology chapter of this thesis (please refer to Chapter 6) I explain how I addressed the above tasks and consequently received useful data on the advantages, barriers, requirements and implementation procedures of technology enhanced teacher-learning in the context of rural Bangladesh, particularly for the teachers of English.

Chapter 6: Research Methodology

6.1 Introduction

The field of education is riven with disputes, not least about the veracity of different research approaches. These are usually conducted at the level of method and strategy with little attention paid to epistemology and ontology. And yet it is only at these levels that the real issues are foremost. Epistemology focuses on knowledge, ontology on the reality which we seek to know (Scott, 2000, p. 11).

In the literature and the current views of learning (discussed in Chapter 3) there is the growing interest of thoughts on social constructivist and connectivist approaches, particularly when there is an involvement of technology in the process (Anderson, Annand, et al., 2005; Bondarouk, 2006; Jones & Carter, 2007; Keengwe, Onchwari, & Agamba, 2013; Kop & Hill, 2008; Lowerison et al., 2008). These thoughts are however difficult to transfer to technology enhanced teacher-learning or its research planning procedures because of the involvement of various issues such as adult learning, professional development and technological designs. Additionally, the varied social influences enhance this struggle because ‘a ceaselessly changing complexity is the norm in social life’ (Pawson, 2006, p. 18) and ‘social mechanisms are about people’s choices and the capacities they derive from group membership’ (Pawson, 2006, p. 66). Moreover, in the society and the world people’s perceptions and motivations on any actions (including teaching and learning) are guided by their individual learning approaches and cultural factors such as personality type, society’s treatment to gender and peer influence in the learning process (Barry & Fulmer, 2004).

Because of the presence and the influence of multiple variables of learning, learners and technological applications in technology enhanced teacher-learning, I consider that the critical and holistic understanding of these factors and processes is imperative. I realise that the participation of the target community or the beneficiaries in the research is essential for the reliable examination to their professional needs and demands, and also for

recommending realistic learning and development opportunities for them. Presently, the governments and private organisations are emphasising the participation and inclusiveness of the stakeholders in their research and programmes (Nind & Vinha, 2013). To ensure a comprehensive investigation to the research area and to confirm the target community's participation the effective use of research instruments for data collection is also vital.

6.2 Research objectives

The overarching aim of this research is to explore realistic technology enhanced teacher-learning approaches that can provide effective and sustainable professional development opportunities to rural Bangladeshi secondary teachers of English (as mentioned in Section 1.5 of Chapter 1). For designing the credible research methodology to achieve this aim I firstly reinstated the key expectations and the nature of my thesis, and consequently identified the following five key research objectives.

a) To explore varied professional learning approaches

Professional learning enhances motivation, strategic skills and curiosity of teachers along with improving their subject-based knowledge and skills (Hutchens, 1998). I was interested to study the effective approaches of professional learning involving technology for rural Bangladeshi teachers.

b) To bridge theory and practices

Researchers (such as Cole & Knowles, 1993; Dann, Müller-Forhbrodt, & Cloetta, 1981; Veenman, 1984; Zeichner & Tabachnik, 1981) warn that many teaching/learning theories learned by teachers at pre-service training are often incompatible in real teaching. I was therefore interested in designing realistic teacher-learning approaches which can solve the 'balance between theory and practice' (the requirement mentioned by Morris & Williamson, 2000, p. 281). I recognised the need for alternative teacher-learning approaches which can replace the traditional lengthy and isolated pre-service training models by focusing on workplace-based and continuing technology enhanced teacher-learning programmes (as suggested by UNESCO, 2005). Additionally, I aimed to follow-up the learning and development, and ensure the provisions of cooperation within a professional learning community (Langer, 2000).

c) To involve practitioners

I expected to involve the teachers of the secondary schools of rural Bangladesh in my investigation and considered their inputs essential for deciding any conclusions. I believed (similar to the expectations of Means, 1994) that the practitioners' involvement would help ensure a sustainable educational reform through technological innovations.

d) To build awareness for reflections

I aimed to make the research participants aware (as mentioned by Ebert-May et al., 2011; Rienties & Townsend, 2012) of the important aspects of professional learning particularly on technology, pedagogy, and content knowledge so that they can reflect and share their ideas on these issues. I assumed that by gaining knowledge and experiences of technology enhanced teacher-learning they would be able to reflect on these aspects more critically.

e) To address society and culture

I was keen on investigating socio-historical, economic and political situations of rural Bangladesh to formulate comprehensive guidelines (as suggested by House et al., 1999) for designing and applying technology enhanced teacher-learning for secondary teachers of English.

6.3 Research boundaries

Based on my research related perceptions and expectations, and also by estimating the time and resources available for my study, I maintained the following three research boundaries in my study.

Firstly, I followed the critical research approach by involving multiple aspects of learning and technological interventions. As I wanted to understand how various psychological, social and educational variables collectively construct an operational structure for technology enhanced teacher-learning approaches, I did not extensively investigate the individual variables in this thesis. Therefore, to better understand the nature and the role of each variable (or agency) I recommend for further research in this field.

Secondly, I realised that a critical and comprehensive study about technology and professional learning should require a large-scale research within a substantial contextual domain. I therefore do not claim this thesis as an extensive study in terms of greater socio-economic and geo-political circumstances. However, in the designing, implementation and finding stages of my thesis I addressed a number of relevant contextual variables which other investigators and educators can apply to interpret the reality of the contexts they investigate.

The third boundary of my research is that I designed a critical research methodology and applied it in a developing country context for achieving guidelines for planning effective and sustainable teacher-learning programmes. Because of the limitations of the time and resources it was not possible for me to conduct any long-term technology enhanced teacher-learning programme with the stakeholders which could provide evidence on the sustainability of this kind of professional learning approaches. I however consider this stage of the study important and thus want to accomplish this in a separate research project. Yet, I expect that this research would provide a realistic technology enhanced teacher-learning framework and the baseline knowledge which seem essential for conducting a long-term and wide-scale research on teacher-learning in rural Bangladesh.

6.3.1 Construction of methodology

The overall structure of my research methodology contains three major areas namely philosophies, approaches and methods.

- i) ***Philosophies:*** Critical Realism (CR) is the philosophical base of my research. In Section 6.4 of this chapter I elaborate its influences (both on theories and in practices) in educational research and construct a rational frame for designing my research methodology.
- ii) ***Approaches:*** My research contains the elements of community-oriented, inclusive, participatory and mixed-method research approaches (presented in Section 6.5).
- iii) ***Methods:*** I used a questionnaire-based survey and a series of six workshop-led focus group discussion sessions as data collection

methods. In Section 6.6 I explain the reasons why I did not consider the other approaches of investigation such as action research, case study and practitioner research. Then, I discuss the designing and administering procedures of these tools and validate their suitability for the effective exploration of my research questions.

6.4 Research philosophy

In the on-going tradition of positivist and interpretivist approaches of research I identify Critical Realism (CR) as an alternative methodology for investigating learning and knowledge building processes (Smith, 2006). The key philosophy of this approach is that the 'natural and social reality' is an 'open stratified system of objects with causal powers' (Morton, 2006, p. 1).

The concepts of CR can be traced back to the seventeenth century when Rene Descartes and John Locke, respectively French and a British philosophers, discussed knowledge, particularly its formation in human body and mind. Descartes (1988) believed that knowledge can be discovered through two media namely experience and deduction (which he claimed as the certain knowledge). On the other hand, Locke (1996) did not endorse the concept of certain knowledge and emphasized observations and the use of senses for realising it. However, both Descartes and Locke agreed that knowledge is founded on experiences. I discover the similar critical and realistic beliefs of knowledge and human endeavours of knowledge searching in the old Eastern philosophies too. To search for the truth or real knowledge, Lalon Fakir, a seventeenth century Bangla 'baul' poet emphasized the proper realisation and utilisation of 'human' capacity (more precisely 'human body' and its inner spirits of rationality) instead of trying to take help from supernatural being or scriptures (Khan, 2013). D'Souza (2010) shows how two thousand and five hundred year old Confucian concepts (such as 'realization of the transcendently real self') was produced in China which was later reconstructed and developed by the modern Critical Realists like Bhaskar. In fact, Roy Bhaskar, a British philosopher, has popularised CR through his 'dialectical critical realism' approach. Although Bhaskar can be criticised for his prominence on philosophical grounds and the obscurity of explanation, the general interpretation of his thoughts on knowledge can be identified as the

complete arrangement of views involving the 'processes of change, emergence, and transformation... to unravel the stratified nature of reality, its unity and diversity, and the ontological distinctions and relations between nature, society, and human life' (D'Souza, 2010, pp. 269-270).

6.4.1 CR features

Critical Realism (CR) offers its potential to build foundations in the research on society and people (Houston, 2001). However, this approach has not been considerably utilised in social sciences yet (Oliver, 2012). As a result, its use is rarely found in ICT or technology enhanced learning (TEL) related research (Vaujany, 2008). Moreover, the presence of CR in literature is mainly theoretic (Carlsson, 2003; Mingers, 2004). However, the validity of this approach cannot be undermined because,

....we will only be able to understand-and so change-the social world if we identify the structures at work that generate those events or discourses... [and this structures] can only be identified through the practical and theoretical work of the social sciences (Bhaskar, 1989, p. 2).

CR is flexible to diverse theories, research methods and tools in exploring contextual elements and causal mechanisms which ultimately create structures and actions (Mingers, 2004). It explains any context as the whole and provides suggestions about mechanisms or programmes suitable for that particular context (Pawson, 2006). Realising the causal mechanism and causal context consequently help predict the outcomes of any action or intervention (Radulescu & Vessey, 2009).

However, unlike the research practices in humanities or scientific streams, researching any phenomenon holistically in social sciences is challenging. Social structures are socially embedded which are difficult to explore only through pure philosophical explanations, or by clinical tests in laboratories. Moreover, any social science research which is engaged with applications of technology includes several difficulties such as,

- lack of operational guidance for using existing theories and methods in incorporating technology in the research (Love, Irani, & Edwards, 2004)

- lack or absence of proper planning for technological exploitations and for ensuring their compatibility in practical situations (Primrose, 1991), and
- difficulties to explain why the implementation of technology is a success or a failure (Kumar, 1997)

In the last three decades CR concepts and approaches have become more elaborated, accessible and organised for general readers, and more functioning in research practices by involving learning and knowledge construction processes particularly in the field of education. The scholarly work of Collier (1994), Archer (1995, 2003), Lawson (1997), Sayer (2000), Robson (2002) and Pawson (2006) show CR as the relevant and utilisable approach for observing personal, organisational, and social situations including their elements and mechanisms. Based on their views I identify the following three important aspects of CR.

- Firstly, CR refers to a number of social elements. For example, through 'entities' it discusses any material or social forms including people, organisations, resources and ideas (Easton, 2010). These elements are influenced and guided by 'causal powers' (Sayer, 1992) which are again shaped by 'causal mechanism' (Fox, 2009), 'human activities' (Lawson, 1997), and 'social structures' (Stones, 1996).
- Secondly, CR claims that social systems are open and constructed by complex combinations of varied elements and powers (Pawson, 2006). Therefore, '[in open systems,]...a multiplicity of mechanisms is operating, conjointly bringing about a series of events, which would not have been brought about by any proper subset of those mechanisms' (Collier, 1994, pp. 43-44). Critical realists believe that there are many unobservable elements in the society which influence the observable ones.
- Thirdly, CR is mainly explanatory in nature, as Jeppesen states,

Epistemologically, the aim of Critical Realism is to explain the relationship between experiences, events and mechanisms. The perspective emphasises questions of 'how and why' a particular phenomenon came into being, got its specific character and so on (Jeppesen, 2005, p. 5).

Consequently, unlike traditional research practices CR investigates beyond observable situations and explores unobservable social structures. However, during the experimental or observational stages it can involve scientific methods such as ‘clear conceptualisation and hypothesis making, the usage of critical comparisons, the discovery of empirical patterns and the monitoring of their scope and extent’ (Pawson, 2006, p. 19).

6.4.2 Application of CR in this research

Social scientists (for example, Lorenz, 2004; Pease, 2010) argue that credible research findings or truths need to be socially constructed and theory-laden so that they can challenge and complement varied perspectives of investigation, and offer more acceptable angles of visions. Various disciplines such as history, social work, ecology, law, economics and environmental studies therefore have embraced CR based research approaches and applied those in quantitative and qualitative studies, individually and together, to explore socially constructed truths (Arnd-Caddigan & Pozzuto, 2006; Easton, 2010; Taylor & S., 2001).

To ensure the above benefits I followed the CR approach in my thesis. In order to construct the philosophical base of my study and systematic implementation measures in technology enhanced teacher-learning in rural Bangladesh, I followed the CR principles and procedures written below.

a) CR Principles

In my study I wanted to explore the inclusiveness (with considerations to demographic and socio-economic circumstances), quality (in terms of content and pedagogy), consistency (in terms of integrated and sustainable continuation) and collaboration (based on mutual understanding and shared responsibilities) among the rural Bangladeshi teachers of English. Based on the CR concepts and theories of Descartes (1988), Bhaskar (1989), Sayer (1992), Collier (1994), Locke (1996), Stones (1996), Pawson (2006), Lawson (1997), Jeppesen (2005), Fox (2009) and D'Souza (2010) I considered the following research principles.

- investigation to ‘actual’ (real objects of my research context), ‘empirical’ (experience of my research participants) and ‘transcendental’ (structures

that influence and operate the context of my research) truths (based on the recommendation of Lawson, 1997)

- observations, analysis and assumptions of the research context (including socio-economic states, human activities, workplace conditions, and man-made social structures), social patterns and mechanisms (such as teachers' personal life and professional connections)
- recognition of causal powers (such as motivation, challenges and guidelines for professional development)
- comparative and contrastive analysis of multifaceted and intertwining systems (such as personal, social and educational)
- considerations of experiences and meaning making processes to realise my research context, and needs and preferences of the research participants

b) CR Procedures

... [Critical Realism] provides the most comprehensive account of principles and practice, theory and methods, promise and limitations (Pawson, 2006, p. 17).

After reviewing the contemporary thoughts of CR, discussed in detail in the earlier sections of this chapter, I found the views and principles effectively utilisable in my educational research. I identified many advantages of this approach such as its inclusiveness of personal and social variations and recognition of both visible and unobservable entities of people and society. Additionally, I found the approach capable of bridging interrelated actions, experiences, perspectives and underlined structures of any context into research discussions. Moreover, from a methodological perspective, I saw that CR encompasses both qualitative and quantitative investigations via the use of scientific research instruments and logical assumptions.

To explore the technology enhanced teacher-learning in rural Bangladesh I followed the next three major critical realist operational procedures.

- Firstly, I involved multiple methods of reasoning (such as deductive and exploratory) for analysing and interpreting the teachers' experiences,

activities and the social phenomena (Danermark, Ekstrom, Jacobsen, & Karlsson, 1997).

- Secondly, I minimised the possibility of any bias while interpreting causation and context. In this regard, I presented the collected data in such formats which are sequenced in different frames (as suggested by Baird & Zelin, 2000) and require minimum cognitive efforts to comprehend (based on the recommendation of Huang, Gorawara-Bhat, & Chin, 2005).
- Thirdly, by acknowledging the importance of technological and pedagogical interventions for teacher-learning I investigated and analysed relevant elements (for example, personal, workplace related and social situations) holistically. The following diagram, modified from Robson, 2002 (cited by Fox, 2009), provides a comprehensive map of the CR procedures that I applied in my research (please refer to the next sections of this chapter for more discussion).

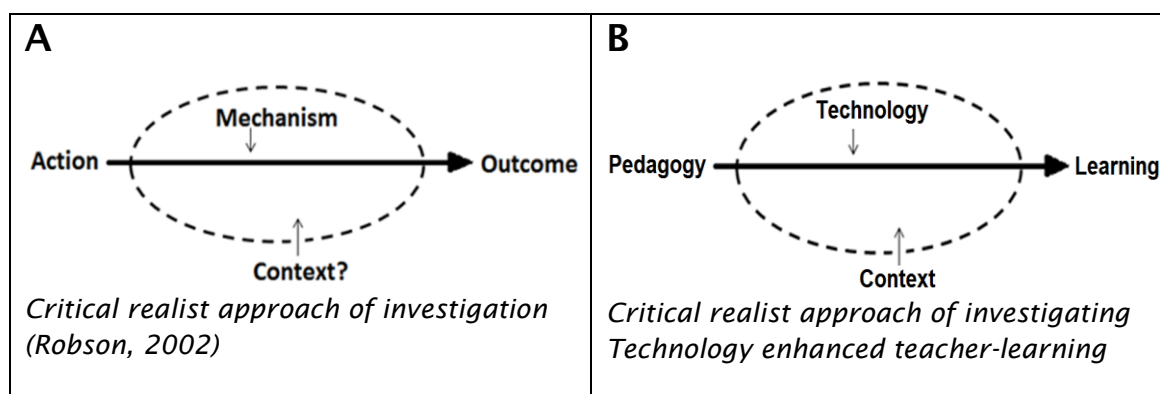


Figure 6.1: CR-based research procedures for technology enhanced teacher-learning

In Figure 6.2 and diagram B I rename and specify the procedural aspects of CR (diagram A, originally proposed by Robson, 2002). Based on these procedures, I studied relevant pedagogical actions, technological interventions and contextual issues for understanding the technology enhanced teacher-learning possibilities and outcomes in rural Bangladesh. To meet the emancipatory goal I followed the recommendation of Collier for revealing ‘[the research participants]... needs, ... frustration, and the relation of those needs and that frustration to the social structure’ (Collier, 1994, p. 182). In several situations I explored these through ‘informed guesses’ or logical assumptions via face to face dialogues with the stakeholders.

6.5 Research approaches

In any research, there are three questions namely ‘why research?’; ‘what to research?’ and ‘how to research?’ to address (Remenyi, Williams, Money, & Swartz, 1998). Whereas research questions and assumptions answer ‘Why’ or the purpose of research; research participants, context or actions respond to the question ‘What to research?’ Then again, the research methods and data collection tools cater the demand of the question ‘How’ or the procedures of the research. However, a factor plays the guiding role in the process of addressing these questions which is the approach of the investigation. In fact, choosing a suitable approach for any research is not only essential to define the nature of the research, but also to choose and administer proper research methods. Additionally, the research approach can provide the rationale for analysing the collected data in a logical manner. However, coordinating the approach with the philosophy of the research is important for ensuring uniformity, consistency and reliability.

Since the Critical Realist (CR) philosophy of my thesis allowed a critical or holistic study of the reality or practical situations of rural Bangladeshi teachers’ professional development, choosing a simplistic research approach did not seem viable to me. The CR principles and procedures had also set requirements of understanding the features of my target teacher community and ensuring inclusive qualities through their participation. I therefore ensured the community-focused, inclusive, participatory and mixed-method characteristics in my research. Here, these features are briefly described.

a) Focus on community

Specific research methods are determined by the purpose of the study, how the information is to be used, the context and setting, the theoretical perspectives – including “local” theory, the applicability of measurement tools, and the input of community participants (Israel, Schulz, Parker, & Becker, 1998, pp. 176-177).

In any social science research, for gaining useful indigenous knowledge from the research beneficiaries, community involvement is essential. One of the major benefits of this involvement is that the gained knowledge can efficiently

be used for bringing qualitative changes in that community. According to Rose and Miller (2008), individual beliefs and values are realised through exploring, classifying and interpreting any community. Additionally, the contributions of community in investigation processes can strengthen the research by ensuring that the findings are context-specific and appropriate to the community (Minkler, 2012).

To test the suitability of technology enhanced teacher-learning activities among secondary English teachers of rural Bangladesh I engaged rural Bangladeshi secondary teachers, the target professional community of the research. For the focused investigation I chose only the teachers of English in the process. Additionally, I ensured the representation of the local head teachers and teacher educators as they work closely with the teachers of English.

I followed 'deductive' and 'exploratory' approaches (Marshall, 1997; Saunders, Lewis, & Thornhill, 2003) to study my research community. According to Marshall (1997, p. 17), the deductive nature of research 'involves a sort of logical leap. Going a stage further than the theory, data are then collected to test it'. In my research, in the first instance, I studied the theories and pedagogical practices of technology enhanced teacher-learning which I later informed my research participants so that they can reflect on the practicality and sustainability of those approaches in rural Bangladesh context.

Furthermore, I embraced the exploratory nature of research by investigating and achieving new views and understanding of technology and teacher-learning related knowledge (Burns & Grove, 2005). The reason for chosen this approach was that, in rural Bangladesh technology enhanced teacher-learning practices are absent, and thus exploring any assumptions and patterns of this type of learning needed further research. While investigating I therefore collected the experiences and opinions of the community stakeholders and analysed those for understanding the real situations of technology enhanced teacher-learning (as recommended by Jasper, 1994). My involvement of the local teacher community however raised a number of concerns such as there was a gap of knowledge (in terms of technology and pedagogy) and culture (in terms of the orientation to rural and urban settings) between me and my research participants. There was also a risk of finding the required number of participants willing to partake in my research project voluntarily. However, I

was able to solve the problems by establishing a common interest about my research project (which is the overall development of teacher-learning culture in rural Bangladesh), and also by observing the social and educational circumstances of rural Bangladesh in person.

b) Inclusiveness

The term 'inclusiveness' commonly refers to the educational movement which advocates for the 'meaningful access' and the participation of the learners who are otherwise excluded from education because of their 'differences' such as disabilities and ethnicities (Waitoller & Kozleski, 2013). Although the term 'inclusive education' is popularly cited by contemporary educationists and researchers, in research practices the expression of 'inclusive research' is not frequent. However, the efforts to enhance co-operation among researchers, funders, agencies and research participants for achieving suitable future directions for effective policy formation and their implementation in various research projects are noticeable (Ward, River, & Fenge, 2008).

I found the objectives of inclusive education similar to the requirements of critical approaches of investigation. Both acknowledge the importance of considering multiple aspects and participation of diverse participants. I therefore endorse that the inclusive research provides the greater picture of any research areas. However, activities (such as group discussion) of this type of research may be influenced by power relations instigated by the differences of age, class, gender and level of education. Even, in an inclusive group activity any individuals can be marginalized by other participants (Fenge, 2010). Therefore, a balanced and congenial environment is required in this type of research.

In my study I engaged various stakeholders namely the teachers of English, head teachers, teacher educators, a computer trainer and an expert/researcher in the data collection process. The following graph (Figure 5.3) shows the diversity among my research participants.

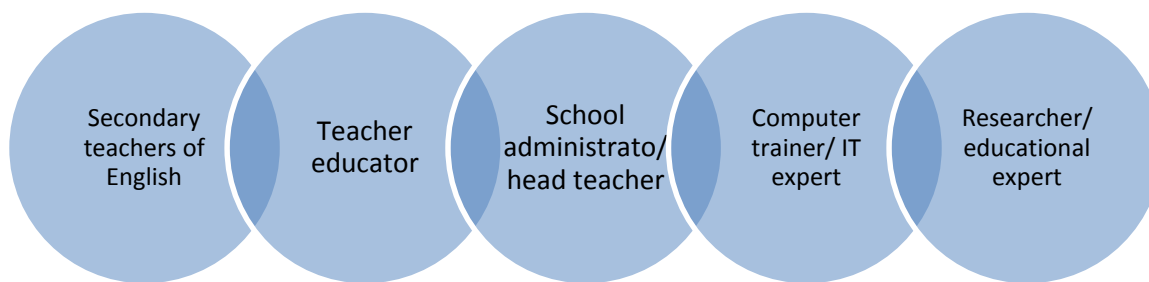


Figure 6.2: Stakeholders involved in the research

In the focus group, one of the data collection tools of my research, I involved all these stakeholders and gained rich research data because of their complementation and differences. Additionally, I used a questionnaire, the second data collection tool where I engaged teachers of English irrespective of genders, and of different age and professional-experience groups.

c) Participatory elements

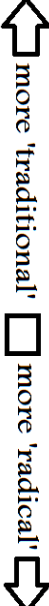
My research also contains the elements of participatory research approach which is defined by Reason and Bradbury (2008, p. 1) as the ‘orientation to inquiry’ or the initial gain of local knowledge. In this approach of research participants’ life experiences are valuable and the principles of democracy are practised through ensuring the safe space for contributing (based on the nature of the study of Evans & Jones, 2004). According to Nind and Vinha (2013, p. 9), an ideal participatory research should be ‘in the interests of a particular group [who]... have something to say about how the idea for the research should be generated [and]... what this means in practice’. The approach shares a number of common features such as reflective practices, researcher-practitioner collaboration and the concept of socially constructed knowledge with practitioner research, teacher-research, ethnography, case study and action learning (Gronhaug & Olson, 1999; Shaw & Lunt, 2012).

In social science research, particularly in qualitative approaches, participatory research has gained the higher importance in recent years because it has several benefits. Firstly, this type of research addresses people’s needs, includes various contextual aspects (such as economy and society), and accommodates indigenous or local knowledge (Martin & Sherington, 1997). The approach is also capable of involving research participants and partners for knowledge creation and dissemination (Bergold, 2007). Consequently, it

has the potential to systematically study the ‘life-world’ and ‘meaningful actions’ socially, educationally and economically disadvantaged teachers (Bergold & Thomas, 2012).

The University of Lancaster (2013) recommends activities such as mapping, social surveys, peer research, drama and interactive workshops for effective participatory research. Referring to Cornwall (1996) and Truman and Raine (2001) the university provides the following modes of relation between the researcher and research participants in the participatory research (please see Table 6.1 below). While choosing my research approach I took help from this research descriptor.

Table 6.1: Nature and activities of participatory research (Lancaster University, 2013)

Mode of Participation	Nature of User Involvement	Relationship between research and users	
Co-option	Token; representatives are chosen, but no real action	On	
Compliance	Tasks are assigned, with incentives; researchers decide agenda and direct the process	For	
Consultation	Users' opinions asked, researchers analyse and decide on a course of action	For/With	
Co-operation	Users work together with researchers to determine priorities; responsibility remains with researchers for directing the process	With	
Co-learning	Users and researchers share their knowledge to create new understanding and work together to form action plans with research facilitation	With/By	
Collective Action	Users set their own agenda and mobilize to carry it out, in the absence of outside researchers or facilitators	By	

According to the description of Table 6.1, the nature of participatory research includes characteristics like co-option, compliance, consultation, co-operation, co-learning and collective action among research participants, and the degrees of their involvement determine how traditional or radical the research is.

In my research I ensured the participation of my target practitioners (the secondary teachers of English, head teachers and teacher educators of rural Bangladesh). While collecting data, similar to the 'consultation' and 'cooperation' stages of Table 6.1, I gathered their knowledge and experiences of technology enhanced learning through discussion-based and collaborative activities (particularly in the focus groups, one of my two data collection instruments). In the focus group sessions I participated as an expert and trainer of varied technology enhanced teacher-learning pedagogies (for the detailed discussion on pedagogies please see Chapter 5). Here, I ensured the presence of the elements of compliance in the investigation as my role was only to decide the discussion agenda, provide information on pedagogies and engage the participants in discussion only; but the knowledge building through conversation was done by shared, complementary and negotiated dialogues. However, I should acknowledge that the ideal level of a participatory research or the highest level of participation via collective action was not possible to implement in the sessions because of the contextual situations and the nature of my research. I thought that trying to gain useful data about technology and pedagogy from the participants who do not have the required knowledge and experience about those would be unrealistic. Secondly, because of the newness of the research in the context of rural Bangladesh I considered allowing the participants to design their own research plan and administer that without any interventions an unproductive effort. Moreover, I had to complete the entire data collection procedures within a fixed period of time because of the limited time and resources available for my research. However, because of the compliance, consultation and co-operation between me and my research participants, I was able to ensure a moderate level of participation of my target community. The approach in fact negotiated the traditional and radical views of participatory research where external knowledge and new learning experiences met indigenous knowledge and local realities through a systematic structure of investigation process. Additionally, I bridged the outsider's (here it is me, the researcher) knowledge and skills with

the insiders' (my research participants) professional practices and learning situations which is, according to Bourdieu (1990), essential in any research, particularly in the field of education.

d) Mixing of methods

One of the recurring issues in social and behavioural sciences research is the relative value of different research approaches, especially with intense debates on different epistemologies (e.g., positivist versus interpretive) and methodologies (e.g., qualitative versus quantitative).

(Venkatesh, Brown, & Bala, 2013, p. 21)

Methodological combination is not rare in social science research. Researchers (such as by Mingers, 2001; Ridenour & Newman, 2008; Rossi, 1994; Teddlie & Tashakkori, 2009) commend that several methodologies can coexist effectively and complement positively if they are selected through a practical and systematic research design. The approach has a prolonged tradition as this concept existed in ancient Greek history where Protagoras and Gorgias suggest to evaluate several truths; and Aristotle, through his 'golden mean' or principle of balance, takes a moderate approach (which is opposite to Socrates or Plato's singular or universal approaches to view the world) to comprehend the realities (Johnson, Onwuegbuzie, & Turner, 2007). Although the term mixed-method appeared in the second half of the twentieth century, parallel concepts had been discussed and applied by many social science researchers (such as Hollingshead, 1949; Lynd & Lynd, 1929/ 1959) before then. In contemporary research practices, mainly in the field of social sciences, mixed-method research approach is generally referred to the 'philosophical assumptions as well as methods of inquiry [which] guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative data in a single study or series of studies' (Creswell & Plano-Clark, 2010, p. 5). Researchers also term this as various names such as blended research (Thomas, 2003), multi-method research (Morse, 2003), integrative research (Johnson & Onwuegbuzie, 2004) and mixed research (Johnson, 2006).

In my research, by using the mixed-method approach I expected to gain the following benefits:

- varied perspectives, arguments and focus-points related to both theories and practices of my research area (Johnson et al., 2007; Teddlie & Tashakkori, 2009)
- methodological flexibility (not restricted to either qualitative or quantitative approaches only) which provides the broader understanding of my research questions (Teddlie & Tashakkori, 2009)
- scope for convergent validation or triangulation by integrating, comparing and competing my qualitative and quantitative data (Fielding, 2012; Niaz, 2008)
- scope to confirm and explore my research questions at the same time for reaching richer conclusions (Teddlie & Tashakkori, 2009)

While designating my research methodology I however assumed that the mixing of the two research approaches (qualitative and quantitative) may create procedural problems while designing and applying data collection tools (Lisle, 2011). My concern was that, the attempt to address both the qualitative and quantitative nature of data may weaken the quality of one or both of the approaches (Morse, 2005). As Giddings and Grant (2007) warn that in many mixed-method research only different methods, not the methodologies, are combined; in my thesis I designed my qualitative and quantitative research approaches in such careful manner so that they carry both individual and shared phenomena. In this regard I considered the variables of my research such as learning culture, state of information and communication technology, professional learning needs and teachers' perceptions in relation to qualitative and quantitative data collection tools (based on the recommendation of Mingers, 2001). I also reported my qualitative and quantitative findings separately, and later compared those together.

6.6 Methods and instruments

In my research I applied survey and focus group methods for data collection. In this regard, I used a self-completion questionnaire for collecting quantitative

data (please see Appendix 1 and Appendix 2 for the English and the translated Bangla versions); and a series of six workshop-led focus group discussions for collecting qualitative data (please see Appendix 3 for the plan and discussion points). The methods and the instruments fulfilled the requirements of critical realist philosophies and contained elements of community-focused, inclusive, participatory and mixed-method approaches of research.

While choosing the methods I studied a number of alternatives such as action research, case study, practitioner-centred and ethnography, but did not consider those because of their limitations in exploring my research areas and associated challenges in administering within the limited time and resources available for my fieldwork.

6.6.1 Acceptance and rejection

During the planning stage I realised that the practical evidence and research findings on technology enhanced teacher-learning in rural Bangladesh was not adequate for conducting a secondary data based research. For the same reason, it was not possible to design any experiment-based research to explore relevant psychological, social and educational perspectives. I therefore decided to conduct a baseline study or pre-operation exposure for formulating future guidelines on technology enhanced teacher-learning approaches, particularly for rural school teachers. I chose two different methods of investigation namely a survey and a series of six focus group discussions for gaining both qualitative and quantitative data, and for understanding the educational context of rural Bangladesh, particularly the teacher-learning situations (as suggested by Mingers, 1997). I expected that the survey findings would provide psychological, social and educational perspectives of rural Bangladesh, and the environment of the workshop-led focus group discussions would be encouraging and productive for gaining consistent and in-depth data through queries and reflections (as indicated by Bloor, Frankland, Thomas, & Robson, 2001) where valuable observations of the participants' attitude and performances regarding the use of technology for professional learning could also be made. In fact, I hold the optimistic view (similar to the assumption of Gronhaug & Olson, 1999; Lunt & Livingstone, 1996) that, through focus group

discussions the research participants would contribute efficiently as mature scholars via less threatening and more cooperative interactions.

I however had evaluated a number of other research methods such as action research, case study, practitioner-centred and ethnography for possible inclusion before choosing the above two. Yet, I had to reject those for the following reasons.

Firstly, my major research objective was to gain useful scientific knowledge to explore effective approaches of technology enhanced teacher-learning. In rural Bangladesh this approach and practice are absent and still there is no foundation knowledge and skills among the target teachers which they can improve. Therefore, I did not consider any action research which, according to Sagor (2004), can improve any existing teaching or learning practices.

Although action research engages people in certain practices and collects their reflections on those practice-based experiences (Bergold & Thomas, 2012), I gave the opportunity to my research participants to use technological devices (such as tablet computers and the Internet hotspots) for information gathering and learning, but extended the discussion sessions with them to psychological and social issues. Another factor that can distinguish my research from an action research is its difference in the level of participation of the participants (Brown & Tandon, 1983). In my research, more specifically in the focus group discussion sessions, the level of individual participation was comparatively less (because of my interventions and contributions) than any general action research. Again, there was flexibility over the time (in the workshops and during focus group discussions) and no control on the causes and effects of the actions (during workshop activities) which are found in many action research (Gronhaug & Olson, 1999). Moreover, my research followed the critical realist views which set a holistic perception for observing and anticipating the psychological, social and educational phenomena for reaching any decisions. Generally, in action research this combination of observations and assumptions are not evident (Sorenson, 1992).

Secondly, the reason for not considering a case study in my research was that, whereas a case study 'investigates a contemporary phenomenon within its real life context' (Yin, 1994, p. 13), I expected to explore my research participants' actions, experiences and reflections to anticipate future implications of any

strategies or interventions. In fact, case study methodology is generally considered effective to investigate any new research areas where relevant theories do not seem sufficient to explain the target phenomena (Eisenhardt, 1989). Conversely, I had constructed the base of my research by existing technological and pedagogical theories which I later tested with contextual realities and the stakeholders' perceptions. Although both the case study and participatory research approaches generally investigate 'how' and 'why' aspects of any research subjects (Yin, 1994), in my thesis I explored additional perspectives such as 'who', 'what' and 'where'.

Thirdly, in any practitioner research the practitioners or teachers mainly conduct the study (Ellis & Armstrong, 2013). In this research I performed the leading role and used the evidences of existing teacher-learning practices. My research is not entirely a bottom-up or inductive type of study which is the common approach of practitioner research (Shaw & Lunt, 2012). I in fact took deductive and exploratory investigations by following the critical realist approach to realise unseen social and educational structures relevant to technology enhanced learning for rural school teachers.

Fourthly, my research was different to ethnography which observes 'particular segments of social life that are naturally occurring' within specific research boundaries and time (Scott & Usher, 2011, p. 93). Although I visited a number of rural schools, stayed in rural areas for realising the rural social and educational situations, and observed participants' attitudes and behaviours through recorded video footages; my study was not entirely based on personal observations and experiences (the requirement mentioned by O'Reilly, 2005). However, for exploring the research context I employed my personal experiences, observations and realisations along with my research participants' concerns, expectations, satisfactions, needs and reflections for the holistic investigation. The findings of the study are therefore future-oriented which provide guidelines for any prospective technology enhanced teacher-learning initiatives in rural Bangladesh.

6.6.2 Instruments and strategies

I collected three types of data namely 'spoken', 'written' and 'observed' (as suggested by Lankshear & Knobel, 2006) through an extensive literature

review and then from the fieldwork in Netrakona, a rural district of Bangladesh. The literature review provided theories, research evidence, scholarly discussions and contextual information related to my research area (organised in Chapter 2, 3, 4 and 5). In the fieldwork, the questionnaire-based survey and the workshop-led focus group discussion methods systematically collected data from stakeholders. While I used my literature review and the survey to collect written data, the workshop led focus group discussions supplied the spoken and observed ones. I engaged these three data collection instruments to explore all my research questions.

6.6.2.1 Concept building through literature review

I conducted a document-based study or review of printed, electronic and online documents (such as books, journal articles, reports, news articles and research papers) for conceptualising a number of relevant key issues including 'learning', 'teacher development' and 'technology enhanced learning'. Although the literature review or document analysis alone can be a complete research approach (Hoggart, Lees, & Davies, 2002), I applied this in my thesis for collecting the concepts and research data to rationalise the purpose of my study and also to complement my empirical findings. Through investigating the varied literature I covered the following areas.

- State of education, English teaching and teachers, provisions of teacher-learning, technological facilities and relevant government policies in Bangladesh
- 'Learning' and 'technology enhanced learning' related theories and their involvement in learning pedagogies, particularly in the field of teacher-learning

The literature review provides the background information for researching the learning culture (Theme 1 of the research questions) and possible implementation strategies of technology enhanced teacher-learning (Theme 2 of the research questions) in rural Bangladesh. Additionally, it provokes the need for investigating rural Bangladeshi English teachers' attitudes and the applications of modern technology for teacher-learning (Theme 3 of the research questions).

6.6.2.2 Community profiling through survey

...community is communicative – communicative of new cultural codes of belonging... (Delanty, 2003, p. 191)

Because of the similarity of professional environments and practices teachers of educational institutions are part of the greater teacher community, and they are connected socially and professionally. The size and the nature of any teacher community extends when it crosses the school borders, or even the borders of regions or any country.

To conduct this research on the aspects of professional development of rural Bangladeshi school teachers through using technology it was necessary to realise these teachers' and their communities' psychological, social and educational features. Survey, particularly questionnaire based survey, seemed to be an effective method for this type of investigation or community profiling.

The survey questionnaire is the conduit through which information flows from the world of everyday behaviour and opinion into the world of research and analysis; it is our link to the phenomenon we wish to study (Czaja & Blair, 2005, p. 59).

Based on the major principle of the critical realistic approach that various aspects of the rural Bangladeshi school teachers' communities should be investigated, I, similar to the perception of Kalyane and Devarai (1994), expected that this would help construct a successful community profiling where necessary data on the teachers' professional wants and needs are gained. The understanding of the needs (educational, professional, personal or social) of the target community was important to realise to recommend any measures that can improve their present conditions and practices.

In my research, while planning strategies to involve the teacher community or the beneficiaries I addressed the methodological questions that who should be involved for collecting research data, what data collection instruments should be used, and what would be the role of the participants. Based on these thoughts I discuss the four major aspects of my survey namely the respondents, questionnaire design, piloting, and survey conduction procedures below.

a) Survey respondents

The survey participants of my research were the rural Bangladeshi high school teachers of English, both males and females, of different ages, having diversity in English teaching experiences and professional qualifications (for general details about this population please refer to chapter 2). To ‘generalise or to make inferences about the population of interest for research questions’ (as recommended by Czaja & Blair, 2005, p. 127) and because of the rural focus of the thesis, I chose Netrakona, a rural district of Bangladesh, as the geographic location for data collection. I knew the criteria for selecting my survey participants (which is any English teacher working at a rural secondary school in Netrakona district) and thus I followed the ‘probability’ survey type sampling process (Scott & Usher, 2011). Moreover, I chose the sources of these teachers (which are the secondary schools situated in the district) randomly from a list of all the schools of Netrakona district, but engaged only those teachers in my survey who had agreed to participate. My selection of research participants therefore combined a ‘simple random sampling’ process with the ‘purposive sampling’ one, which is, according to Albertin and Nair (2004) and Godambe (1982), a powerful approach for sampling.

b) Questionnaire design

I administered a paper-based self-completion questionnaire containing sixty closed-ended questions under eight themes in my survey (please see Appendix 1 and Appendix 2). The questionnaire items reflect the themes of my research questions and are able to collect quantitative data. However, at the beginning stage of designing this data collection instrument I needed to connect its items with my research questions. Additionally, it was necessary to investigate the literature for finding the use of similar questions in other surveys, for designing the response types and their levels, and also for preparing a ‘survey introduction’ or ‘cover letter’.

I addressed most of the research questions of my thesis in the questionnaire. Table 6.2 shows how the research questions of the eight sections of the questionnaire (each section is based on one particular theme) address the different research questions.

Table 6.2: Questionnaire addressing research questions

Questionnaire items and areas covered	Research questions and themes
Section A: Question 1-10 (personal and professional information such as gender, age, teaching experience, school type and the existing facilities of information and communication technology)	Theme II: attitudes and affordances Question 'a': What is the present state of technology in the learning and professional development of the rural Bangladeshi secondary English teachers?
Section B: Question 11-15 (preferences and attitudes on personal professional development)	Theme I: learning culture Question 'a': How do secondary English teachers of rural Bangladesh prefer to receive professional learning?
Section C: Question 16-25 (learning network)	Theme I: learning culture Question 'c': Who are connected to their professional learning processes?
Section D: Question 26-30 (family and workplace support for professional learning)	Theme I: learning culture Question 'd': What personal and work-place related advantages do they receive while engaging in professional learning? Question 'e': What personal and work-place related challenges do they face while engaging in professional learning?
Section E: Question 31-35 (attitudes about using information and communication technology for professional development)	Theme II: attitudes and affordances Question 'b': What is the attitude of the teachers towards the use of technology in learning?
Section F: Question 36-45 (strengths and deficiencies in English teaching)	Theme I: learning culture Question 'b': What professional knowledge and skill areas do they need to develop?
Section G: Question 46-50 (forms of teacher-learning schemes)	Theme II: attitudes and affordances Question 'c': What forms of technological interventions do they consider motivating, engaging and productive for professional learning?
Section H : Question 51-60 (preferences on teacher-learning activities and approaches)	Theme III: pedagogy and management Question 'a': What pedagogical approaches of technology enhanced teacher-learning do the teachers consider feasible for their professional learning? Why do they think so? Question 'c': What administrative and management procedures do they consider essential for implementing any technology enhanced teacher-learning schemes? Why do they think so?

Theme II Question 'c', and Theme III Question 'a', and 'c' of my research questions are however partially addressed in the questionnaire. I therefore emphasised these areas in the workshop-led focus group discussions.

While designing the questionnaire I explored a number of example surveys to gain exposures for strengthening the qualities such as clarity, validity and appropriateness of my survey questions. In this regard, I reviewed the purposes of the questionnaire items, their language patterns and response forms. I found that questionnaires can be successfully applied to collect data for understanding various teacher research areas including

- demographics, professional needs, expectations and attitudes regarding the use of technology in teaching (Crook, Sharma, Wilson, & Muller, 2013; Delcourt & Kinzie, 1993; Martinovic & Zhang, 2012)
- preferences and opinions on the contents and activities of teacher development schemes (Murdoch, 1994)
- teacher perceptions and beliefs, teaching preparedness and student engagement (Louden & Rohl, 2006; Milton, Rohl, & House, 2007; Stein & Wang, 1988; Uden-van, Ritzen, & Pieters, 2013)
- insights on the types and features of professional learning communities (Olivier & Hipp, 2006) and
- professional and learning networks (Friedkin & Slater, 1994)

Although the questionnaires of most of the above research projects are only focused on a single aspect of teachers' professional and personal life, in the questionnaire design stage of my thesis they all together provided comprehensive guidelines and multiple aspects of teacher-learning along with the use of technology in the process. Based on the review of these examples, I re-examined and modified my question types, their language and the response options.

The respondents were supposed to complete the self-completion questionnaire by putting the tick mark. Among the eight sections of it Section A requires factual information, and based on the number of possible answers the questions have 2, 3 or 4 response options (please see Appendix 1 and Appendix 2). On the other hand, section B to H require responses on

perceptions, reflections, opinions and self-assessment in five-point Likert scale responses (Likert, 1932). The responses use five words/ phrases indicating agreement/disagreement, or frequency, or quantity. In Likert scale the words I used as response options are highly frequent (or known to the common people) and thus they are more comprehensible and convenient than other survey scales such as semantic differential and Stapel scale (Malhotra, 2004; Malhotra & Peterson, 2006).

I measured the level of teachers' attitudes about technology enhanced professional development and preferred learning strategies in the process, and the extent of their family and workplace support for professional development by the following 5 levels of agreement (as suggested by Vagias, 2006).

(Questionnaire Section B, D, E, G, H)

- 5-Strongly agree
- 4-Agree
- 3-Neutral
- 2-Disagree
- 1-Strongly disagree

Similarly, I set the following 5 levels of frequency (as suggested by Vagias, 2006) to realise the respondents' perceptions on collaborative learning.

(Questionnaire Section C)

- 5-Very often
- 4-Regularly
- 3-Sometimes
- 2-Once or twice
- 1-Never

Additionally, to understand the strengths and deficiencies in English teaching I provided the following 5 levels of professional efficiency and satisfaction.

(Questionnaire Section F)

- 5-All
- 4-Most
- 3-Some
- 2-Only a few
- 1-None

I expected that all the questions would be comprehensible and answerable by my survey respondents. However, for the systematic progression of the questions I listed those under eight themes and arranged from factual to reflective and then to self-evaluation stage. I thought that comparatively the difficult questions should be at the later stage of the questionnaire so that the participants get a chance to build up a relationship with the content and response processes of it. Additionally, I attached an informative and instructive cover letter (please see Appendix 1 and Appendix 2) which includes the objectives of the survey, a broad summary of the sections of the questionnaire, instructions on how to respond, and the statements assuring the respondents' confidentiality and right to withdraw the participation.

c) Piloting

I predicted a number of challenges in the survey. Firstly, because of the critical realist nature of my study, I wanted to explore a wide range of phenomena and their interrelation which involved several variables in the survey questionnaire. To ensure the proper research purposes and the meaning of these question items was challenging. The designing of sampling procedures, non-response problems and high logistic and administrative costs also appeared as the barriers of this method (as warned by Kennedy & Vargus, 2001).

To overcome the challenges of the survey method I took two sets of measures for ensuring the purpose and the discipline of the questions of the questionnaire. I divided the items into eight sub-themes. Then I translated the questionnaire into Bangla (because the research participants' first language is Bangla) which I later tested among four respondents in the first stage of my pilot study. All the respondents of this test were secondary school teachers teaching English, Bangla and General Sciences. Although all the participants were not the teachers of English, I assumed that their understanding and performances with the questionnaire would reflect its general comprehensibility and the usability. Moreover, I did not consider this as a flaw as I was not testing any academic or professional knowledge or skills, rather was exploring the participants' experiences, reflections and opinions on education and technology related issues.

The first stage of the pilot study confirms the five aspects of my questionnaire namely the research participants' willingness to participate the study, their

comprehensibility and accessibility towards the questions, the clarity in answering format, and the time required for responding to the entire questionnaire. The findings at this stage of pilot study and the adjustments I made to the questionnaire are summarised below (please see Table 6.3).

Table 6.3: Initial findings and adjustments in the questionnaire

Testing areas	Testing strategies	Findings and adjustments (after piloting)
Participants' willingness and motivation	responses in the questionnaire and discussion with respondents	All participants answered all 60 questions. They said that the questions were interesting as those involved their personal and teaching life related queries. Action: No addition or deduction of questions was needed.
Comprehensibility	queries during completing the survey and responses in the questionnaire	While completing the questionnaire participants asked for clarification of the question number 13, 41, 45 and 50. During discussion they confirmed that the other questions were easily understandable. Action: I revised the language of the question number 13, 41, 45 and 50 for enhancing clarity. Then, before finalising the revised version I shared that with the participants. I however did not change the themes and the purposes of the questions.
Accessibility	discussion with respondents	The participants confirmed that the layout of the questionnaire and the font size of the typed letters did not create any obstacle in reading and understanding the questions. Action: No changes were needed in terms of the layout and typing of the questionnaire.
Answering format	responses in the questionnaire	I attached a coversheet with the questionnaire where I clearly mentioned the instruction on responding to the questions. Therefore, all the teachers used the tick mark for indicating their choice in the multiple choice questions (MCQ) and did not report any problems in doing so. Action: No changes were needed regarding the answering format of the questionnaire.
Time for responding	responses in the questionnaire	The participants took 16 to 21 minutes to complete responding to the entire questionnaire. As all of them answered all the questions, the allocated 25 minutes seemed sufficient for answering the questionnaire. Action: No changes were needed regarding the allocated time for responding to the questionnaire.

After completing the initial stage of the piloting I administered an experimental survey with 36 teachers of English of 10 schools and received 36 completed questionnaires. The respondents answered all the questions within the prescribed time. I processed the data with SPSS software and measured the internal consistency or the coefficient of reliability of the questions by Cronbach's alpha test (Cronbach, 1951). Here, in Table 6.4 I provide the alpha scores of the individual sections (except Section A) and all the sections together. I do not include the score of Section A as the questions of this section contain demographic features such as age, gender and teaching experiences; and therefore the heterogeneous constructs and poor interrelatedness are present there (as explained by Cortina, 1993; Tavakol & Dennick, 2011).

Table 6.4: Cronbach's alpha test scores

Sections of the Questionnaire	Cronbach's alpha scores
Section B (5 items)	.715
Section C (10 items)	.823
Section D (5 items)	.469
Section E (5 items)	.590
Section F (10 items)	.918
Section G (5 items)	.775
Section H (10 items)	.862
50 items of the questionnaire	.736

Based on George and Mallery's following interpretation of Cronbach's alpha scores (George & Mallery, 2003, p. 231) I evaluated my findings (please compare with Table 6.3).

- _ > .9: Excellent
- _ > .8: Good
- _ > .7: Acceptable
- _ > .6: Questionable
- _ > .5: Poor
- _ < .5: Unacceptable

I found that the alpha scores of Section B, C, F, G and H are acceptable. The alpha scores of Section D and E were however low, but I anticipate that it was because (as indicated by Swailes & McIntyre-Bhatty, 2002; Voss, Stem, & Fotopoulos, 2000), the small number of items in these sections (in both

sections there are only five questions to respond). Moreover, the overall alpha score of the questionnaire is 'acceptable' which confirms the validity of the internal consistency of my questionnaire. I therefore decided to use my survey with a greater number of teachers. I also included these 36 completed questionnaires with other survey responses.

d) Survey conduction procedures

Before conducting any survey choosing the suitable respondents is vital. It is important to evaluate whether they are truly affected persons or prospective beneficiaries. Moreover, the degrees of their participation, the required logistical support, and the possible challenges in administering the survey are essential to consider (Bergold & Thomas, 2012). In this questionnaire-based survey, I chose Netrakona, a rural district of Bangladesh, as the context for data collection (the location is highlighted in green in Figure 6.4).

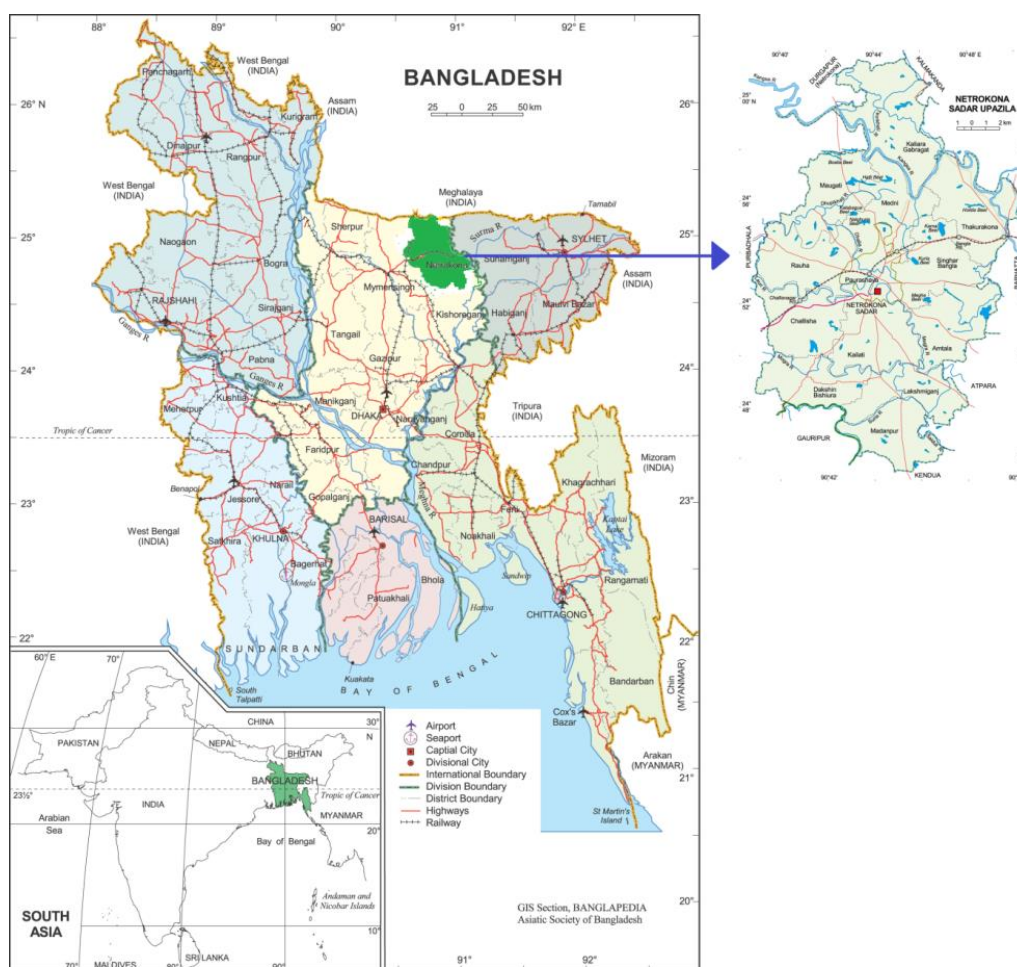


Figure 6.3: The fieldwork location ("Bangladesh and Netrakona district," 2006)

In the survey 207 rural secondary English teachers participated as respondents. In the beginning, I collected a complete list of the secondary educational institutions of Netrakona district (348 in total) and the available telephone numbers of the schools/ head teachers (185 in total) from the local Education department. In the next stage, I randomly selected fifty secondary schools from the list and contacted the head teachers over the phone for seeking permission and help to communicate with the English teachers of their institutions for the survey. After receiving the permission and the names of the teachers of English from forty four schools I clustered the schools in six areas (the schools situated within short distance were in one cluster) and made a tour-plan for visiting those. I and my research assistant (I recruited and trained him for assisting me in the survey data collection process) spent 1 to 3 days to cover each area (the number of schools in each area varied from three to seven). We individually met the teachers of English in their workplace and briefly explained our research purpose and the method of their involvement. We requested the teachers to participate in the survey by responding to the paper-based questionnaire. We then distributed the detailed Participant Information Sheet (please see Appendix 4), Consent Form (please see Appendix 5) and the questionnaire to the teachers who agreed to voluntarily contribute. As per our plan, the survey participants worked individually, read the coversheet and responded to the questionnaire by putting tick marks. We made all the responses confidential and anonymous.

6.6.2.3 Workshop-led focus group discussions

‘Focus groups’ is one of the most popular research methods in the field of social sciences (Stewart, Shamdasani, & Rook, 2007). A group of six to twelve people (Johnson & Christensen, 2004; Morgan, 1997) from similar social and professional backgrounds (Kitzinger, 1994) are expected to reflect and discuss a set of planned issues in this type of data collection activity (Bergold & Thomas, 2012; Merton & Kendall, 1946). The term ‘focus groups’ is generally plural because more than one group of participants are engaged in this type of research method for discussing similar issues. However, in my thesis I use the term ‘workshop-led focus group discussions’ instead of ‘focus groups’ for two reasons. Firstly, in the study I conducted my six focus group sessions with the same participants. Secondly, I included an informative and practical experience oriented workshop with each session.

Here the objectives, planning, participants, and implementation procedures of the sessions are described.

a) Objectives and planning

I planned a series of six workshop-led focus group discussion sessions to gain useful qualitative data on personal beliefs, attitudes, behaviours, preferences and opinions; and the professional views, networks, needs and expectations of the participants about technology enhanced teacher-learning. I expected that the sessions would be exploratory (the requirement set by Liamputtong, 2009) and would generate the scope for ‘creating, collecting, identifying, discovering, explaining, and generating thoughts’ (Fern, 2001, p. 5). I decided to video-record the sessions, particularly the discussion parts, for the convenience of data documentation and processing.

I addressed all my research themes and questions in the workshop-led focus group discussion sessions. However, my focus was on effective forms of technological interventions (research question: Theme II Question ‘c’) and the applicability of different technology enhanced teacher-learning pedagogies, particularly their implementation and management procedures (research question: Theme III Question ‘a’, ‘b’ and ‘c’), in rural Bangladesh.

I prepared a detailed activity plan (please see Appendix 3) to ensure that the goals and discipline are ensured in the sessions. The summary of the plan and their objectives are provided below.

Table 6.5: Objectives and discussion points of the workshop-led focus group discussions

Sessions	Objectives	Preparation	Discussion points
Session 1 (45 minutes)	To introduce the general features, advantages and challenges of six technology-enhanced teacher-learning pedagogies (based on the findings of chapter 5)	Handouts, pens, papers, video camera	General features of six technology-enhanced learning pedagogies and their advantages and challenges
Session 2 (45 minutes)	To introduce a number of electronic and online tools/ programmes and explain how they are used for professional learning	tablet computers (iPads), Internet hotspots and video camera	Use of technological tools (the session is mainly hands-on practice based)

Session 3 (30 minutes)	To discuss a set of social, psychological and educational points particularly relevant to technology enhanced teacher-learning for rural secondary teachers of English	video camera	Feasibility of technology-enhanced learning approaches in the educational context of the participants. The discussion included issues on participants' learning needs, professional learning preferences, technological affordances and the role of professional learning networks.
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I tried to keep the discussion sessions informal and collective (as suggested by Kamberelis & Dimitriadis, 2008) and focused on only one pedagogical type in each discussion session (as per the recommendation of Wilkinson, 2004).

However, in some occasions I had to discuss two or more than two pedagogies, particularly while comparing and contrasting their strengths and weaknesses.

b) Participants

I involved a total of six members (2 English teachers, 2 head teachers, 1 teacher trainer, and me as the content expert and discussion facilitator) in the workshop-led focus group sessions. In order to ensure that the participants' backgrounds are as per the plan, I followed the 'purposive' sampling procedure. I visited two schools to recruit two English teachers and two head teachers who would voluntarily agree to participate in the sessions. Additionally, I contacted BRAC, an international non- government development organisations, to allow one of their English teacher trainers who would voluntarily join.

While meeting the prospective participants I explained to them the purpose of my study and the nature of their participation. The head teachers of the schools and one English teacher from each school agreed to participate in the focus group sessions. Although the participation of these teachers was voluntary, for ensuring the representation of the female gender in the process I approached a female teacher of English as well. An English teacher trainer of BRAC having several years' experience of working with rural secondary teachers of English also agreed to participate the sessions. Table 6.5 below summarises the participants' backgrounds.

Table 6.6: Participants of workshop-led focus group discussions

	Head teacher (1)	Head teacher (2)	English Teacher (1)	English Teacher (2)	Teacher Trainer	Researcher and facilitator
Gender	Male	Male	Male	Female	Male	Male
Age	51 years	44 years	31 years	40 years	37 years	34 years
English teaching or/and training experience (for head teachers it is teaching plus administrative)	22 years	17 years	1 year	10 years	9 Years	14 years
Basic computer literacy	Yes	Yes	Yes	No	Yes	Yes
Computer training received	Yes	Yes	No	No	Yes	Yes

After receiving the consent for participation and the video-recording of the sessions (please see Appendix 6) I distributed a tentative activity plan (please see Appendix 3) among all the participants. I informed them that the content and activities of the sessions might change as per their level of contributions in the sessions and the needs of the research. I also gave them the time-table and venue details.

c) Trial and implementation

The workshop-led focus group participants attended six sessions, each containing two hours, in two weeks with one week interval, during May and June in 2013 (please see the time-table below).

Week 1	3 sessions in three afternoons (5 pm to 7 pm)
Week 2	Interval
Week 3	3 sessions in three afternoons (5 pm to 7 pm)

I chose the five to seven o'clock session time for the convenience of the participants as the general school hours in rural Bangladesh is 10.00 am to 4.00 pm. The reason for keeping one week interval was to allow the

participants to reflect on the discussion points and the workshop activities using technology.

I took the necessary preparation in advance against a number of anticipated challenges. For example, I predicted that the participants of the focus group sessions may have differences in opinions which might lead them to heated debates. Therefore, in such discussions, I considered my role as facilitator very important. This however was not difficult for me because I am a university lecturer and a teacher trainer, and I have prior experiences of working with rural Bangladeshi secondary teachers of English. Moreover, as a doctoral researcher I had required knowledge on technology enhanced learning related issues. However, for maintaining the effective environment for productive outcomes from the workshop-led focus group discussions I remained careful and sensitive to the participants' beliefs and culture, and tried to be analytic in terms of discussion points and questions (as suggested by Fern, 2001).

As mentioned earlier, I planned the workshop-led focus group discussions to fulfil some certain objectives. Therefore, each of the six sessions had a number of particular activities and discussion points.

During the first stage of the sessions (which lasted between 30 to 45 minutes) the participants worked in a workshop environment. Here I acted the role of the facilitator and tried to make the participants familiar with a number of technology enhanced teaching and learning pedagogies along with their principal features, advantages and challenges. I introduced six technology-enhanced teacher-learning pedagogies namely reflective, problem-based, case-based, dialogic, project-based and apprenticeship-based pedagogies (please refer to Appendix 3). During these sessions, the participants listened to the information carefully, took notes, and asked questions for clarification or for any examples.

In the second stage of the sessions, which lasted another 30 to 45 minutes, I gave an iPad, the tablet computer manufactured by Apple Company, connected with the Internet to each of my participants. I showed a number of computer programmes and online activities relevant to the six pedagogies in this stage. I also hired a local computer trainer to help me in the first two sessions, so the participants received adequate support to learn the basic use of iPads. The sessions were generally flexible and hands-on experience-based where the

participants tried to learn and practise the following computer applications and functions.

- CD and file (word, audio and video)
- Video and photo capturing
- Internet
- Website searching
- E-mail
- Blog
- Facebook
- YouTube
- Online Whiteboards
- Skype
- Yahoo Messenger
- Blackboard (online learning management systems)

I chose the above computer and the Internet applications for my research purpose because I had found their involvement in several teacher-learning pedagogies and in research activities around the world (explained in Chapter 5). On the other hand, most of the research participants of this study did not have any working knowledge to operate a computer or the Internet. Therefore, to explore technology enhanced teacher-learning approaches I thought that these computer and the Internet-based programmes would be easy for them to learn and operate.

Finally, in the third stage (which lasted for 28 to 38 minutes), the participants and I joined a discussion event for sharing ideas on the possibilities of applying the six pedagogical approaches for secondary teachers' learning and professional development in rural Bangladesh. Additionally, we discussed relevant aspects of professional learning needs and preferences, learning networks and technological affordances in the context of rural Bangladesh. While discussing, I encouraged all the participants to share their feelings, opinions, concerns and recommendations on the above issues freely, and based on real examples and explanations.

6.7 Data processing, reporting and analysis procedures

Similar to the procedures of data collection; the data processing, reporting and analysis measures are also complicated and time consuming. After the data collection phase a number of steps such as ‘working with data, organising it, breaking it into manageable units, synthesizing it, searching for patterns, discovering what is important and what is to be learned, and deciding what ...[the researcher] will tell others’ have to be accomplished (Bogdan & Biklen, 1982, p. 145). Moreover, particularly while presenting quantitative data and analysing it, the arrangement and reporting of numerical information for providing descriptions, differences and relationships are required (Fink, 1995). By acknowledging the value of all these demands I processed and reported my research data according to the following procedures.

6.7.1 Data processing methods

My fieldwork in Netrakona, Bangladesh, provided me with two datasets: one was gained through the questionnaire-based survey and the other one through the workshop-led focus group discussion sessions. The survey data are quantitative in nature which provide the demographic and perception-driven information of 207 respondents. On the other hand, the focus group discussion data, which I transcribed from the recorded 3 hour and 22 minute video footages, are qualitative. Additionally, my notes on the participants’ discussions during the information dissemination and hands-on practice sessions provided me with similar types of qualitative data on technology enhanced teacher-learning issues of rural Bangladesh.

a) Quantitative data processing procedures

While processing the survey data I followed the following three steps.

Data entry: I entered my survey data directly from the 207 completed paper-based questionnaires into spreadsheets in a computer file using the SPSS software (please see Appendix 10 for the computer screenshot view of the processed data). I used this electronic approach because it is faster, less expensive, more organised and easier to navigate than paper-based data entry.

Data cleaning: Among the 207 completed questionnaires, I found 3 questionnaires each having 3 to 7 items not being responded. I assumed that the reason for not attempting the items by the respondents might be their carelessness, or they had wanted to finish the task quickly, or they had just ignored the items. I therefore considered those cases as missing completely at random or MCAR (Little & Rubin, 2002), and applied 'listwise deletion' approach (as per the guidelines of de Leeuw, Hox, & Dillman, 2008). According to this method I deleted the three incomplete questionnaires and conducted data reporting and analysis with 204 sets of complete responses. Because of the 'listwise deletion' I had to remove only three cases which, out of more than 200 cases, is not a significant number. Moreover, as those are MCAR, there was a minimum risk of any biased measurement and analysis.

Data treatment: I processed the survey data using SPSS software and presented their types and values in manageable and statistically suitable formats (as suggested by de Vaus, 2008). In the SPSS file each column represents a variable and each row a respondent (shown in Appendix 10). I used the following designated numbers against the responses.

- 5 for 'Strongly agree'
- 4 for 'Agree'
- 3 for 'Neutral'
- 2 for 'Disagree' and
- 1 for 'Strongly disagree'

b) Qualitative data processing procedures

While processing the workshop-led focus group discussion data I again followed three steps similar to the quantitative data processing procedures.

Data entry: I transcribed the video footages of the workshop-led focus group discussion sessions in English, composed those in Microsoft Word programme (please refer to Appendix 7 for a sample transcription) and imported those in a computer file using the NVivo software.

Data cleaning: I followed two different approaches while transcribing my focus group data. Firstly, in the information dissemination and the hands-on practice sessions, I took brief notes on the participants' responses and non-verbal

expressions relevant to my thesis objectively (please refer to Appendix 8 for the sample note taken during the information dissemination and hands-on practice sessions). Secondly, I transcribed the video-recorded group discussions. As I had to translate and transcribe these sessions simultaneously, after transcribing a session I re-checked the content and amended the translated texts whenever needed. I particularly checked the overlapping of the discussions (while two or more than two participants talked simultaneously) and mentioned this in my transcripts. I also tried to ensure that my translation properly conveys the meaning of the original data. Additionally, I tried to keep consistency in using any symbols, for example, I wrote ‘...’ for the conversations which were not audible. Moreover, after composing the transcripts in MS Word file I formatted the page layout and line spacing so that the participants and their statements are clearly comprehensible.

Data coding: I processed my focus group transcripts in the NVivo programme and coded those according to a number of themes (please refer to Appendix 8). In the process I maintained the following data reporting cycle adapted from the NVivo Getting Started Guide (QSR, 2014). Based on the structure of my thesis and the nature of my data collection instruments I however modified the explanations of its stages.

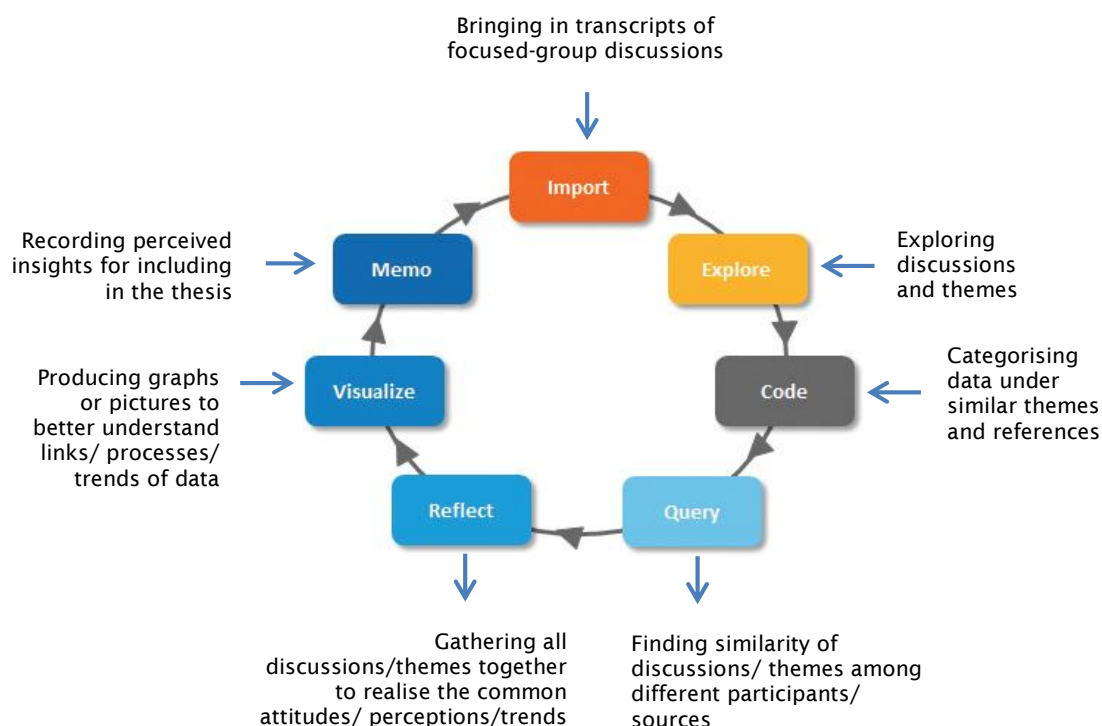


Figure 6.4: Focus group data reporting cycle

In the first instance, I imported the transcriptions of the focus group discussions in the NVivo file (please refer to Appendix 7 for a sample transcript). Then I conducted a general review of the content and roughly identified the following themes for coding (the themes are about technology enhanced teacher-learning in rural Bangladesh).

- positive aspects
- concerns and fears
- suitability of pedagogies
- management procedures

While coding the above themes, I found a number of sub-categories. In the later stage, I therefore specified the broad themes into several sub-themes. For example, while coding the ‘management procedures’ I identified the following sub-themes.

- teachers’ role
- nature of instructions
- types of learning activity
- role of trainer
- monitoring policies
- assessment procedures

6.7.2 Data reporting techniques

Data is referred to as recordable facts that can produce information through meaningful arrangements, generate communication by transmission, and build knowledge through accumulating its particular items (Saywell & Cotton, 1999). ‘Well-displayed data can clearly illuminate and enhance the interpretation of a study, while badly laid out data and results can obscure the message or at worst seriously mislead’ (Freeman, Walters, & Campbell, 2008, p. 1). In an academic study the reporting of data is therefore important, and thus requires various careful measures. In this thesis my main objective of reporting the research data was to gain a set of evidence-based comprehensible and utilizable information. For ensuring the clarity and reading convenience I report my quantitative and qualitative datasets in two different chapters (Chapter 7 and 8). Firstly, in Chapter 7, I present my survey data in three

features namely the community profile, validity of the theoretical framework, and the aspects of technology enhanced teacher-learning. Then, in Chapter 8, I report my focus group data which mainly contains the experiences and reflections of the focus group participants.

a) Community profile

In the first part of my survey report, I present the data on the following ten demographic and technological orientation related questions which are listed as individual items in Section A of the survey questionnaire (provided in Appendix 1 and Appendix 2).

- i) gender
- ii) age
- iii) overall teaching experience
- iv) English teaching experience
- v) number of teacher training received
- vi) number of computer training received
- vii) level of ICT literacy
- viii) school type
- ix) number of English teachers in the respective school
- x) state of ICT connectivity in the respective school

For presenting the data I applied descriptive statistics which, according to (Wetcher-Hendricks, 2011), is an effective approach to explore and present the useful background information of any research context and the participants. Here, I used the measurement of frequencies for understanding the comparative states among the response groups of the survey participants. For summarising and simplifying the quantitative data (as suggested by Tufte, 2001) in my report I display the frequencies through visuals; namely bar and pie charts.

b) Validity of the theoretical framework

In my theoretical framework I claim that the personal and the communal domains, and the context of learners influence each other in teacher-learning schemes (discussed elaborately in Chapter 4, Section 4.4). In the second part of my survey report I therefore discuss whether this phenomenon acts the same with the secondary school teachers of rural Bangladesh. For doing so I

categorise the factors (or the variables) of my survey according to the following three domains of professional learning.

- Three aspects namely ‘professional learning preferences’, ‘professional needs’, and ‘attitudes to technology based learning’ symbolise the teachers’ personal domain of professional learning.
- Two aspects namely ‘preferred procedures of teacher training’ and ‘preferred nature of teacher-learning activities’ denote the communal domain of the teachers’ professional learning, and
- Two aspects namely ‘professional learning network’ and ‘learning motivation and facilities’ represent the learning context particularly the educational and professional circumstances of the survey participants. I acknowledge that the gained information does not provide the comprehensive picture of the professional learning context of rural Bangladeshi English teachers. I therefore depended on the focus group discussion data to understand this domain more precisely.

c) Aspects of technology enhanced teacher-learning

The survey data provide the following seven aspects (or variables) of teacher-learning.

- professional learning preferences
- professional learning network
- learning motivation and facilities
- attitudes to technology based learning
- professional needs
- preferred teacher training procedures
- preferred nature of teacher-learning activities

The aspects are connected to the participating teachers’ learning culture, attitudes and the use of technology in professional learning (Themes 1 and 2 of the research questions), and the implementation strategies of technology enhanced teacher-learning they prefer (Theme 3 of the research questions).

By acknowledging the changing entities of the variables and the influence they receive from the people, society and actions (as described by Wetcher-Hendricks, 2011), in the third part of the survey report I explore each of the aspects through the demographic features, workplace conditions and the availability of technological facilities to the secondary teachers of English of rural Bangladesh (these items are listed as demographic and technological orientation related features in the previous Community Profile section).

d) Teacher experiences and reflections

In Chapter 8 I present the findings of the six workshop-led focus group discussion sessions. The data provide the following three sets of qualitative information which I received from the three segments of each focus group discussion session.

- participants' responses and queries on various technology enhanced teacher-learning pedagogies (Segment 1: information dissemination sessions)
- my observation over the participants' participation and performances while using tablet computers, and their reflections on the use of these technological devices (Segment 2: hands-on practice sessions)
- participants' understandings, realisations, opinions, concerns, expectations, queries and suggestions on technology enhanced teacher-learning approaches in rural Bangladesh (Segment 3: discussion sessions)

Besides the above data, in the workshop-led focus group discussion report I include my field notes which I wrote while administering the survey in Netrakona. In the description of the focus group findings I also involve my personal experiences and reflections (please refer to Section 8.2 of Chapter 8 for the explanation regarding my role in presenting the focus group data).

While reporting and analysing the qualitative data I use pseudonyms to safeguard the identity of the participants. For the six participants I use ET, HT, TT and RF which respectively refer to the teachers of English, the head teachers, the teacher trainer and the researcher. I add 1 and 2 with ET and HT as there were two teachers and two head teachers. For specifying the session I

also add the session number (1 to 6) in the end of the name. For example, 3ET1 refers to the response of one of the two teachers of English which he/she provided in the 3rd day of the six focus group sessions.

6.7.3 Data analysis procedures

This research involved the mixed-method approach where I collected and analysed both quantitative and qualitative data to answer my research questions. In this regard I followed the ‘convergent parallel design’ model (as suggested by Creswell & Plano-Clark, 2010) where I first reported the quantitative and qualitative findings individually and, then analysed those by complementing and contrasting to each other. I admit that both the datasets contain some incomparable findings; however, their individual value is not insignificant in responding to some research questions of my thesis. These individual answers in fact helped me formulate a holistic explanation of the ‘problem areas’ of my thesis.

While analysing my datasets I considered the four features (explained in Section 6.7.2 above) namely the general profile of the participating teachers, the interplay of the three domains of professional learning, aspects of technology enhanced teacher-learning, and the experiences and reflections of the stakeholders to explore answers of my research questions. In some cases, an individual feature provided suitable and sufficient information to respond to one research question. In other cases, I analysed two or more than two features to answer one research question. I however analysed the data in a critical manner where I observed those from multiple aspects and possibilities. While interpreting my findings I also tried to rationally explain the reasons, associated factors and possible impacts to ensure that my analysis is impartial and realistic.

6.8 Ethical issues

While planning and conducting the survey and the workshop-led focus group sessions a number of ethical questions arose which I solved in a rational and humane manner. I had a concern that the participants might face distress, discomfort, inconvenience and adverse effects during my data collection

process. Here I discuss some of my concern areas prior to the research and the initiatives that I took to overcome those.

Personal commitment: My most important ethical consideration in this thesis was to become convinced with the authenticity of my research questions, their relevance to the associated stakeholders, my obligations to the community where I conducted the research, and my accountability to the academic institution where I was affiliated for this academic study. To ensure these all, I carefully evaluated my research context in order to set a number of credible research questions which could effectively investigate the technology enhanced teacher-learning related features of rural Bangladesh. In this regard, I was determined to keep myself unbiased if there were any unexpected research findings.

Informed consent and confidentiality of participants: As my participants agreed to complete the questionnaire and attend the workshop-led focus group sessions voluntarily, it was my responsibility to provide them with the complete details of my research project. I was also cautious to confirm that the facts of my research were provided to them without any misinterpretations. Additionally, I tried to be careful in protecting their personal identities, dignity and anonymity in my writing and also while disseminating the research in conferences and seminars.

Tackling embarrassment: Some of the questions in my questionnaire (for example, the questions of Section A) request for participants' personal details such as the length of English teaching experience and the number of English and IT training they have received. Similarly, there are a number of questions (such as the questions of Section F) which ask to know the levels of confidence and capacity of their English teaching. While responding to these questions there was a possibility that the participants might feel uncomfortable to disclose their personal weaknesses. To tackle this problem I tried to assure my respondents that their confidentiality and personal identity would be strictly secured, and their responses would be anonymous and be used for research purposes only.

Introducing non-traditional practices: The first two stages of the workshop-led focus group discussion sessions aimed to engage the participants in studying the concepts and examples of various technology enhanced learning

activities. Simultaneously, I wanted to provide them with hands-on experience of using computers. As the participants did not have any prior experience of operating a tablet computer, this non-traditional practice could lead them to difficulties in operating modern technological devices. To overcome the problem I engaged a local computer trainer to help them during the hands-on practice sessions. On the other hand, I allotted the third stage of the sessions for group discussions where we discussed the participants' learning needs, professional learning preferences, role of professional learning network, and technological applications relevant to a particular technology enhanced learning pedagogy. During the discussion a conflict sometimes arose between the relevant educational theories with the practical experience and culture of the participants. To overcome this challenge I showed respect to the diverse aspects of the participants' experiences, their different psychological states and behaviours. Additionally, I endorsed their opinions and arguments, and showed appreciation of their social, professional and personal identities.

Video recording: I recorded a video of the workshop-led focus group discussions to make the data documentation process through transcription convenient and accurate. It was natural that some of the participants felt shy or anxious while talking in front of a video camera. To mitigate their anxiety I explained to the participants the purpose of the recording and confirmed them that the footages would never be shared with any third party without their informed consent. I also confirmed that only the pseudonyms would be used in transcriptions and the recorded data would be used for the research purposes only. Additionally, while recording I set the camera on a fixed tripod and at a little distant place so that its presence does not draw any unwanted attention from the participants.

Value judgement: The major part of the data collection and the analysis process of my research required value judgements particularly while evaluating the conditions, preferences and experiences of rural Bangladeshi teachers of English. In order to provide valid and reliable descriptions of these aspects I tried to be realistic and sensitive to the practical circumstances of my research context and the research participants. In my descriptions I was also keen on expressing my personal reflections and critical evaluation of the contextual situations and the people's actions.

My personal value judgement criteria and procedures in this thesis are parallel to 'consensus' (for example, Gauker, 1995), 'indexical' (for example, Rey, 1997), and 'correspondence' (for example, Rorty, 1979) theories. Based on those the subjectivity of my judgement was dependent on three circumstances. Firstly, in some cases I approved my judgement on the research issues and findings when they were supported by other theorists, educationists, and practitioners (including my focus group participants) of my research field. Secondly, I formulated my arguments and logic to judge when I found my opinions and perceptions different to others. Thirdly, in several cases I judged my research issues according to the contextual reality which means through acknowledging the different meanings and presentations of issues in different conditions.

6.9 Conclusion: stepping to the next stage

While constructing the research methodology I tried to keep the context of my research particularly the learning culture, professional learning needs, state of learning facilities and the research participants' preferences at the centre of all investigations. My approach in the data collection process was generally critical realist, community-focused, inclusive, participatory and mixed-method research where I addressed a range of psychological, social and educational factors in relation to technology enhanced teacher-learning approaches in rural Bangladesh.

I administered a questionnaire-based survey and a series of six workshop-led focus group discussions for understanding the patterns of the social and educational agencies of rural Bangladesh, particularly their interplay with the technology and learning. My principle aims for taking these approaches of data collection were to gain the practical knowledge about the contextual demands of a group of socially and professionally disadvantaged rural Bangladeshi secondary teachers of English in the case of technological interventions for professional learning. In my thesis I consider the aspects of learning mainly from adult and situated perspectives which I investigated via personal, professional and workplace related perceptions, practices, needs and wants.

All the response options in the survey questionnaire were pre-set and a large number of respondents were involved in the process which provided a set of

quantitative data. The general phenomenon of this dataset is mainly objective and statistically meaningful. Conversely, the workshop-led focus group discussion data are mainly qualitative in nature as I observed the participants' reflections, attitudes and behaviours, and later analysed and interpreted those in the subjective manner. Although these qualitative data are mainly cross-sectional as I conducted the sessions within three weeks with the same group of people, these reflect some longitudinal value as there was a recognisable improvement of the usage of technology by the participants during that time.

The next two chapters (Chapter 7 and 8) report my survey (quantitative) and the workshop-led focus group discussions (qualitative) data. Then, Chapter 9 critically analyses these two datasets and presents my understanding on the practical situations of rural Bangladesh in relation to technology enhanced teacher-learning approaches for the secondary teachers of English. Additionally, it lists a number of suggestions which have originated from my research findings and my personal attachment to the teacher community of rural Bangladesh.

Chapter 7: Survey data reporting

7.1 Key areas

In this chapter I report my survey data under the following three key areas.

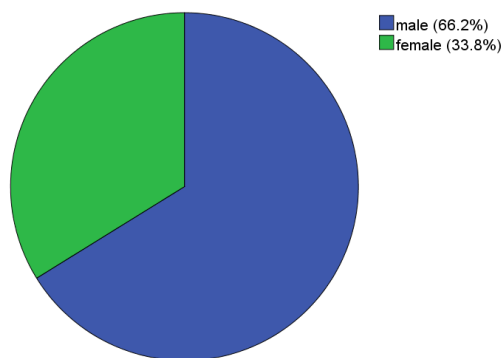
- In Section 7.2, I draw the general profile of my research participants by describing their demographic features and the conditions of technological orientation. This description would help realise their professional background and personal capacity including teaching experience, training exposure, computer and the Internet connectivity in schools, ability to operate a computer, and the number of workplace colleagues teaching the English subject. The findings are associated to the learning culture (Theme 1 Question ‘b’ and ‘c’) and the availability of technological facilities in rural Bangladesh (Theme 2 Question ‘a’), and also useful to answer all the research questions of this thesis (discussed elaborately in Chapter 9).
- In Section 7.3, I explore the statistical correlation among the personal and communal domains, and the learning context of my research participants to assess the theoretical framework of my thesis (presented in Chapter 4). Although the relationship among these three domains is normally expected (according to the contemporary learning theories discussed in Chapter 3), I am keen on re-confirming this because the components and boundaries of these three areas are arbitrated upon seven teacher-learning aspects namely ‘professional learning preferences’, ‘professional needs’, ‘attitudes to technology based learning’, ‘preferred procedures of teacher training’, ‘preferred nature of teacher-learning activities’, ‘professional learning network’ and ‘learning motivation and facilities’ (discussed elaborately in Section 4.4.1 of Chapter 4 and Section 6.7.2 in Chapter 6) which requires to be proved as interconnected. These aspects are the key components of my survey questionnaire and thus their relationship would provide the foundation to critically discuss the teacher-learning situations in rural Bangladesh context.

- In Section 7.4, I report my findings on the seven aspects of technology enhanced teacher-learning. In the discussion I show the association of the demographic features and states of technological orientation of my research participants with these aspects. The findings would help understand the respondents' professional learning preferences (discussed in Section 7.4.1), learning network (discussed in Section 7.4.2), motivation and teacher-learning facilities (discussed in Section 7.4.3), attitudes to technology based learning (discussed in Section 7.4.4), professional needs (discussed in Section 7.4.5), preferred teacher training procedures (discussed in Section 7.4.6) and preferred nature of teacher-learning activities (discussed in Section 7.4.7). The information partially answers research questions 'a', 'b', 'c', 'd' and 'e' of Theme 1; research questions 'b' and 'c' of Theme 2; and research questions 'a' and 'c' of Theme 3 (please refer to Chapter 9 for further discussion).

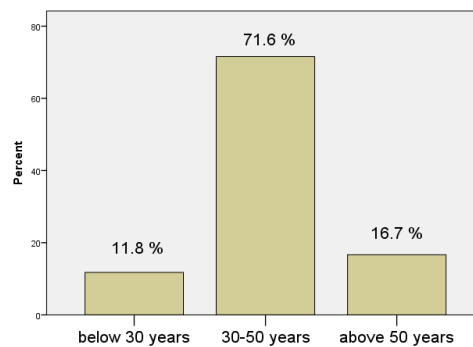
The survey findings provide information to answer all the research questions of Theme 1 (learning culture) and Theme 2 (attitudes and affordances). They also respond to the research question 'a' of Theme 3 (pedagogy and management), but do not cover question 'b' and 'c' because these require the views of school administrators and teacher educators whereas all the survey respondents were the teachers of English. I however emphasised question 'b' and 'c' of Theme 3 in the focus group discussion sessions where two head teachers and a teacher educator participated in the discussion along with me and two teachers of English (please refer to Chapter 6 for focus group discussion format and Chapter 8 for focus group data reporting).

7.2 Community profile

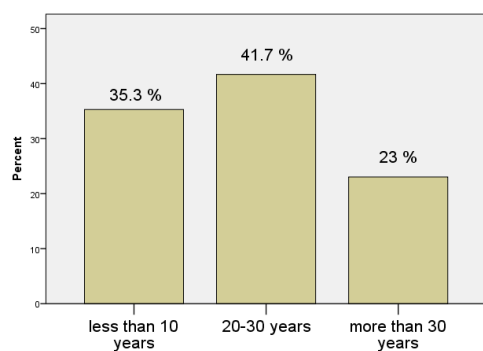
The first section of my survey questionnaire (attached in Appendix 1 and Appendix 2) contains the queries on participants' gender, age, teaching experiences, training exposure on teaching and computer operation, level of computer usage, workplace (school) types, number of English teachers at workplace and the availability of computer and the Internet there. Based on the data of this section the demographic features and the technological orientation of my research participants are presented through the following ten individual graphs (i to x) in Figure 7.1.



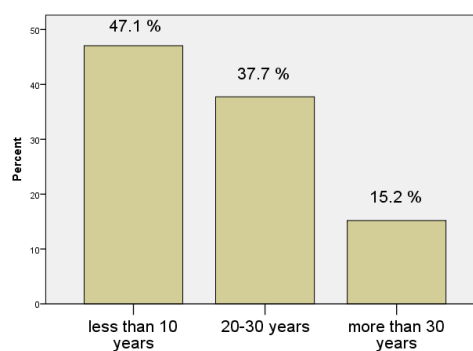
(i) Gender



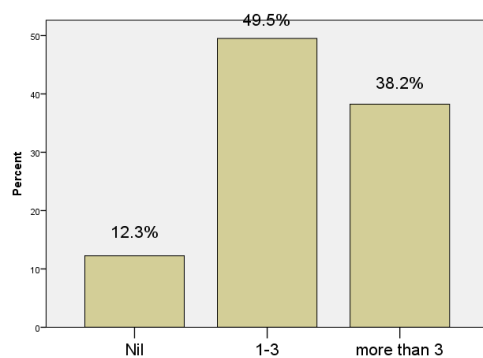
(ii) Age



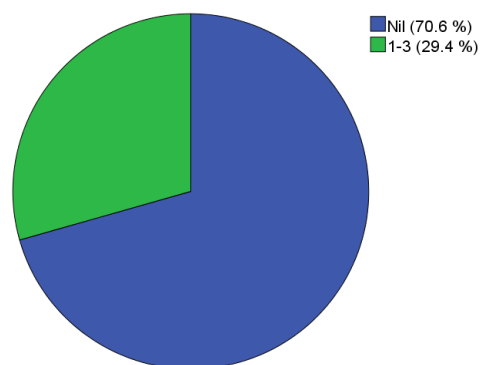
(iii) Total teaching experience



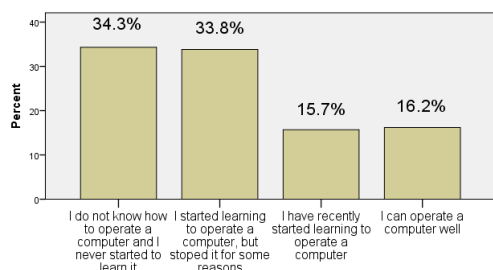
(iv) English teaching experience



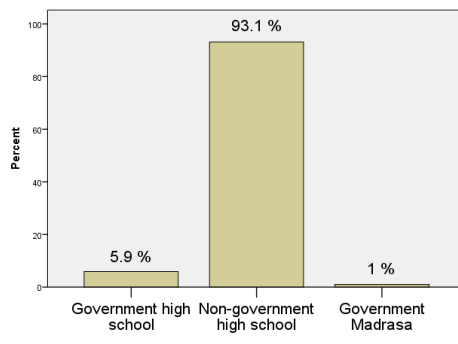
(v) Number of teacher training programmes attended



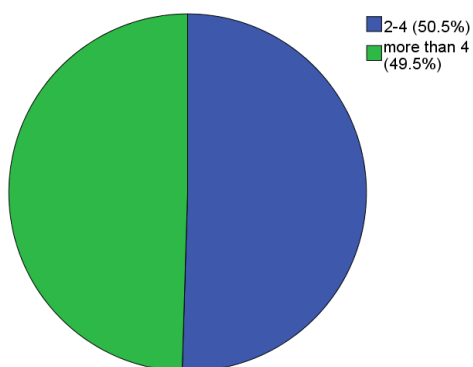
(vi) Number of computer training received



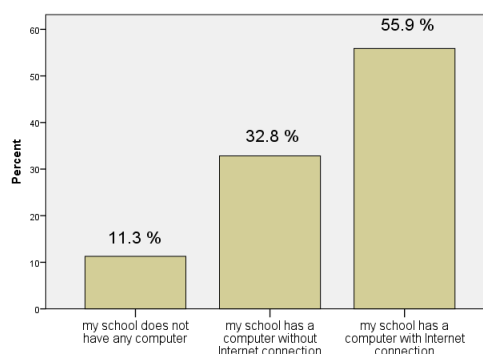
(vii) Level of computer usage



(viii) Workplace (school) types



(ix) Number of English teachers



(x) Access to computer and the Internet

Figure 7.1: Demographic features and state of technological orientation of research subjects

According to the survey findings (please see Figure 7.1), among the 204 participating teachers (excluding 3 teachers who did not respond to all the items of the questionnaire) about two-third (66.2%) are male (graph-i). More than two-third teachers (71.6%) are between 30 to 50 year old (graph-ii). Teachers having 20 to 30 years' teaching experience are 41.7% whereas teachers with less than ten years' teaching experience are 35.3% (graph-iii). About half of the teachers (47.1%) have been teaching English for less than ten years and 15.2% have been doing this for more than thirty years (graph-iv). Again, about half of the teachers (49.5%) have attended one to three teacher training programmes, but 12.3% teachers do not have any teacher training

exposure (graph-v). The data also show that more than one third of the teachers (38.2%) have participated in more than three teacher training programmes.

Data regarding the workplace or schools show that most of the participating teachers of English (93.1%) are from non-government high schools, whereas 5.9% are from government high schools and 1% are from government affiliated Madrasas (graph-viii). Among the schools about half (50.5%) have two to four teachers of English and the remaining half (49.5%) have more than four teachers of English (graph-ix). More than half of the schools (55.9%) have computers with Internet connection and about one third (32.8%) have only the computers (graph-x).

According to the dataset, more than two third of the teachers (70.6%) have not received any computer training and the remaining 29.4% have received one to three computer training programmes (graph-vi). About one third of the teachers (34.3%) do not know how to operate a computer and another one third (33.8%) had started learning it, but stopped for some reasons (Figure 10-vii). This figure also informs that 16.2% of the teachers can operate a computer well.

In addition to the information on the personal and professional backgrounds of the survey participants the data provide information on the teachers' professional training and learning experiences, the numbers of their English teaching colleagues, and the computer and Internet facilities in their schools (please refer to Section 9.4.1 of Chapter 9 for the detailed discussion on the present state of technology in teacher-learning in rural Bangladesh). These partially explain the professional learning needs (research question 1 'b'), professional network (research question 1 'c') and the present state of learning technology of the rural Bangladeshi secondary schools (research question 3 'a'). In Chapter 9, the discussion chapter, I combine these findings with the findings of the focus group discussions, and provide comprehensive explanations of the above research questions.

7.3 Relationship among learning context, personal and professional domains

According to the critical realist philosophy, to realise the educational and teacher development systems or mechanisms in an educational context it is important to explore the natures, actions and links of the teacher-learning related elements (which can be considered as ‘entities’) such as the teachers, their ideas and views, school situations and resources. Additionally, it is essential to understand what ‘causal powers’ (such as human activities or social structures) are active in those elements and systems (please refer to Section 6.4 of Chapter 6 for the comprehensive discussion on Critical Realist research philosophy and the operational procedures). To do this, firstly it is required to investigate the extent of the relationship among the teacher-learning elements that I study in this thesis. Any significant relationship among those elements will provide the rationale to discuss their natures, links and influences. Moreover, the identified relationship will also establish the validity of the technology enhanced teacher-learning framework of this thesis (presented in Chapter 4).

To explore the linear relationship among the personal and the communal domains of learning, and the learning context of rural Bangladesh I conducted the Bivariate Correlation measurement, commonly named as Pearson Correlation Coefficient test. The test is applied to measure whether there is any statistical significance of the linear relationship between two continuous variables and the strength of their associations (Myers, Well, & Lorch Jr, 2010). I applied the following cut-off points (recommended by Muijs, 2011, p. 111) to determine the strength levels of the relationships.

- < 0.1 weak
- < 0.3 modest
- < 0.5 moderate
- < 0.8 strong
- ≥ 0.8 very strong

Table 7.1, 7.2 and 7.3 below present the results.

Table 7.1: Correlation between personal domain of learning and learning context

		personal domain of learning	learning context
personal domain of learning	Pearson Correlation	1	.337**
	Sig. (2-tailed)		.000
	N	204	204
learning context	Pearson Correlation	.337**	1
	Sig. (2-tailed)	.000	
	N	204	204

** . Correlation is significant at the 0.01 level (2-tailed).

Table 7.2: Correlation between learning context and communal domain of learning

		learning context	communal domain of learning
learning context	Pearson Correlation	1	.311**
	Sig. (2-tailed)		.000
	N	204	204
communal domain of learning	Pearson Correlation	.311**	1
	Sig. (2-tailed)	.000	
	N	204	204

** . Correlation is significant at the 0.01 level (2-tailed).

Table 7.3: Correlation between personal and communal domains of learning

		communal domain of learning	personal domain of learning
communal domain of learning	Pearson Correlation	1	.573**
	Sig. (2-tailed)		.000
	N	204	204
personal domain of learning	Pearson Correlation	.573**	1
	Sig. (2-tailed)	.000	
	N	204	204

** . Correlation is significant at the 0.01 level (2-tailed).

According to Table 7.1, the correlation between the personal domain of learning and the learning context is significant and its level is ‘modest’ (< 0.3). Table 7.2 establishes that the correlation between the learning context and the communal domain of learning is significant and its level is ‘modest’ (< 0.3). According to Table 7.3, the correlation between personal and communal domains of learning is significant and its level is ‘moderate’ (< 0.5).

Based on these findings it can be realised that there are active interweaving influences among the various teacher-learning aspects (please refer to Section 4.4 of Chapter 4 which explains the aspects of the personal and communal domains of learning, and the learning context) relevant to rural Bangladeshi secondary school teachers’ professional development. Figure 7.2 below shows the levels of these relationship and influences.

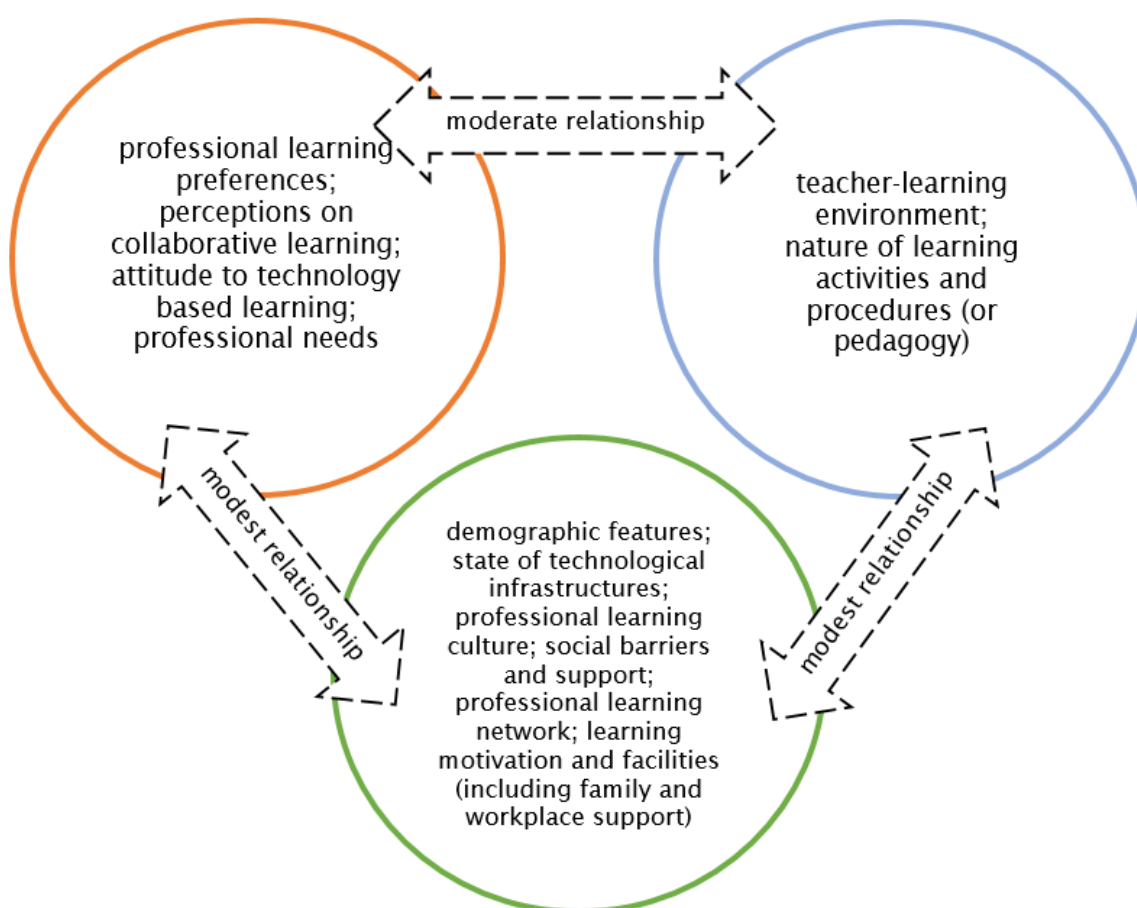


Figure 7.2: Relationship among teacher-learning factors in rural Bangladesh secondary school context

Section 7.4 discusses my findings on the seven key teacher-learning aspects (please refer to Chapter 6 for the explanation on how these aspects are addressed in the survey questionnaire) which are vital for the professional development of the secondary teachers in rural Bangladesh.

7.4 Aspects of technology enhanced teacher-learning

Based on the demographic features and the state of technological orientation of the research participants I explored seven aspects of professional learning namely : professional learning preferences, professional learning network, learning motivation and facilities, attitudes to technology enhanced learning, professional needs, preferred teacher-learning procedures and preferred teacher-learning activities. A critical and realistic understanding of these aspects are vital in this thesis because it can reveal the attitudes and readiness of rural Bangladeshi stakeholders in accepting or rejecting technology enhanced teacher-learning approaches. Additionally, it can provide the essential explanation of the relevant contextual situations such as the risks and opportunities associated to technology enhanced teacher-learning schemes. Moreover, these findings are able to provide recommendations and future directions for effective and sustainable adaptation of any technology enhanced professional development programmes in rural Bangladesh (please refer to Section 1.4 and 1.5 of Chapter 1 for the discussion on the focus of my thesis and my research questions).

To explore the seven aspects of teacher-learning I examined the survey data in three steps. In each step I used SPSS software for conducting statistical equations. Here, the procedures are demonstrated with an example of the ‘professional learning preferences’ aspect. The detailed procedures and findings of all the seven aspects are documented in Appendices 11 and 12.

a) Step 1: Mean scores

I calculated the Mean scores of the indicators (or the questions) of each aspect (or variable) and listed those in descending manner. The scores are the ‘arithmetic average’ of the responses (as defined by Fink, 1995) which I interpreted according to the following terms.

1 to 1.99	:	low
2 to 2.99	:	average
3 to 3.99	:	modest
4 to 5	:	high

For example, the 'professional learning preferences' variable contains five indicators (or questions) namely the preferences to 'reading', 'training', 'using experience', 'using reflections', and 'interacting with group members' (shown in the questionnaire attached as Appendix 1). Table 7.4 below presents the mean scores of these indicators. It also presents the 'overall' preference which is a new variable and the mean of all the individual professional learning preference items.

Table 7.4: Mean scores of 'professional learning preferences' in descending order

	N	Minimum	Maximum	Mean	Std. Deviation	Interpretation of Mean score
preference to training for professional learning	204	2	5	4.75	.475	high
preference to reading for professional learning	204	2	5	4.54	.607	high
preference to interact with group members for professional learning	204	1	5	4.49	.809	high
preference to use reflections for professional learning	204	2	5	4.33	.809	high
preference to use experience for professional learning	204	2	5	4.25	.627	high
overall preference	204	2	5	4.4709	.46272	high

The mean scores of Table 7.4 provide the respondents' levels of preference and acceptance of different teacher-learning approaches. This ultimately explains the existing teacher-learning culture of rural Bangladesh by addressing the Research Question 'a' of Theme 1(learning culture): 'how do

secondary English teachers of rural Bangladesh prefer to receive professional learning?’

b) Step 2: Independent-Samples *t* Test and ANOVA

In the second step, to explore the demographic and technological orientation based differences among the indicators of a variable I conducted the Independent-Samples *t* Test (when there are two groups of responses) and ANOVA (when there are three or more groups of responses). It is important to mention that, besides exploring the data related to gender, I conducted the Independent-Samples *t* Test for investigating two other indicators namely the ‘number of computer training programmes attended’ by the respondents and the ‘number of English teachers’ at respondent’s own school. I selected this test type for these two cases because my survey participants chose from only two options although the questions provided three options for answering (shown in vi and ix of Figure 7.1). In my report, while the Independent-Samples *t* Test results provide differences between the two groups of respondents (based on demographic features and states of technological orientation), the ANOVA results deliver the overall differences among three or more groups of respondents (based on demographic features and states of technological orientation).

For example, to discover the association of ‘professional learning preferences’ with demographic features and the state of technological orientation I conducted the Independent-Samples *t* Test and ANOVA of the Section B (question 11 to 15) of the survey questionnaire. The findings of these tests provide the in-depth information of teacher-learning preferences through comparing the teachers’ preferences with their demographic differences and the variances of the availability of technological facilities. This is particularly helpful to critically respond to the Research Question ‘a’ of Theme 1. Table 7.5 and Table 7.6 show the significant results of the Independent-Samples *t* Test and ANOVA of the ‘professional learning preferences’ questions where p-value is less than .05 (for the complete results of all the Independent-Samples *t* Test and ANOVA please refer to Table ‘I’ to ‘xiv’ of Appendix 12).

Table 7.5: Association of 'professional learning preferences' with gender, computer training, and number of English teachers at school (independent-Samples *t* Test results)

Indicator	Demographic features and state of technological orientation		N	Mean	SD	t-statistics	p-value
preference to reading for professional learning	computer training	Nil	144	4.48	.647	-2.517	.013
		1-3	60	4.68	.469		
preference to training for professional learning	number of English teachers	2-4	103	4.83	.445	2.460	.015
		More than 4	101	4.67	.492		
preference to use reflections for professional learning	gender	Male	135	4.24	.859	-2.090	.038
		Female	69	4.49	.678		
	computer training	Nil	144	4.18	.874	-5.307	.000
		1-3	60	4.68	.469		
	number of English teachers	2-4	103	4.17	.974	-2.797	.006
		More than 4	101	4.49	.559		
readiness to interact with group members for professional learning	computer training	Nil	144	4.38	.892	-3.896	.000
		1-3	60	4.75	.474		

Table 7.6: Association of 'professional learning preferences' with age, total teaching experience, English teaching experience, number of teacher training received, school types and access to the computer and Internet (ANOVA test results)

Aspect	Indicator		Sum of Squares	df	Mean Square	F	Sig.
preference to training	total teaching experience	Between Groups	1.899	2	.950	4.354	.014
		Within Groups	43.846	201	.218		
		Total	45.745	203			
	English teaching experience	Between Groups	1.800	2	.900	4.116	.018
		Within Groups	43.945	201	.219		
		Total	45.745	203			

preference to use reflections	number of teacher training received	Between Groups	3.925	2	1.962	3.056	.049
		Within Groups	129.070	201	.642		
		Total	132.995	203			
	English teaching experience	Between Groups	7.762	2	3.881	6.229	.002
		Within Groups	125.233	201	.623		
		Total	132.995	203			
preference to use experience	age	Between Groups	2.784	2	1.392	3.636	.028
		Within Groups	76.961	201	.383		
		Total	79.745	203			
	total teaching experience	Between Groups	4.237	2	2.119	5.639	.004
		Within Groups	75.508	201	.376		
		Total	79.745	203			
	English teaching experience	Between Groups	2.358	2	1.179	3.062	.049
		Within Groups	77.387	201	.385		
		Total	79.745	203			
	number of teacher training received	Between Groups	3.461	2	1.731	4.560	.012
		Within Groups	76.284	201	.380		
		Total	79.745	203			
	school types	Between Groups	2.676	2	1.338	3.489	.032
		Within Groups	77.069	201	.383		
		Total	79.745	203			
preference to interact with group members	access to computer and Internet	Between Groups	5.085	2	2.542	3.997	.020
		Within Groups	127.871	201	.636		
		Total	132.956	203			

c) Step 3: Tukey's HSD test

In the case of any significant difference in the ANOVA results I conducted the post hoc comparisons named Tukey's HSD (honestly significant difference) which can identify the exact area of differences (Walker & Almond, 2010). For example, In Table 7.6 the ANOVA test results show a significant difference of the participants' 'preference to training' in the case of their 'total teaching experience'. According to Question 3 of Section A of the questionnaire, there are three time lengths for the 'total teaching experience' which are 'less than 10 years', '20-30 years' and 'more than 30 years'. To identify the significant

differences between the two time lengths I conducted Tukey's HSD test and found two cases of significant differences of the mean scores. First one is between the English teachers having 20 to 30 years' total teaching experience and the teachers having less than 10 years' total teaching experience. The second difference is between the teachers having 20 to 30 years' English teaching experience and the teachers having less than 10 years' teaching experience (the findings of all the significant differences of the participants' 'preferences to professional learning' are reported in Appendix 11.a).

7.5 Summary of findings

The survey provided a wide range of quantitative data relevant to various aspects of teacher-learning in rural Bangladesh. As I had designed the items (or the questions) of the questionnaire in relation to my research questions (shown in Table 6.2 of Chapter 6), most of the quantitative data appeared as relevant and useful for my thesis. However, the summary of the findings provided below reports only the significant findings in non-technical (by not using statistical terminologies) descriptions which would help identify the key points relevant to the research questions in convenient manner (please refer to Appendix 11 for the complete reporting of the survey data findings, and Chapter 9 for the comparative discussion with the focus group data findings and their critical analysis). Moreover, for ensuring that the descriptions are meaningful and lucid I use the following words and phrases to refer to the responses related to demography and technological orientation.

- 'young', 'mid-aged' and 'aged' for the teachers 'below 30 years' , '30-50 years' and 'above 50 years' respectively
- 'short', 'moderate' and 'long' for the teachers who have 'less than 10 years', '20-30 years' and 'more than 30 years' of total or only English teaching experience
- 'no', 'a few' and 'some' for the teachers who 'did not attend any', '1 to 3', and 'more than 3' teacher training or computer training programmes
- 'one', 'some' and 'many' for the schools which have 'one (only the respondent)', '2 to 4', and 'more than 4' English teachers

Sections 7.5.1 to 7.5.7 below report the key findings of my survey data.

7.5.1 Professional learning preferences

The questions of Section B of the questionnaire require responses on personal preferences and attitudes about ‘reading’, ‘training’, ‘using experience’, ‘using reflections’, and ‘interacting with group members’ for professional learning.

The participants showed high preferences for all these approaches. However, the levels of the preferences are different according to their length of teaching (including teaching English), the number of training session (both general and on English) they have received, gender, age, access to the ICT facilities, and even the number of teachers teaching English at their workplace.

Teachers having long teaching experience prefer to use experience for professional development, but those having moderate teaching experience prefer attending traditional teacher training programmes in this regard. Similarly, those having moderate to long English teaching experience prefer traditional teacher training programmes and the use of reflections and experience for professional development. The female teachers and the teachers who have attended a few computer training prefer to use reflections in professional learning. However the teachers who have attended a few teacher training programmes have less preference to the use of reflections. Then, the teachers who have received a few computer training programmes prefer to use reading. The teachers who have attended a few computer training and the teachers whose schools have a computer with the Internet connection prefer the interaction with other teachers in group for professional learning.

The findings about the ‘professional learning preferences’ of the survey respondents help explain their learning culture particularly the types of technology enhanced learning activity they consider suitable for their professional development. The information partially answers the research question ‘a’ of Theme 1 (learning culture). I compare these results with the focus group findings in Section 9.3.1 of Chapter 9.

7.5.2 Professional learning network

The Section C questions of the questionnaire are about the people (namely teachers of English of the same school, teachers of English of other schools, teachers of other subjects of the same school, teachers of other subjects of other schools, head teachers, local government education officer, non-government education officers, education experts, government teacher trainers and the family members of the teachers) who are connected to the survey participants for professional learning purposes. The findings show a wide variance of their professional network in terms of demographic features and the state of technological orientation. While the professional network with the head teachers and the teachers of English of the same school is high; it is modest with the teachers of English of other schools, with the teachers of other subjects of the same school and with own family members; and average with the teachers of other subjects of other schools, local government and non-government education officers, education experts and government teacher trainers. The following findings show the levels of these differences.

Firstly, the female teachers of English maintain the higher level of professional connection with the teachers of English and other subjects of the same school, school heads and the local government education officer. Although the aged teachers maintain a very high professional network with the government teacher trainers, they do not have high professional connection with the English teachers of the same school. The mid-aged teachers of English have the highest level of professional network with the teachers of English of their school and the local government education officer.

Secondly, the teachers of English having the long teaching experience have low level of professional network with the teachers of other subjects of other schools. Similarly, the teachers having long or moderate English teaching experience have low level of professional network with the English teachers of both the same school and of other schools, head teachers of own schools, government teacher trainers and own family members. However, the teachers having short English teaching experience have the highest level of professional network with the teachers of English of their own school and other schools, head teachers, non-government education officers, government teacher trainers and with their family members.

Thirdly, the teachers who have not attended any teacher training programmes maintain the highest level of professional network with the teachers of other subjects of the same school, the local government education officer, the head teacher of the own school and with their family members. On the other hand, the teachers who have attended some teacher training programmes maintain the highest professional network with the education experts.

Fourthly, according to the data, the teachers who have attended a few computer training maintain the highest level of professional network with the teachers of English and other subjects of the same school and others schools, school heads, the local government education officer, education experts, non-government education officers, government teacher trainers, and with their family members. Similarly, the teachers who can operate a computer well or have recently started to learn it have the strongest professional network with the teachers of English and of other subjects of other schools, non-government education officers, and government teacher trainers. The data also show that the teachers who do not know how to operate a computer and never started to learn it, or who had started learning it but stopped for some reasons, have the lowest level of professional network with the teachers of English and of other subjects of other schools, non-government education officers and the government teacher trainers. Moreover, the teachers of those schools which do not have any computer maintain the highest professional network with the local government education officers.

Fifthly, the teachers who have only a few teachers of English in their school have higher professional network with their family members.

The survey results of the 'professional learning network' explain the features of professional learning connections of the survey respondents and answers research question 'c' of Theme 1 (learning culture). In Section 9.3.3 of Chapter 9 I analyse these findings with the findings of the focus group sessions.

7.5.3 Learning motivation and facilities

Motivation and facilities (from family, society and workplace) are vital in the professional learning and capacity building of teachers (please refer to Chapter 3 and Chapter 4 for further discussion on the role of motivation, intention and

environmental situations). Section D of the questionnaire posed a number of questions to learn about the family and workplace support the participants receive for their professional learning and development. The findings show that the level of encouragement and facilities the English teachers receive from their school authority and from the family are generally high. They are also highly motivated to receive training at distant learning centres. Although these teachers consider the quality of the learning environment at home high, they think that the quality of the learning environment at their workplace is modest.

Female teachers receive the higher level of encouragement from their family to participate in professional training, but they consider the environment at their home less favourable for professional studies. Similarly, teachers who attended a few or many teacher training programmes get the highest level of encouragement for teacher-learning from their family, but they do not find the environment at their home favourable for professional learning. Consequently, they are the most positive ones for receiving professional training at distant places. Contrariwise, the teachers having long English teaching experience and the teachers having no teacher training experience find the learning environment at home favourable for professional learning and development.

The data show that the mid-aged and aged teachers receive the higher level of encouragement from their school authority. Non-government high school teachers however consider that the learning environment at their workplace is highly favourable.

Teachers of the schools having a computer with Internet connection have the highest level of motivation for receiving training at distant places and they also receive the highest level of encouragement from their family. On the other hand, the teachers of the schools which do not have any computers consider their workplace as highly favourable for professional learning and they have the least preference for receiving professional training at any distance places. These teachers also get the least encouragement from their family regarding receiving any professional training. Compared to the teachers who do not know how to operate a computer or who had started learning to operate it (but stopped for some reasons), those who have recently started learning to operate a computer receive the least encouragement from their school authority.

The findings on family and workplace support and motivation for professional learning are useful to answer the questions ‘d’ and ‘e’ of Theme I (learning culture). Please refer to Section 9.3.4 and 9.3.5 of Chapter 9 where I further develop these survey findings with the findings of the focus group sessions.

7.5.4 Attitudes to technology enhanced learning

I explored the attitudes of the survey participants about the use of information and communication technology for professional development through the questions of Section E of the questionnaire. The findings help answer the question ‘b’ of Theme II (attitudes and affordances). I also analyse these findings in Section 9.4.2 of Chapter 9 with the findings of the focus group sessions.

According to the survey findings the teachers’ perception about the use of technology for teaching and professional learning is highly positive. They are also eager to learn to use the computer. In the data I did not find any major variances among the English teachers in terms of their attitudes to technology enhanced learning. However, I saw that the mid-aged and aged English teachers possess more positive attitudes than the young teachers regarding the need for computer skills for teaching any subjects and the use of ICT for professional knowledge building along with teaching skills development. The data also show that the teachers who can operate a computer well and who had started learning to operate it (but stopped for some reasons) have the higher level of positive attitude regarding the use of ICT for professional knowledge building. The teachers who have received a few computer training however possess high level of positive attitude regarding the use ICT for professional knowledge building.

7.5.5 Professional needs

The Section F of the questionnaire are on the strengths and deficiencies in English teaching of the survey participants. According to the findings, the teachers consider having high level of professional abilities in the areas namely their preparation for teaching English lessons, the English vocabulary they know, their understanding on the content of English lessons, the use of different learning activities, awareness about teaching and learning objectives,

ability to plan English lessons, ability to use class instructions in English and ability to involve learners in lesson through personalisation while teaching English. Their satisfaction about the lesson activity management is also very high. The data however show a few significant differences in the areas of their professional needs. Firstly, the male teachers of English have perceptions of having the higher ability to use English language for delivering class instructions. The teachers whose schools have a computer with Internet connection show the higher level of awareness about teaching and learning objectives of the English lessons they teach. Similarly, the teachers of English who have received a few computer training or can operate a computer well, and those who had started learning to operate this (but stopped for some reasons) have perceptions of having the higher level of readiness to teach English lessons. The teachers who have attended a few computer training believe that they are highly aware of the learning objectives and the content of the English lessons they teach.

The findings on the strengths and deficiencies in English teaching provide information on the professional needs of the survey respondents which also address the research question ‘b’ of Theme 1 (learning culture). I analyse these findings in Section 9.3.2 of Chapter 9 with the findings of the focus group sessions.

7.5.6 Preferred teacher-learning procedures

For implementing any technology enhanced teacher-learning schemes the teachers’ preferences about the forms of collaboration and the nature of teaching/learning activities are important to know (please refer to Chapter 4 for the discussion on the role of participants’ interest and engagement in collaborative learning, and Chapter 5 for a number of relevant examples of technology enhanced teacher-learning pedagogies). The understanding of these areas can help realise the type of technological intervention in the process as well. Section G of the questionnaire contain a number of questions relevant to the approaches of collaborative teacher-learning, and the responses are therefore useful in answering question ‘c’ of Theme II (attitudes and affordances). I analyse these findings along with the findings of the focus group sessions in Section 9.4.3 and 9.5.2 of Chapter 9.

The findings of this section show that the teachers have high level of confidence on the professional knowledge of the teachers of their own school, and their views on the involvement of teachers in designing teacher-learning programmes, on professional development activities with teachers having different backgrounds, and on the approach of continuing teacher-learning are also very high. On the other hand, they have high confidence on the professional knowledge of the teachers of other schools of the same district. The data show two significant differences in this area. According to the findings, the female teachers possess the higher level of confidence on the professional knowledge of the teachers of their own school and also of the teachers of other schools of their district.

7.5.7 Preferred nature of teacher-learning activities

The questions of Section H of the questionnaire provide responses about the participants' perceptions about effective teacher-learning activities and assessment styles. The findings partially address the questions 'a' and 'c' of Theme III (pedagogy and management). I analyse these findings in Sections 9.4.3 and 9.5.1 of Chapter 9 with the findings of the focus group discussion sessions.

According to the findings, the teachers' perceptions are very positive on the approach of teacher-learning and teaching at school simultaneously, about the need for full-time teacher trainer in teacher-learning programmes, sharing teaching related issues with known teachers, learning through observing the teaching of others, sharing of experience with unknown teachers, the use of examples in teaching, the use of personal teaching experiences, about individual-focused learning activities, about assessing the performance of the participants of teacher-learning programmes, and about keeping the provision of regular tasks and assignments in teacher-learning. The noteworthy difference in this area is that the teachers who have attended a few computer training have the highest level of preference on sharing teaching related issues with their known teachers.

7.6 Conclusion

The survey data provide useful information on the participants' demographic features and the perceptions on various teacher-learning issues such as professional learning approaches, learning network, level of motivation and support from the workplace and the family, attitudes to technology for professional learning, teacher-learning needs and expected teacher-learning procures and activities. The outcomes are relevant to the research questions of this thesis. A discussion of these findings complemented to the findings of the focus group discussions are therefore provided in Chapter 9 for the comprehensive understanding of the research questions. In that chapter I compare and analyse the findings of these two datasets to explore suitable technology enhanced teacher-learning approaches for rural Bangladeshi teachers of English.

Chapter 8: Focus group data reporting

8.1 Introduction

In this chapter I report my workshop-led focus group discussion data in three steps.

- In Section 8.3, I present the focus group participants' initial feedback during the workshops and hands-on practice sessions on technology and teacher-learning. The information conveys their attitudes towards using technology for learning and professional development. At the same time, it shows their preparedness for using modern technological applications in any technology enhanced teacher-learning programmes. The findings help answer the research questions 'b' of Theme 2, and 'a' and 'b' of Theme 3 (these are analysed critically in Sections 9.4.2 and 9.5.1 of Chapter 9 with the results of the survey).
- In Section 8.4, I provide the list of conversation points that emerged in the six focus group discussion sessions. I use a number of graphs to show their ranges of variety (or sub-themes) and amounts of contents. Then, I categorise the sub-themes in 7 key themes. Although in the focus group discussion sessions there was more diversity of discussion areas in the later sessions, my aim of this research was not to measure the participants' pace of longitudinal development of skills or interest about technology enhanced teacher-learning, but to analyse the findings together to identify the issues related to the benefits and challenges of implementing technology enhanced teacher-learning schemes along with the associated operational procedures for rural Bangladesh. These findings in fact provide the foundation for the theme-based discussion in the next section (Section 8.5).
- In Section 8.5, I describe the discussion themes in relation to the references taken from the focus group transcripts. The themes include various aspects of technology enhanced teacher-learning in rural Bangladesh such as schools' conditions, existing technological facilities and the participants' perceptions and recommendations on viable

technology enhanced teacher-learning schemes to rural Bangladeshi secondary school teachers. The findings answer the research questions of this thesis which I indicate and discuss in the next chapter (please refer to Chapter 9).

In addition to the above areas, I also include a description of my roles in the focus group data collection and reporting activities (in Section 8.2) which clarifies the nature of my engagement and contributions to this qualitative study.

8.2 My role

My major objective to conduct the focus group discussions was to explore the experiences and reflections of the stakeholders so that I can understand the possibilities of technology-enhanced teacher-learning approaches in rural Bangladesh (explained further in Section 6.2 and Section 6.6 of Chapter 6). In my focus group sessions I was in intensive contact with the participants through face to face and dialogue-based interactions. In the whole process I involved my personal strategies, knowledge and skills for collecting relevant data. In a similar manner, while processing and reporting this dataset, which is qualitative in nature, I engaged my research objectives, reflexivity and 'positionality' deliberately or unintentionally for ensuring the comprehensibility and generalizability of the gained information. Through 'positionality' I involved my multifaceted identities which are, according to Hopkins (2007) and Maher and Tetreault (2001), developed by various factors including the associated culture, gender, class, experience, social and professional network, and perceptions. Recognising my role in this focus group report is therefore important to properly realise its content (as mentioned by Vanderback, 2005). Here the key facets of my 'positionality' involved in the focus group data reporting are listed.

Teacher

I am a teacher of English by profession and I am experienced in teaching to different learner groups in schools, colleges and universities. In this report, my personal teaching and teacher-training experiences are to an extent comparable to the experiences of my focus group participants.

Teacher trainer

I am a facilitator of teacher development programmes in Bangladesh having the experience of providing teacher training to several hundred rural secondary teachers of English.

Researcher

As the researcher of this thesis I extensively investigated the background information of this research area, reviewed the research-based literature and designed suitable research methods for the proper investigation of the research problem. My focus was on the research questions of this thesis and I was keen on exploring those with the evidence.

Focus group facilitator

I facilitated the six workshop-led focus group discussion sessions. There I disseminated several types of technology enhanced teacher-learning pedagogy, provided some technological instruments for learning, and helped the participants experience how they work, and led the discussion sessions with practical and thought provoking questions which I considered required for my research.

Data organiser and analyst

As the researcher of this thesis I engaged my research related knowledge and skills in the qualitative and quantitative data collection, processing and analysis processes.

Report writer

I have narrated this research journey, presented the findings, and drawn the conclusions. It is important to mention that my cultural background, mother tongue, educational past and professional experiences are some of many factors that have influenced this entire writing process.

8.3 Initial feedback

I arranged one workshop and one hands-on practice session prior to each of the six focus group discussions for empowering my research participants with

relevant knowledge, evidence and experiences; and to enable them to effectively respond to my research queries (Chapter 6 provides the detailed description of the workshop-led focus group discussion sessions). Although my reporting of the qualitative data is mainly centred on the discussion sessions, the opinions of the stakeholders during this stage provide the description of the practical context of teacher-learning in rural Bangladesh. In Figure 8.1 the actions and responses of the research participants during the workshop and hands-on practice sessions are categorised, and then the features are described elaborately.

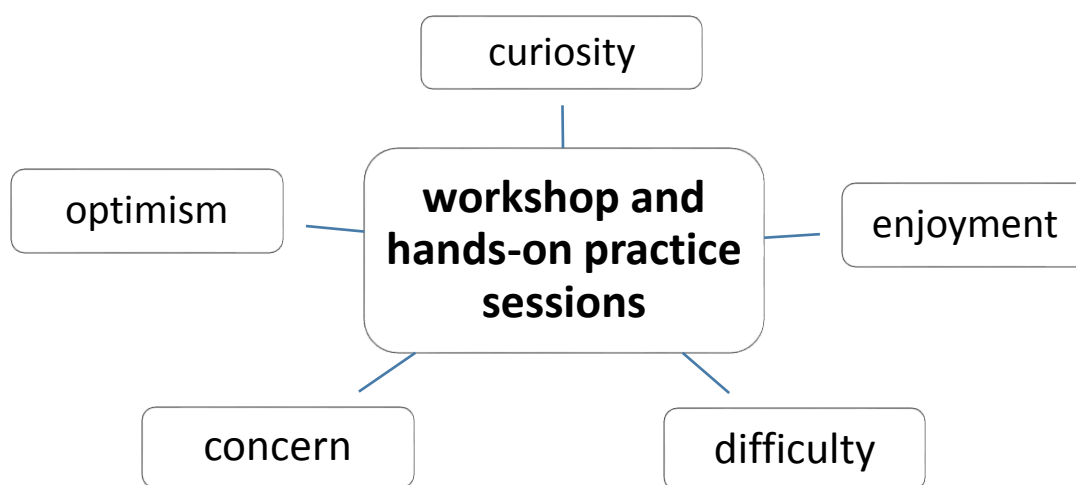


Figure 8.1: Initial feedback on technology enhanced teacher-learning

a) Curiosity

In my personal experience of working with the rural Bangladeshi teachers of English (I provide a brief description of this in Chapter 2) I found them generally curious about teacher-learning and professional development issues. In teacher training sessions I observed that they are enthusiastic and curious to explore professional knowledge and skills. Those experiences were reinforced during the survey and focus group discussion sessions.

While I was visiting the rural secondary schools in Netrakona district for conducting the survey (see Chapter 6 for further description) many teachers asked me about the possible impact of my research in their school, whether my research is linked to any training they may be offered, or whether they are going to receive any technological devices or learning material in future. In the

workshop-led focus group discussion sessions I found my participants mostly attentive and enquiring to the various aspects of the technology enhanced pedagogies. Particularly in the workshops and the hands-on practice sessions they showed their eagerness to know various issues. Here, a few questions and requests that I received during the two phases of the focus group discussion sessions are listed.

- (Pointing to the iPads) How much does it cost? (1HT2)
- How many computers can this (the Internet hotspot) cover? (1ET2)
- Please show me how I can see the government registration status of my school on the Education Department's website. (2ET2)
- (To the computer trainer) Please show me how to open an email account? (2ET1)
- I have heard that it is possible to call free of charge via the Internet. Is it true? (3HT1)
- Can I record Skype conversation for showing it to my head teacher? (3TT)
- How can I change the background of this blog? (3ET1)
- How many months does it take to learn the computer fully?(4ET1)
- In one training session a trainer told me that it is possible to read daily newspapers by using the Internet. How can I do so? (5HT2)
- Is there any video on YouTube on how to operate a computer? (6HT1)

b) Enjoyment

It seemed to me that the focus group participants enjoyed the workshops and hands-on practice sessions. Most of the time in these sessions they engaged themselves in the activities and discussion. I did not find any sign of boredom or disliking among them while I was disseminating information on various technology enhanced teacher-learning approaches and the use of technological tools for learning. In day 3 and 4 I had to extend the sessions to complete my planned tasks, but the participants were happy to spend that extra time.

During the sessions several times I saw them smiling and making joyful expressions such as ‘that is great!’, ‘this is interesting!’, ‘wow!’ and ‘beautiful!’ Although one teacher of English and the teacher trainer were comparatively younger than the head teachers and the other teacher of English, I did not find any problem among them in working together and sharing ideas collaboratively.

c) Difficulty

During the workshops and the hands-on practice sessions in some situations I found the participants facing difficulties in understanding and performing. In a number of occasions their facial expressions resembled that the information I was providing on technology enhanced teacher-learning pedagogies was not comprehensible to them. In those situations I re-explained the issues with more elaboration and examples and then re-checked their understanding by inviting them to share their opinions. In the hands-on practice sessions the participants initially struggled to properly use the tablet computer. They were also taking time to learn the basic operation techniques with the computer trainer. I realised from their performances in the first hands-on practice session that the teacher trainer and one teacher of English had the operational skills of computer, and the remaining participants were either beginners or non-users. The participants however showed a gradual development of skills in using the tablet computer during the later five days.

d) Concern

In the workshops and the hands-on practice sessions the focus group participants did not show any major concerns about the computer and the Internet applications (please refer to Chapter 6 and Appendix-3 for the list of the applications) which I had introduced to them. I however observed that some of the participants initially hesitated to operate the computer applications (for example, while browsing the Internet and capturing videos using the tablet computer). Similarly, during the hands-on practice sessions some participants sometimes did not try to operate the instructed computer application without having the complete guidelines from the computer trainer. Moreover, the participants such 1HT2 and 2ET1 did not firstly show their confidence about the use of the social networking sites like Facebook and YouTube for teachers’ professional development. Their doubt and fear

regarding the use of tablet computers and the Internet applications however gradually decreased in the later days.

e) Optimism

I observed a significant difference in the confidence and interest of the focus group participants regarding the use of technology, particularly in the field of teacher-learning. The teachers of English, the head teachers and the teacher trainer all expressed their expectations for continuing the learning of the computer and the Internet. For example, 4ET2 declared that he would soon learn typing in English at a professional learning centre. 4ET1 said, 'if we could get a few days more, we would learn many more applications of the Internet'. In the third week the teacher trainer showed me a blog which he designed by himself. 5HT1 shared his plan that he would buy a laptop especially for his children. Both the head teachers also said that they are going to use the computers of their school, but also mentioned that they would need more training and practice for that. The participants also discussed the price of the Internet packages provided by the local mobile phone companies. Although they seemed to be interested about the Internet, I found that most of them were unhappy about the high price of the services.

8.4 Discussion areas and key themes

In each of the six workshop-led focus group discussions I and my participants mainly discussed a particular technology enhanced teacher-learning pedagogy (for example, technology enhanced and reflection-based teacher-learning). Firstly, in the information dissemination session I provided information on the type, benefits and problems of a pedagogical approach. Then, I talked about the implications (such as advantages, challenges and possible solutions) of the use of technology in that particular type of pedagogy for teacher-learning. During this session, the focus group participants asked questions and sometimes reflected on the information they had received. Secondly, in the hands-on practice session we used tablet computers and the Internet to perform a number of teacher-learning activities (please refer to Chapter 6 and Appendix-3 for the list of activities) relevant to that particular pedagogy. While practising with tablet computers the participants asked questions and

commented on several issues. Finally, during the discussion sessions we conversed on the questions and answers of the following three key areas:

- a) advantages and challenges of the technology enhanced teacher-learning pedagogies
- b) suitability of technology enhanced teacher-learning pedagogies
- c) management procedures of technology enhanced teacher-learning and operational schemes

Alongside the above discussion areas we also discussed a number of other teacher-learning issues such as the existing professional learning culture in rural Bangladesh, the state of the access to information and communication technology, English teachers' learning needs, attitudes of teachers to technology enhanced learning; and the motivation they get from their family, society and workplace for receiving professional learning.

By using the NVIVO software I conducted the theme-based coding (the procedure explained in Chapter 6) on a number of conversation points (I consider these points as sub-themes). My approach was like 'topic coding' (as described by Richards, 2005, p. 88) because I labelled any particular text of my transcribed data 'according to its subject'. The following figures (Figure 8.2 to 8.7) show the conversation points (or sub-themes) of the six focus group discussion sessions and the percentages of the discussion time of each point. The percentages of the time calculated by NVIVO however are based on the coded points only, and they do not include the conversations which are not coded in the transcripts. Additionally, the time is also approximate because the length of the Bangla transcription of the conversation is not the same to the English translated one. However, I keep the percentages in the figures to realise the comparative picture of the relevant (or coded) conversation points.

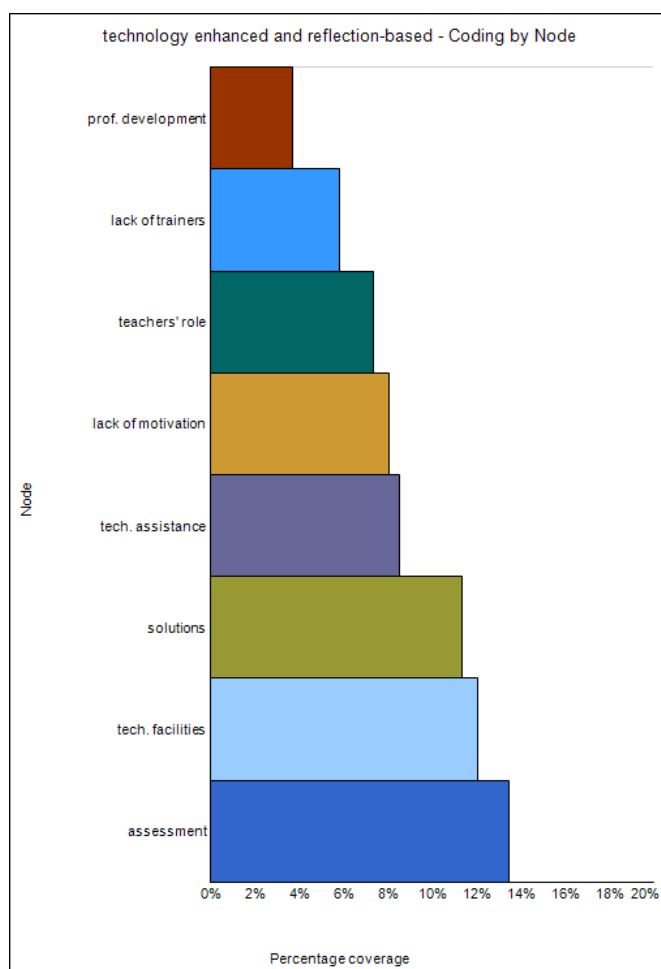


Figure 8.2: Day 1 discussion points (or sub-themes)

In day 1 we spent 31 minutes discussing various aspects of the technology enhanced and reflection-based teacher-learning pedagogy. The coded data show that we discussed 8 issues (or sub-themes) namely advantages for professional development, lack of trainers, teachers' role, teachers' lack of motivation, benefits of having technological assistance, solutions of possible challenges, expected technological facilities and teacher-learning assessment procedures (presented in Figure 8.2).

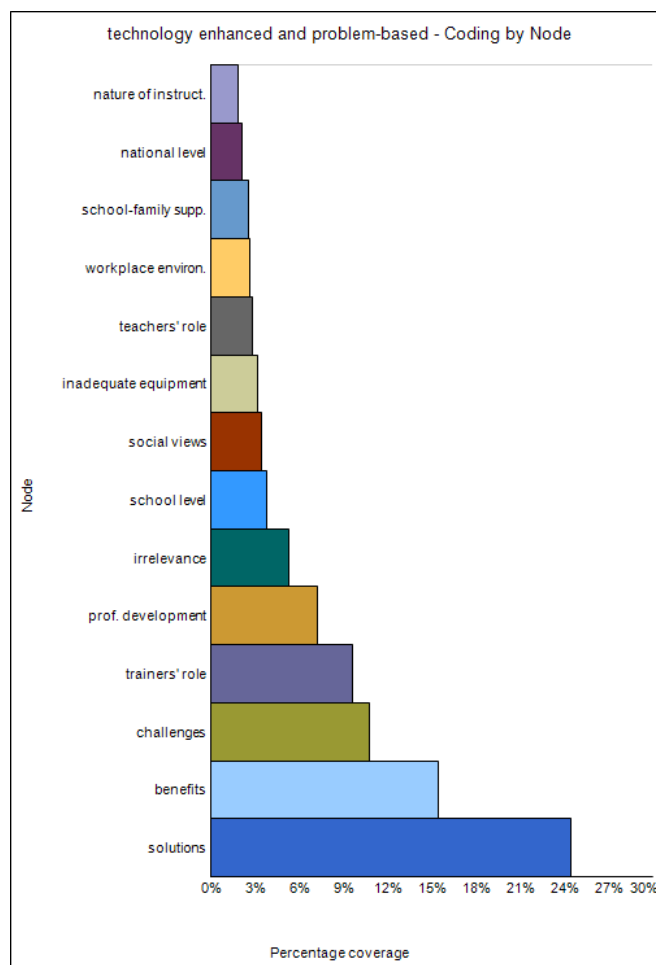


Figure 8.3: Day 2 discussion points (or sub-themes)

In day 2 our discussion time was 28 minutes and we discussed 14 issues on the technology enhanced and problem-based teacher-learning pedagogy. The coded data show that we conversed on fourteen issues namely workplace environment, school and family support for teacher-learning, trainers' role, teachers' role, professional development opportunity, irrelevance to professional practices, school level policy, national level policy, scope for extending social views, inadequate equipment in rural Bangladeshi schools, expected nature of instruction, and the befits, challenges and solutions of the technology enhanced and problem-based teacher-learning approaches (presented in Figure 8.3).

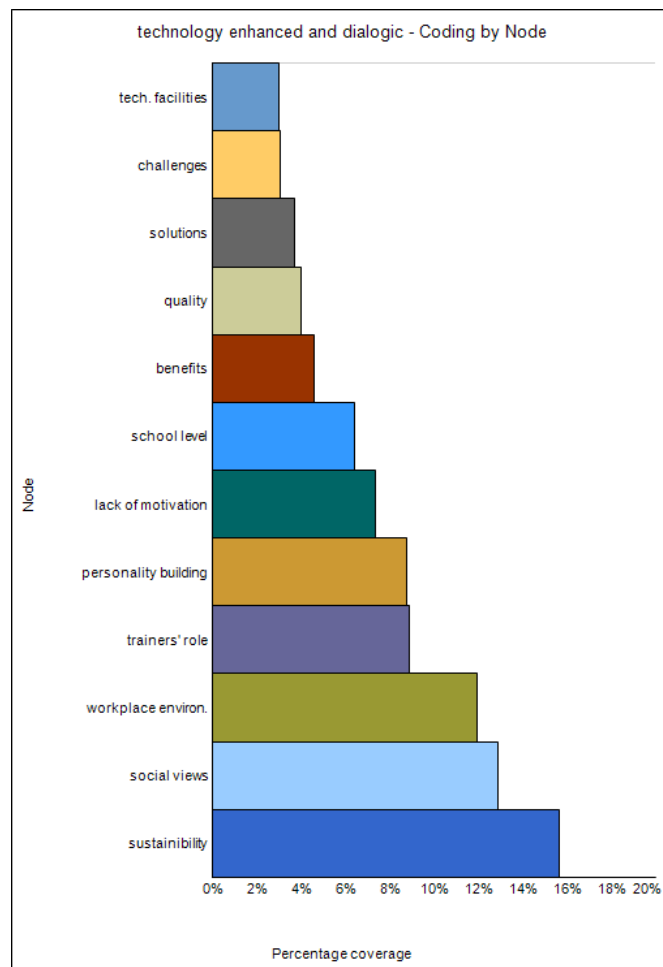


Figure 8.4: Day 3 discussion points (or sub-themes)

In day three we discussed for 38 minutes and covered twelve areas on the technology enhanced and dialogic teacher-learning pedagogy. The coded data show that the conversation points are the workplace environment, sustainability, technological facilities, scope for personality building, scope for extending social views, trainers' role, lack of motivation, school level policy, aspect of quality assurance, and the benefits, challenges and solutions of technology enhanced and dialogic teacher-learning approaches (presented in Figure 8.4).

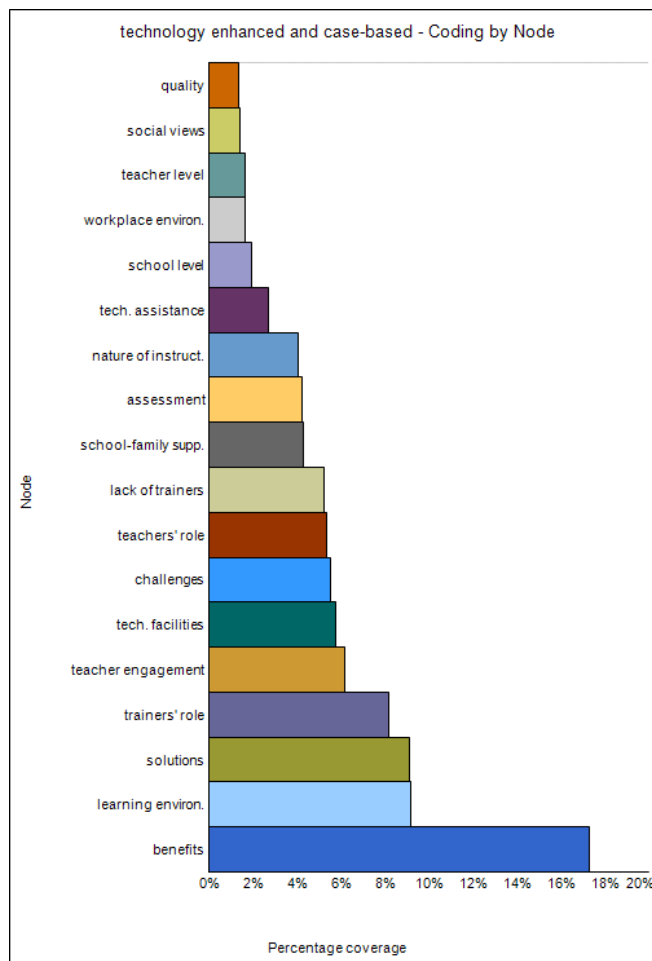


Figure 8.5: Day 4 discussion points (or sub-themes)

In day four we spent 36 minutes for discussion which, according to the coded data, covered eighteen conversation points on the technology enhanced and case-based teacher-learning pedagogy. The points are teacher engagement procedures, workplace condition, learning environment, school and family support for teacher-learning, trainers' role, teachers' role, school level policy, teacher level policy, technological facilities, lack of trainers, assessment procedures, scope for technological assistance, possibility for quality assurance, scope for extending social views, expected nature of instruction, and the benefits, challenges and solutions of the technology enhanced and case-based teacher-learning approaches (presented in Figure 8.5).

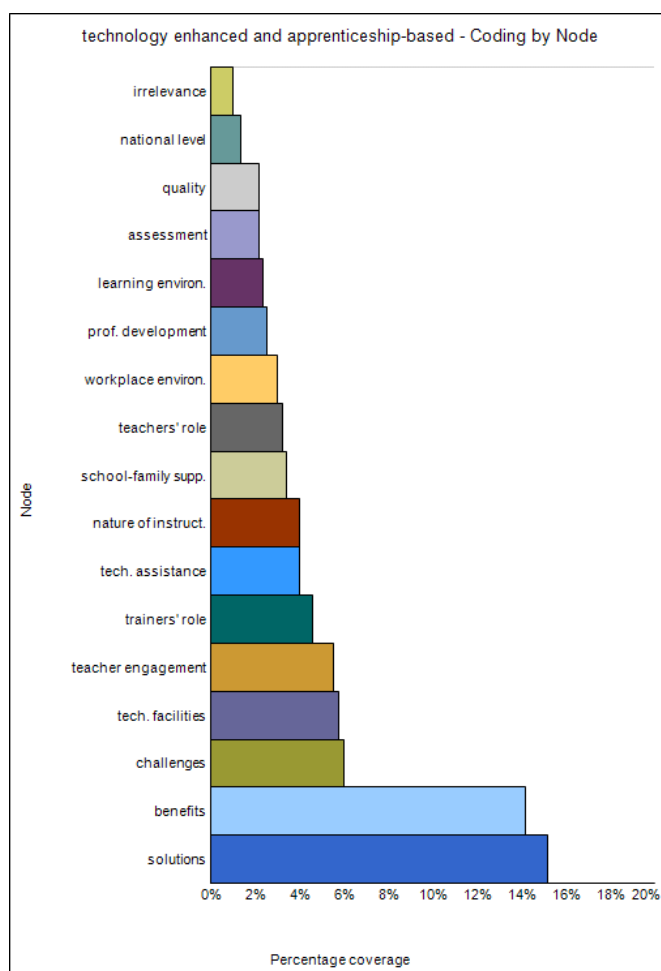


Figure 8.6: Day 5 discussion points (or sub-themes)

Day five discussion lasted 27 minutes and, according to the coded data, we discussed 17 aspects of the technology enhanced and apprenticeship-based teacher-learning pedagogy. The aspects are teacher engagement procedures, workplace condition, learning environment, school and family support for teacher-learning, trainers' role, teachers' role, national policy, technological facilities, professional development opportunities, assessment procedures, possibility of irrelevance to practical teaching practices, scope for technological assistance, possibility for quality assurance, expected nature of instruction, and the benefits, challenges and solutions of the technology enhanced and apprenticeship-based teacher-learning approaches (presented in Figure 8.6).

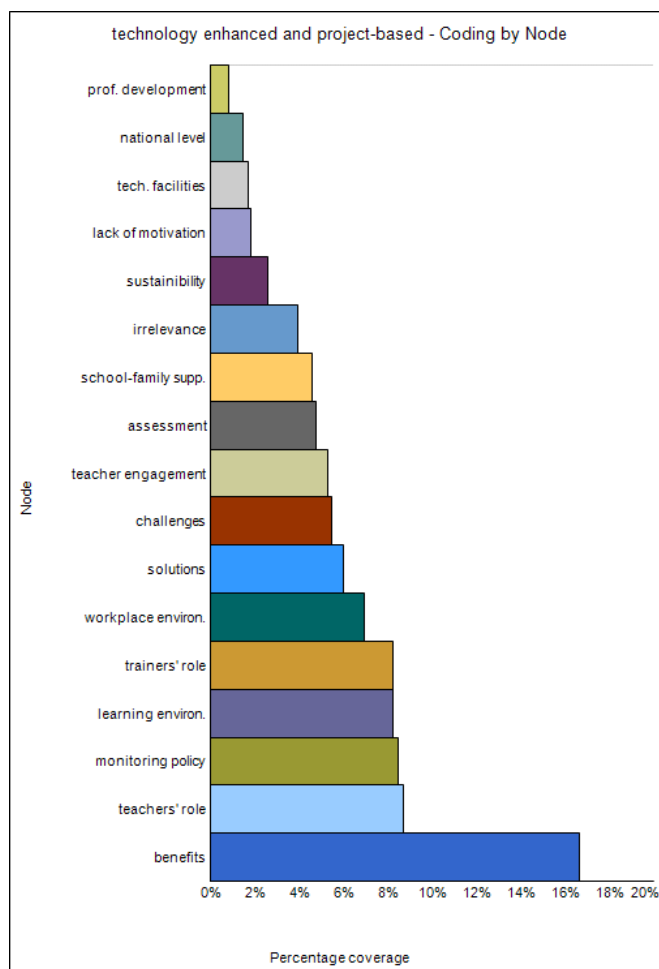


Figure 8.7: Day 6 discussion points (or sub-themes)

We spent 31 minutes in the sixth focus group discussion session and, according to the coded data, conversed on 17 aspects of the technology enhanced and project-based teacher-learning pedagogy namely teacher engagement procedures, workplace condition, learning environment, school and family support for teacher-learning, trainers' role, teachers' role, national policy, technological facilities, professional development opportunities, scope for sustainability, assessment procedures, possibility of irrelevance to practical teaching practices, monitoring policy, possibility of lack of motivation, and the benefits, challenges and solutions of the technology enhanced and apprenticeship-based teacher-learning approaches (presented in Figure 8.7).

8.5 Findings

From the transcripts of the discussion sessions I coded 26 conversation points (or sub-themes). These conversation points or the sub-themes provide the following seven themes (shown in Figure 8.8) on technology enhanced teacher-learning in rural Bangladesh namely workplace environment and professional development situations, the state of technological facilities, the potential benefits of technology enhanced teacher-learning, anticipated challenges, pedagogical suitability, operational policies and implementation procedures.

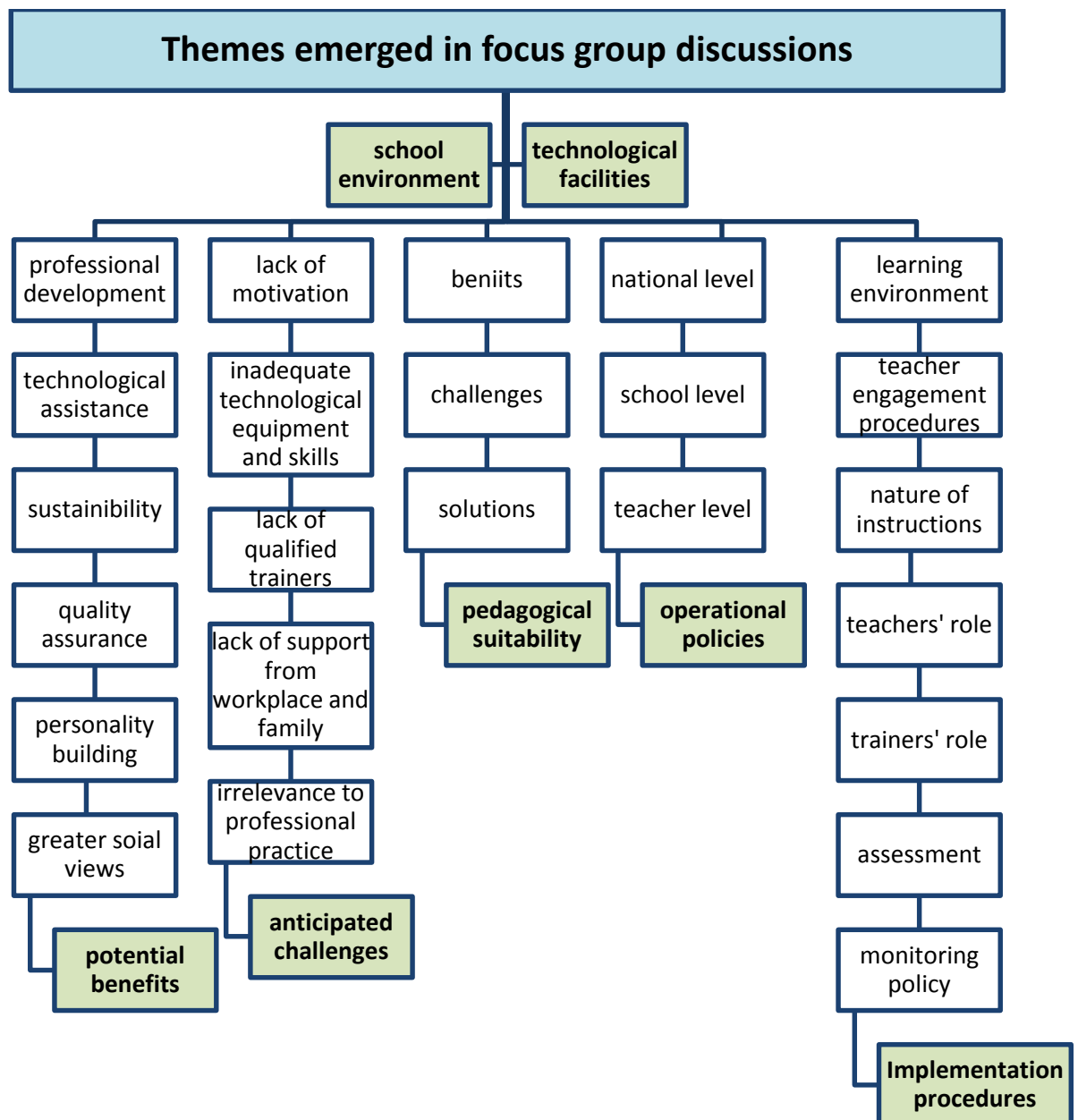


Figure 8.8: Themes and sub-themes of the focus group discussion

The themes and the sub-themes are reported below with references from the focus group discussion sessions.

8.5.1 School environment and professional development situations

The focus group discussion sessions provided useful data on the educational situations of rural Bangladeshi secondary schools and the existing teacher development facilities. Although the workplace environment was not the focus of our discussion, it emerged while we exchanged views on other major points including technology enhanced teacher-learning pedagogies and their operational procedures.

According to the participants' comments, secondary schools in rural Bangladesh are not financially stable (3HT1), teachers are low-paid (1HT2, 3ET1, 5TT) and the teaching is not properly monitored (5HT2). In these schools most of the English teachers' level of English language is poor (6ET2). Many of them are not properly trained for teaching and 'even do not have good communication skills' for any collaborative learning activities (6ET1). 6HT1 mentioned that rural school teachers have very limited scope to be creative and they often 'blindly follow the instructions of the teacher guide (provided by the government education department) or what they have learned from their colleagues (6HT1). 2HT1 described the lack of teacher development facilities and the applications of teacher-learning in the teaching in the following statement,

... here there is no facilities for teachers to learn and receive training during the whole year. They occasionally go for teacher training and come back after 10/15 days. I even do not know what they have done. However, I believe they learn many new methods of teaching, but I am not sure how much they apply in their class (2HT1).

While discussing different technology enhanced teacher-learning pedagogies 3HT1 mentioned that, it is difficult for the school authority to allow teachers to spend any free time within the school work hours and a quiet study room with computer facilities for professional development. In this regard 3HT1 added that,

... only computer cannot help us, we need a good study room for the teachers so that they can spend some time there and learn for professional development. It is however a matter of our government and the education department (3HT1).

In terms of teacher development practices in rural Bangladeshi schools and in the overall education culture 6ET1 said that collaborative learning activities are not practised here. He believed that in Bangladesh students and professionals generally learn individually and the concept of learning through discussion is not well known. 4ET1 mentioned that rural Bangladeshi school teachers 'suffer from poor communication skills in English, unavailability of time for professional development and many other social problems'. 3HT2, 4ET2 and 6ET1 pointed that the group-work moves smoothly while the participants are mixed in terms of gender, age and professional experiences. 4TT however opposed the opinion and mentioned that the success of group-work depends on how the activity is designed, how it is conducted and the quality of the group leader or the trainer. 3HT1 also provided the following suggestion how the participants should act in any collaborative learning activities.

Teachers should practise how to think a discussion topic like a knowledgeable person. They should be able to discuss logically and place their arguments with facts and evidence. Without knowledgeable discussion they cannot learn from each other ... (3HT1).

8.5.2 State of technological facilities

The focus group discussion data revealed that the availability of technological facilities for teacher-learning such as audio and video players, computer and the Internet are limited in rural schools of Bangladesh. Although some schools have recently received computers from the government education department, most of those 'have never been brought out from the packet' (5ET1). Many schools do not have any sufficient place for accommodating a computer lab (4ET1) and many schools do not have any efficient computer teacher who can look after the computers (4ET2). As the computers are not properly and regularly used, they become unworkable very easily (4HT1). 4ET2 in fact blamed the financial condition of the rural schools in this regard and mentioned that,

...it actually depends on the financial strength of the school. In my school I have three computers, but I know a school in my area which even do not have any spare room for keeping the computer, in fact they do not have any computer. In my school I have only few teachers, so I have no option but keep them busy in teaching, and I cannot provide any time or support for their professional development (4ET2).

The focus group participants also stated that most school teachers are not knowledgeable about technology (1ET2) and they do not know how to operate a computer properly (6ET1). In relation to this 6ET1 warned that without knowing the use of computer or the Internet, it will not be possible to participate in technology enhanced learning effectively by the rural Bangladeshi teachers.

The discussion data showed that the technology-enhanced teacher-learning is a very new approach which seems effective, but 'many teachers may not be interested to follow this approach as ... [learning by the use of technology] takes long time' (5ET1). The teachers will also need proper computer training so that they do not face problems while participating in this type of learning activity (5ET1). 5HT2 thought that in rural Bangladesh there is not sufficiently qualified trainers for this type of technology-based teacher development scheme. 5TT however mentioned the possible challenges of technology itself by the following statement.

I think, [technology enhanced teacher-learning] ... will be very easy method for our rural teachers, but the use of technology will be a great challenge. Suppose, the Skype discussion may not be always possible as the Internet speed is very low here. In rural areas there is no broadband facility, so how will one send long videos via the Internet? (5TT)

The lack of availability of the Internet, its high price and the need for high speed were mentioned by the focus group participants (for example, 4TT, 4HT2 and 5HT1 and 5TT) in the discussion.

Besides the limitations and challenges of technology enhanced teacher-learning in rural Bangladesh, the discussion participants also provided a number of suggestions to overcome those. According to 6ET2, teachers can be motivated for learning to use technology by observing how they can improve their

professional knowledge and skills by this approach and how they can later apply those in their teaching. 3ET1 said that teachers should be given the basic computer training and the use of the Internet, but the main focus should be on providing the opportunity to regularly practise and participate in professional and learning activities with technological devices. 3ET1 also considered that the school computer teachers, although they are often remain busy, can help in this matter.

8.5.3 Potential benefits of technology enhanced teacher-learning

The focus group participants mentioned six educational and professional areas of rural Bangladeshi teachers (shown in Figure 8.9) which they considered technology enhanced teacher-learning can improve. Their responses and opinions showed their positive attitude to technology-enhanced teacher-learning which partially answer most of the research questions of my thesis (discussed elaborately in Chapter 9). The benefits and their associated features are discussed below.



Figure 8.9: Potential benefits of technology enhanced teacher-learning

a) Professional development

The participants reported various benefits of technology enhanced teacher-learning, particularly in the area of English teachers' professional capacity building. According to 2ET1, the most important advantage of this type of teacher-learning is its ability to provide 'knowledge on general problems of teaching... [including] the problems the teachers face in other parts of the country'. Additionally, it can provide real life examples through audio-visual media (5ET1), create a platform for 'expressing personal ideas and solutions to tackle problems of the classroom and beyond' (2HT2). 6HT2 believed that reflections are effective to correct a teacher's failures and to avoid future mistakes. Regarding continuing teacher-learning approach 5ET2 said that it would allow 'step by step learning' which is effective for any long-term impact in teaching. The participants praised the idea of involving the experience in teacher-learning as, according to 2ET1, learning from one's own mistakes and receiving advice from colleagues would enhance the professional quality of rural Bangladeshi teachers of English. Another important aspect, reported by 2ET1, is that the approach can help maintain the national standard of curriculum and teaching by involving various teachers, teacher educators, policymakers and education experts together in teacher-learning activities.

b) Technological assistance

Technological assistance would provide advantages to technology enhanced teacher-learning in rural Bangladesh. With the help of technology teacher-learning activities would be 'text-based, audio only, or audio-visual' (4RF) which means they would have 'varied formats that cover varied types of information' (4TT). These learning materials would also attract teachers easily on any educational issues (4TT). The participants mentioned that by using technology the demonstrations and training would be recorded and be used by the teachers for several times which 'they can use for developing their knowledge and skills at their convenient time' (5ET1). This would also be helpful for many rural Bangladeshi teachers' professional practice and family life because traditional face to face meetings are often time consuming and expensive (5ET1). While teachers could learn through the use of technology they would also be able to apply their technological knowledge and skills to

teach their students through audio-visual and online applications (6ET2 and 1HT1).

c) Sustainability

Technology enhanced teacher-learning would be sustainable in rural Bangladesh for a number of reasons. In relation to dialogic pedagogy 3HT2 claimed that technology mediated discussions, reflections and dialogues are usable at all times and ‘for any aspects of professional development’ through diverse learning activities. Particularly for English teachers the approach can offer ongoing support in professional practices such as in lesson planning, in assessing students’ performances and in evaluating personal teaching quality (6HT1). According to 3ET1, technology supports various forms of teacher-learning such as writing and speaking, time-restricted and time-flexible formats. 3HT2 considered that the teacher development approach is inclusive in nature because it can involve all types of teachers who have different demographic identities, learning needs and preferences. Considering the long-term usability and continuing support facilities 3ET1 predicted that the drop-out rates would decrease in this approach because teachers would be able to enjoy the flexibility of the learning activities without hampering their personal and professional lives.

d) Quality assurance

Technology can help ensure the quality of teacher training and learning. As the number of effective teacher trainers is very limited in Bangladesh, ‘by using the Internet effective teaching demonstrations and conversations between a trainer and the teachers can be conducted’ (5TT). Learning in groups can also motivate for the participation of all. In this relation 4ET2 mentioned that ‘if we learn in groups, it becomes very easy, and we cannot avoid participating as we are always noticed by the other participants’. It was however suggested by 3ET2 that to ensure improved group work and enhanced synergy teachers should form groups with the participants having the similar professional capacities and interests. 3ET2 provided an example that, ‘if a female teacher does not feel comfortable having dialogues with male teachers she can join a group of all female teachers’ (3ET2).

e) Personality building

Technology enhanced collaborative discussion and other learning activities would provide opportunities ‘to express personal ideas and opinions very easily ... [and] if there is any wrong with the ideas, other can find out that and also discuss on that’ (3HT1). 3ET1 however warned that dialogues among teachers will require teamwork skills which is difficult to achieve but essential for effective teaching (3ET1). 3TT mentioned that teachers can discuss non-teaching related issues in group which would build their social awareness. According to him, this type of discussion can also develop English language skills and enhance teachers’ communication abilities.

f) Extending social views

... this approach can open opportunities for many things. When teachers share their experiences of problems they, I am sure, will not only talk about teaching but will also want to know the ways to develop their own skills. In our village some teachers even do not know what their deficiencies are. Yesterday, you said us about reflective [pedagogy] which can also be included in this type of teacher training style (2HT1).

The focus group participants claimed that technology-enhanced teacher-learning can help the English teachers of rural Bangladesh to broaden their views on society and people. The approach can build their awareness on various social issues such as ‘environment pollutions and the use of harmful medicine in foods’ (4ET1) and can enhance interpersonal communication skills (3HT1). According to 3ET2, if teachers discuss personal and social issues such as hobbies and travelling, their personal connection and friendship can easily grow. He however suggested that the discussion should be in English for the English language development of the English teachers. 3TT also had the similar view.

When our teachers will discuss together, they will share their individual problems and take help from each other, and will build a good sharing community. They can also make friends and do social activities together... (3TT)

3TT believed that if there are specific interest groups, teachers can find colleagues who are not only interested to teach in the same styles but have

some other common social interests which ‘can build friendship beyond professional relationship’.

8.5.4 Anticipated challenges

Apart from the benefits, the focus group participants also shared their views on the following five challenges (shown in Figure 8.10) of the technology enhanced teacher-learning in rural Bangladeshi schools.



Figure 8.10: Anticipated challenges of technology enhanced teacher-learning

a) Lack of motivation

Many rural Bangladeshi teachers of English may not have enough interest and motivation to participate in technology enhanced teacher-learning schemes. Age, experience and professional interest can be the reasons for this (1ET1, 1TT, 3ET2, 3HT1 and 6ET2).

According to 3ET2, some young teachers do not feel comfortable sharing professional issues with senior colleagues and some seniors do not encourage young teachers to argue and give opinions. The difference in age may

therefore cause obstruction to build professional relationship among teachers in the technology enhanced collaborative work. 1ET1 however emphasised the importance of including senior and experienced teachers in all technology enhanced teacher-learning community for the following reason.

It is very logical that experienced teachers will do better in [the technology enhanced] teacher development activity. They have rich experience and they can talk better. They are also good in giving advice (1ET1).

Conversely, 1TT mentioned that the young teachers can also share effective reflections and contribute positively in collaborative discussion and activities (1TT).

The focus group participants also said that the difference of the teachers' levels of experience, expertise and academic interests can create misunderstanding and debates in a collaborative teacher-learning activity (3HT1). 6ET2 supported this and mentioned that,

... working together is sometimes problematic. Different teachers will have different opinions, there will be conflicts and quarrels.... Managing group work will be very difficult for the teacher trainers (6ET2).

b) Inadequate technological equipment and problem solving skills

Focus group data revealed that technology enhanced teacher-learning in rural Bangladeshi schools will involve many technological applications in the process although a high number of rural Bangladeshi teachers do not have the basic technological knowledge and skills to use those (2TT). According to 2TT, this drawback may hinder the entire teacher-learning plans. Even if teachers receive training on information and communication technology, as they will be involved in teacher-learning during the whole year, on-going computer facilities and trouble-shooting support will be needed for them (2ET1).

c) Lack of qualified trainers

Trainer's quality is a major requirement for any effective technology enhanced teacher-learning schemes (4RF and 4HT2). While discussing the benefits of technology enhanced and case-based pedagogy 4HT1 mentioned why a qualified trainer is essential for effective teacher-learning.

Cases seem helpful to gain new ideas and problems, but I am worried who will help us in the discussion on issues about those, as you said discussion is very important for teacher development? I think, for reading or watching a case effectively and for discussing the learning points a trainer should take correct initiatives so that the teachers can actually learn... (4HT1).

Effective trainers have the practical understanding of their teachers' personal and professional backgrounds which help them link the teacher-learning activities to the real-life teaching of the teachers (4HT2). In this regard 1ET2 expressed the following concern.

... in my personal life I have seen some trainers who do not have any clear ideas about our schools and our teaching activities. I am worried whether they will be able to understand what we are reflecting and why we are doing so. They [the trainers] really need to understand our situations (1ET2).

Moreover, in technology enhanced teacher-learning schemes the role of the trainer will be different and they will require additional knowledge and skills to use information and communication technology for educational purposes (4TT and 4RF). In Bangladesh, particularly in rural areas, the number of this type of teacher trainer for English teachers is very limited (2TT, 2ET1 and 3HT1). Many of the trainers are even not qualified and well-trained (1ET2).

d) Lack of support from workplace and family

We cannot avoid our family or school matters. When I find my family members do not want me to leave my house for a [teacher] training, and when my school authority discourages me about this, I really do not feel motivated for any teacher training (2ET2)

In the focus group discussions the teachers mentioned a number of difficulties they face from their workplace, colleagues and family members for attending any teacher-learning programmes. The challenges were sadly expressed when 2HT2 said that 'in village schools problems have no limit', and 2ET1 voiced her grief by stating that 'problem is part of [their] life and profession'. 2TT also mentioned that 'teachers have many problems, but they do not know how to

solve those'. Although 5ET2 was convinced that the use of technology can help get advice and instructions from experienced trainers without travelling to distant training centres, he warned that there are many teachers in rural Bangladesh who will not feel that the use of technology for teacher-learning activities such as conversations and professional inquiries is comfortable. In this regard he gave the example of his recent online conversation (via Skype) with the UK professors in the day four hands-on practice session where he and the participants could not speak well because of the lack of experience and practice.

The head teachers agreed that sometimes their English teachers learn new approaches of English teaching and want to implement those in the class, but the school authority does not allow them to do it because of the pressure to complete the academic syllabus (4HT2). 4HT2 however agreed that the local education office wants his teachers to be involved regularly in the professional development activities (4HT2).

6HT1 also said that the school authority is unable to give the teachers adequate free time for their personal studies. He mentioned that they have no alternative as in village schools the number of teachers is low and only one or two have to take English in eight to ten sections every day. In this situation technology enhanced teacher-learning approaches will be difficult to implement as they generally take long time and require regular communication with other teachers (6TT). Additionally, most of the rural schools do not have any study room for teachers and the 'common room' where all teachers spend their breaks is 'always busy and noisy' (6ET1).

e) Irrelevance to professional practice

The participants (such as 2ET1, 5HT2 and 6ET2) of focus group discussions expressed their confusion and concern about the application of knowledge and skills gained from teacher-learning in real life teaching. 2ET1 recalled her previous teacher training experiences and said that through training teachers can find the solutions of many professional problems, but many of those may not be possible to apply in the classroom for lack of resources and support from the school authority. By referring to the project-based teacher-learning activities 6ET2 also reflected a similar opinion and showed his concern regarding the applications of the learning in practical teaching. 6TT however

suggested that, if the teachers learn new styles and activities of effective teaching, they can try to tailor those to fit in their classes.

In terms of group formation and collaborative learning activities 2ET2 mentioned the need to involve the teachers who teach the same subject. According to him, this can ensure the relevance during the discussion and opinion sharing. In this regard he also stated that,

Our problem is that we have various types of profession related challenge. Look, we have to teach many subjects. For example, I take English classes of VII and VIII, and also take mathematics of class VII. Now I should discuss my problems of English teaching with the teachers who teach English... (2ET2).

8.5.5 Pedagogical suitability

In the focus group discussion sessions the participants shared their views on the six technology enhanced pedagogical approaches namely reflection-based, problem-based, dialogic, case-based, apprenticeship-based and project-based pedagogies for teacher-learning. The discussion data provided the following advantageous and challenging features of the pedagogies along with a number of useful solutions.

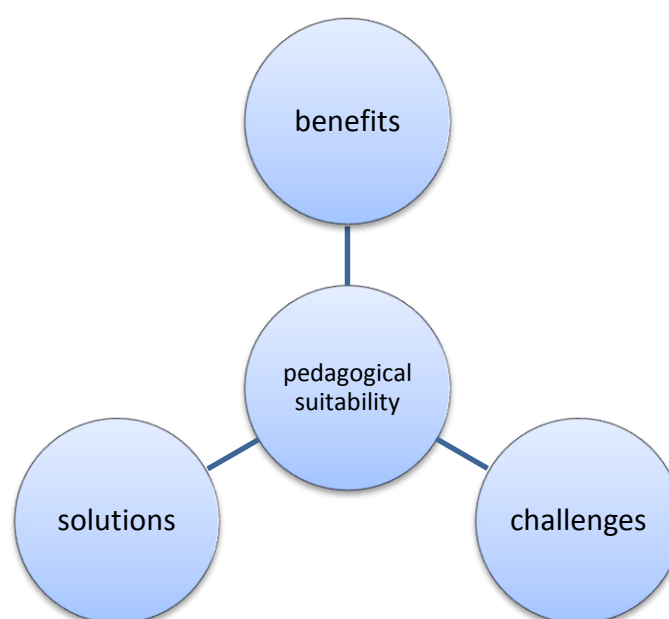


Figure 8.11: Pedagogical suitability

8.5.5.1 Pedagogical benefits

The focus group participants mentioned the following advantages of the technology enhanced teacher-learning pedagogies for the rural Bangladeshi secondary teachers of English.

a) Understanding content knowledge

Technology enhanced teacher-learning pedagogies can successfully provide the knowledge of content that the English teachers teach to their students.

Through problem-based teacher-learning teachers can work on various problems of teaching lessons of the text book which may consequently provide them with the required knowledge of the content along with ideas about their effective teaching techniques (2ET2). Reflections and experience sharing with knowledgeable and expert teachers can also provide effective understanding over the techniques for teaching and learning contents (1ET2). Similarly, cases can be easy and effective sources of information for the English teachers of rural Bangladesh (4TT). According to 4TT,

Cases are easily understandable because they explain a story. If the case is a film then it is easier even. They can be the very good sources for discussion and debate (4TT).

Cases not only increase the knowledge about the teaching profession, they can help improve the teachers' English reading and analytical skills (4ET2). 4ET1 said that cases may also include interesting topics which can help improve the personal development of the teachers (4ET1). 4HT1 described this through the following statement.

... we have to have good knowledge on various social and cultural issues. We will feel more about our people, our students, local community and religious groups if we observe relevant cases... (4ET1).

b) Practical experience gaining

Technology enhanced teacher-learning is suitable for rural Bangladeshi teachers of English to gain experience of effective teaching techniques and activities. For example, through apprenticeship-based teacher-learning teachers can get the chance to observe demonstrations and practical performances by model teaching (5ET2). Then, through project-based

professional activities participating teachers experience various learning processes and receive guidelines to apply the same in the teaching (6ET2). 1HT1 mentioned that in reflection-based teacher-learning teachers can share their experiences of dealing with various real professional problems and learn from each other. Dialogic pedagogy can also serve the similar benefits (3TT).

c) Scope for observation

The focus group participants stated that technology enhanced teacher-learning pedagogies can provide opportunities to observe teaching and learning practices. The observation can be both synchronous and asynchronous (2RF). 5TT explained the benefits of the observation by the following statement.

... I think when a teacher observes how an experienced trainer conducts a session or shows different teaching activities, he/she gets confidence about the learning. This is not the learning by reading or by listening to a lecture from a trainer, this is through experiencing the applications. This must be helpful for them (5TT).

4ET2 considered that video cases can be helpful for observing teaching styles particularly how instructions are given in English and how to manage a large class. According to this teacher, 'we can watch a good English lesson carefully and try to follow that in our English classes' (4ET2).

d) Scope for imitating

...learning by imitating can help perform well in teaching. This is an easy way to learn while witnessing how to teach properly (5ET1)

In technology enhanced teacher-learning pedagogies teachers get the opportunity to imitate models of teaching or good teaching practices. Imitation can be done with lesson instructions, vocabulary teaching techniques, explanations of any content, and feedback giving techniques (5HT1 and 5TT). As imitating can be effective when they are done repeatedly, audio-visual equipment (such as audio player, DVD and computer) can help observe any teaching/learning material as many time as the learner wants. Moreover, by using various Internet programmes such as Skype or Zoom learners can do observations and imitations from remote places (5RF).

e) Professional guidance

Teachers, particularly the trainee teachers, need professional guidance for performing well as teachers. For example, they require strategies for teaching and also for developing their professional capacity including personal knowledge and interpersonal skills (4ET1). Problem-based pedagogy can focus on these areas (2ET2). Regular conversations and reflections among teachers can also be the tool for teacher trainers to provide necessary guidance (3HT1). The focus group participants believed that the trainers have the critical role in providing guidelines to teachers (3HT1 and 5ET2) which should be the part of apprenticeship-based (5ET1) and project-based teacher-learning (6ET1).

f) Learning through examples

Technology enhanced teacher-learning can provide various examples of effective teaching/ learning practices. For the teachers of English these may include 'how to teach reading skills, how to check examination scripts and how to give instructions properly' (5ET1). The apprenticeship-based teacher-learning is mainly example driven (5HT2) and multimedia cases are able to demonstrate practical examples of teaching practices (5ET1).

g) Scope for collaboration and sharing

One of the most important benefits of the technology enhanced teacher-learning pedagogies is their facility for sharing experiences and opinions (6TT). In this approach problems can be solved in groups from distant places (for example, via online) and trainers can also provide guidelines remotely (2TT). 6TT described the benefits of technology enhanced collaborative activities through the following statement.

I see [technology enhanced collaborative activities] very effective as the teachers learn profession related things through collaborative work. This is similar to the ways the students learn. This not only helps solve professional problems, but teachers can also realise what problems their students face while learning and how they should overcome those (6TT).

According to 2HT1, the approach, particularly in project-based activities, provides the participating teachers with valuable experiences of teamwork which is essential for classroom teaching. In apprenticeship-based teacher-

learning the trainee teachers and the expert trainer work together and 'build the professional friendship' while discussing problems and demonstrating teaching skills to each other (5ET1). Similarly, in problem-based teacher-learning 'different teachers can provide different solutions of a particular teaching related problem and compare those to choose any effective one for using in their teaching' (2HT2).

h) Improving problem solving capacity

Technology enhanced teacher-learning pedagogies can provide opportunities to solve various profession-related problems of the teachers of English of rural Bangladesh. By referring to the case-based pedagogy 4ET1 mentioned that the approach can provide various problems of education through which teachers 'will learn new issues of teaching methods and the ways to handle the teaching related problems'. If the problems are real then teachers easily become interested to deal with those and to find solutions (2TT). 2TT added that 'if they work in groups and share their ideas, their learning will not be difficult, they can learn through socialisation and fun'.

2HT1 stated that if teachers know the solutions of their [profession related] problems they become confident in their teaching. 2HT1 explained this further:

This is the fact that many of our teachers are afraid of making mistakes or facing challenges while teaching.... If they know the solutions [of the problems] they will feel confident and fear free (2HT1).

According to 2ET2, 'backdated problems sometimes are not problems at all in the present time'. In problem-based learning activities teachers can discuss new issues and solve contemporary teaching/ learning problems which are the key requirements for any up-to-date teacher-learning schemes (2ET2). 6TT stated the following expectations about problem-solving components of the project-based teacher-learning.

I hope project-based teacher training will not only teach teachers how to overcome some of their professional difficulties, but also will help them understand how they can plan for future learning and problem solving.

The success of this approach is that, the teachers become self-reliant in developing their [professional] skills and knowledge (6TT).

i) Standardisation

Technology enhanced teacher-learning pedagogy can connect the policy makers, educational institutions and teachers across Bangladesh. This linking can ensure the balance of educational systems and achievements among the urban and rural schools (2HT2). 4ET2 showed his concern that the government of the country has set the national standard of education which many teachers are not well aware of. She suggested that the teachers can learn about the learning environment and the teaching of the high achieving schools and the teachers by various real cases and video documentaries which, according to 4ET1, is not possible through evaluating the students' test results only.

j) Scope for discussion

The use of technology can provide ample opportunities for discussion, arguments and idea sharing. A dialogic approach of teacher-learning is purely discussion-based which allows teachers to share various concepts and ideas of teaching and learning (3HT2). This type of discussion and sharing are essential for teachers as through these they can share their teaching/ learning related problems, think about teaching styles, take advice from senior teachers, and can give advice if someone needs (3ET1).

k) Opportunity for step-by-step learning

Technology enhanced teacher-learning pedagogies can provide step-by-step learning opportunities. By giving the example of project-based teacher-learning 6HT2 explained the step-by-step systematic teacher-learning in the following statement.

Project is not only for learning something, like from book or from a training. Here, in every stage, teachers will learn something, and of course will face problems also. There should be a teacher trainer who will look after the teachers and help when they need. If teachers face any problems while doing the project, and if there is no one to help them then there will be severe difficulties. The teachers will be greatly disappointed in those situations ... (6HT2).

3HT1 suggested that in the dialogic pedagogy the discussion topics should be ordered systematically so that the teachers start with simple conversations and in the later part are engaged in critical arguments and reflections.

l) Scope for continuous learning

‘Learning for teachers never ends, every day new problems arise’ (1ET1). By using technology teacher-learning activities can be made continuous and connected. New cases can be provided to teachers to make them familiar with the new concepts and procedures of teaching and learning (4TT). Similarly, dialogues, reflections and discussion can be included in the ongoing teacher-learning procedures (1HT2 and 3ET2).

m) Improving decision making skills

Technology enhanced teacher-learning can help the English teachers of rural Bangladesh take practical and effective decisions on teaching and learning issues. For example, project-based teacher-learning can be effective for teachers to think and make plans for solving teaching related problems (6HT1). ‘This thinking is important as many teachers do not know why they are following a particular teaching method’ (6HT1). 6ET2 reported that the English teachers of rural Bangladeshi schools often cannot take decisions about what to do and what not to do in teaching. Therefore, 6ET2 continued, project-based activities can prepare them to take right and timely professional decisions.

n) Confidence building

Technology enhanced teacher-learning pedagogies can build the confidence of the rural English teachers of Bangladesh in professional learning and while implementing the learning in teaching practices and communicating with others in the workplace or in the society (1ET2 and 3HT1). By referring to the project-based teacher-learning pedagogy 6HT1 explained this issue further by the following comment.

When teachers will be given a project and provided with the help and guidelines I am sure they will be very confident in dealing with the task. If they do their task successfully, that will be a great recognition for them. They will know that they can do a professional task successfully (6HT1).

o) Scope for reinforcement

The use of technology can offer the opportunity to observe and practise any teacher-learning activities repeatedly. For example, in the apprenticeship-based teacher-learning pedagogy by using recorded videos teachers can observe the trainers' teaching styles and techniques again and again (5HT2). They can do the similar type of activity by using video cases (4ET2). Besides, in dialogic pedagogy they can repeat any previous discussion topics and add new conversation points for gaining further information (3HT1).

p) Features for sustainable learning

A significant benefit of technology enhanced teacher-learning pedagogies is that the activities are flexible to be chosen by participating teachers and teacher trainers (2HT1) and the content can be upgraded easily (4RF). By referring to the problem-based teacher-learning pedagogy 2TT mentioned that 'there is an enormous volume of teaching related problems in Bangladesh so, as trainers we will never face difficulties in finding training content and teachers will never feel bored as they can always deal with the new problems'. 2TT however warned that making the content interesting and suitable in teacher-learning may not be very easy. As the technology (such as the Internet and mobile phones) can keep teachers and teacher trainers constantly connected, the teachers can get help and advice whenever required and partake in assessment activities at convenient times and from distant places (3HT1). This facility can also help sustain the technology enhanced teacher-learning pedagogies.

8.5.5.2 Pedagogical challenges

The focus group data revealed the following challenges of the technology enhanced teacher-learning pedagogies.

a) Difficulties in achieving learning objectives

Because of the flexible and collaborative nature of technology enhanced teacher-learning approaches, setting the learning objectives and achieving those within the set time will be challenging in rural Bangladesh (5HT2 and 2TT). Keeping the focus on the objectives and ensuring relevance while conducting teacher-learning activities also seem to be difficult for the trainers

(2TT). Additionally, the trainers will require to understand the professional needs of the teachers and their preferred learning approaches (5HT2).

b) Lack of qualified teacher trainers

As technology enhanced teacher-learning is a new approach in Bangladesh, finding sufficient qualified trainers will be difficult at the initial stage (4HT1). Trainers will have to be efficient in using technology especially in teacher-learning activities (4ET1). Additionally, they will be required to be familiar with the educational context of rural Bangladesh and the state of the teachers working there (4HT2). While giving the example of technology enhanced and case-based teacher-learning approach 4HT2 stated that,

Trainer's quality is a big question. If a trainer does not link the cases with our practical teaching, then what is the use of reading these cases? Many teacher trainers even do not try to understand our school situations (4HT2).

c) Teachers' lack of experience

Technology enhanced teacher-learning pedagogies, particularly the reflective and dialogic ones, require reflections and discussions among the participating teachers (1ET1 and 3HT1). Without relevant experience it will be difficult for rural Bangladeshi teachers to contribute effectively in the teacher-learning schemes (3HT1). Referring to the apprenticeship-based pedagogy 5HT2 questioned 'if a teacher has no English teaching experience, how he/she will understand good teaching or bad teaching just by following a good teacher?'

d) Age and experience gap

Teachers of different ages and experiences may have different levels of professional knowledge (2HT1). Besides, they may possess different attitudes and behaviours which can cause the imbalance in the discussion and collaboration, and ultimately result in debates and conflicts (3HT2). 3HT2 however believed that the young and inexperienced teachers can learn many useful professional strategies from their senior teachers through collaborative learning activities.

e) Need for critical thinking ability

Effective group-work, collaboration and discussion need strong analysis and opinions from the teachers participating in technology enhanced teacher-learning schemes (2TT). In this relation 3HT2 questioned, ‘without the in-depth understanding about the objectives of activities how will [the teachers] gain professional learning effectively and make their proper use in teaching?’ 3TT also gave the following example.

[Dialogic] approach requires the higher ability to analyse complex situations. There may be some problems even the teachers have no ideas at all. If the teachers are not experienced, it will be very difficult for them to effectively participate and learn. I think, young teachers will face problems in this type of activities more (3TT).

f) Fear and hesitation

2HT2 anticipated that many rural Bangladeshi teachers, particularly the female teachers, will hesitate to participate in collaborative and reflective discussion. Lack of communication abilities in English, and technological knowledge and skills will also cause fear among many teachers (5HT1, 5ET2).

g) Lack of motivation and commitment

Technology enhanced teacher-learning may become difficult and demotivating for the participating teachers for a number of reasons. First of all, many rural Bangladeshi teachers are not committed to self-development as they do not face any internal motivation or any pressure from their workplace or the government’s education departments (2ET1). Secondly, learning to use technology for professional development seems time consuming which may cause demotivation (6ET2). Referring to the technology enhanced and project-based pedagogy 6ET1 mentioned that,

... I am afraid that we are so busy in school and in our private time, how will we be able to find time to meet other teachers and work with them in any professional learning projects? (6ET1)

6ET1 added that, if there is the lack of technological facilities and teacher-learning guidelines, there will be high drop-out in this type of scheme.

h) Lengthy time for learning

Time can be a challenging factor for the technology enhanced teacher-learning pedagogies. By giving the example of case-based pedagogy 4ET1 stated that,

... additional time is needed for the case-based training... I think, a case can be discussed day after day for full understanding ... [and also for] gaining the learning of many aspects (4ET1).

2HT2 expressed his concern that problem-based activities are time consuming, and if any complicated problem arises, more time is required (2HT2). 6HT2 anticipated that the project-based teacher-learning activities will take comparatively longer time. These activities will have several stages and in each stage the participating teachers and the trainers will have to be engaged in discussion, reflection and performances (6HT2).

i) Absence of independent study

4HT1 warned that if technology enhanced pedagogies contain collaborative activities and group work only, the participating teachers may not be encouraged to study independently and in their own time. Personal study is required for improving the thinking ability and the reading skills for knowledge gaining (4ET2 and 6ET1).

j) Impact monitoring

Monitoring the learning activities of participants by trainers from distant places will require high technological efficiency and observation skills (2TT). The major difficulty will be that sometimes some teachers will not participate well as they will not understand many things (2TT). Receiving the feedback on the applications of learning from the teachers and following up their performances in the workplace will also be difficult for the trainers (5ET1).

8.5.5.3 Solutions

In the focus group discussion sessions the participants provided the following solutions for overcoming the challenges of the technology enhanced teacher-learning approaches in rural Bangladesh.

a) Pre-training level assessment

Before sharing a technology enhanced teacher-learning programme it is important for the teacher trainer and the trainees to become familiar with the levels of relevant knowledge and skills of the participants (1HT2). During the training period the teacher trainer should also know what the trainee teachers are learning and how they are implementing the learning in their teaching (5TT). In fact, 'observations of the teaching of the teachers can be the effective way to evaluate their learning' (5TT).

b) Access to technological facilities and training

In any technology enhanced teacher-learning programmes the trainee teachers and teacher trainers should have regular access to the information and communication technology such as a computer, required software and the Internet (4TT). The speed of the Internet in Bangladesh is not adequately fast and in the rural areas there is no broadband facility. Therefore, instead of using the Internet, videos (which require fast Internet speed for downloading) on cases and documentaries can be sent to the trainee teachers via CDs or portable hard drives (4RF and 4TT).

c) Integration of multiple approaches

The amalgamation of multiple pedagogical approaches in technology enhanced teacher-learning can be benefiting for achieving the maximum success.

According to 2ET1,

As problems in teaching profession are diverse, the training should be diverse. Training on problems of managing English classes should not be similar to the training on teaching grammar. There should be different activities for different learning objectives (2ET1).

Even, one pedagogical approach may include other pedagogical approaches such as dialogic pedagogy should involve reflective component (6ET1, 5HT2). Moreover, a 'pedagogical problem may have different solutions, but all solutions may not work everywhere, and sometimes, teachers know the solutions, but cannot apply in their teaching' (3HT1).

d) Clear guidelines

Guidelines on participation, assessment and feedback should be provided in technology enhanced teacher-learning pedagogies. For example, in apprenticeship-based teacher-learning programmes guidance on observation techniques should be provided (5ET2). Similarly, rules of demonstration and conversation should be provided in advance which will make the teacher-learning more meaningful (5TT). Besides, '[guidelines] can be supplied on time management, ways to arrange interesting activities and teaching textbooks' (5TT). 5ET1 provided the following principles of setting guidelines for trainee teachers:

[The guidelines]... should be based on the trainee teachers' professional needs. If they are taught something they do not need, than this type of training will not work. First, the trainers should know what the teachers should know, and how those things can be taught to them (5ET1).

e) Dynamic teacher trainers

The discussion participants emphasised the need for efficient trainers in technology enhanced teacher-learning activities. 4HT2 explained the importance of the dynamic roles of trainers by stating that,

....this type of training is new, so our teachers will miss many learning points and face many challenges. We are also talking about a continuing training system where I think the trainer should also be available all the time. Besides, the trainers will stay in remote places, so they should know how to handle the teachers and train them effectively from distant locations... (4HT2).

They also suggested that the trainers should have the clear understanding about the backgrounds of the teachers (2ET1), patience and sympathy to technologically and professionally weak participants and willingness to visit rural schools to oversee the real situations (4HT2).

f) Focus to syllabus and curriculum

The focus group participants suggested to design technology enhanced teacher-learning schemes according to educational aims and objectives set by

the government and education ministry of Bangladesh. 6ET2 said that ‘choosing [of teacher-learning] content should be practical, and if it is relevant and important, teachers become interested to participate’. 6HT1 mentioned that, if any teacher-learning activity is irrelevant and complicated, teachers fail to be motivated in terms of involving their time and labour. By referring to apprenticeship-based teacher-learning approach 5ET2 stated that this type of pedagogy should be based on the current syllabus of English and the methods of teaching suggested by the curriculum. He also mentioned that any teacher-learning schemes may have different stages or levels according to the participating teachers’ capacity and professional needs (5ET2).

g) Enhancing participation

The basic principle of technology enhanced teacher-learning approaches for the rural Bangladeshi teachers of English should be to increase their participation in teacher-learning schemes. Teachers need to be very active and participative in the training and learning sessions (6TT). They should be engaged in preparing action plans for their work and in the implementation phases (6HT2). Additionally, they should work together to achieve the goals they set in advance (6HT2).

h) Encouraging reflections

Reflections can greatly improve English teaching skills and professional knowledge (1RF and 1ET1). Reflections can be based on any discussion or activity or any learning of an expert teacher (5HT1). While reflecting teachers practise English which can improve their communication skills (2ET1).

Regular practice in group is needed for the effective reflections and sharing those with others (3ET2). It is also important to ensure that the teachers are reflecting on professional issues and they are familiar with the problems (1ET1 and 3ET2). Besides, there should be an environment of discussion [teaching and learning related] which is greatly missing in rural Bangladeshi schools, and ‘teachers here do not try to solve problems together’ (2ET1).

i) Balancing individual learning, group-work and collaboration

For improving professional knowledge and skills the teachers of English should work both individually and in groups. ‘They have to learn individually as they

teach individually, and if they work in group all the time, some may never participate and learn anything' (2HT1). However, for gaining enhanced motivation, balanced discussion and proper understanding of teacher-learning activities teachers should learn and share their ideas together (3HT1).

Groups can be formed with the teachers having similar experiences, teaching interests and problems (2ET1). 2ET2 however opposed this idea and argued that teachers having limited experience can also contribute effectively by asking intelligent questions and through mentioning new educational problems. 2HT2 suggested that, it is beneficial to involve some senior and experienced English teachers in each learning-group who can provide practical solutions of teaching/ learning problems (2HT2). According to 3ET2, collaboration will be effective if the participants have similar learning interests and objectives.

j) Repetition and reinforcement

There should be adequate scope and facilities for the trainers and teachers of English to repeat any previous lessons which will reduce confusions and lack of understanding about any teacher-learning activities (4HT1). It is also important for a trainer to check the learning of the trainee teachers regularly (5HT2).

k) Active participation of school authority and education departments

Without involving the school authority and the officials of education departments of Bangladesh the impact of teacher training will be minimum' (5HT1). 4TT recommended the approach below involving head teachers in the technology enhanced and case-based teacher-learning pedagogy.

The teachers can write reports on their understanding about the cases to the teacher trainer. I find that informing the head teacher about this or showing him/her the report can be helpful. In this way the head teacher will be able to follow what his/her English teacher is learning (4TT).

The education experts and the government education officials of the country should also be involved and regularly communicated in the process as they 'decide and monitor the government's [educational] policies' (2TT).

l) English as working language

Technology enhanced teacher-learning activities should be mainly conducted in English language and the trainee teachers should try to communicate in English during their participation (1ET2 and 4ET1). This will ensure their practice of the language they teach to their students, and will enhance their professional confidence (4ET2). However, the use of the mother tongue can be considered in some situations such as discussions on classroom management procedures or teaching strategies where the concepts are important to be properly understood by the teachers (2TT). In this regard, based on English language efficiencies, there can be separate learning-groups such as one where the teachers must speak in English and another where they can speak both in English and in Bangla (2ET1).

m) On-going nature of teacher-learning

It is important to ensure that technology enhanced teacher-learning is available to the rural Bangladeshi teachers and is able to provide teacher-learning facilities continually (3HT1). ‘Teachers do not need to take a leave from their work to attend this type of training’, so there should not be any problem to run any on-going teacher-learning facilities for them (5TT). The schemes should also provide step-by-step learning to the participants. 2ET2 explained this further by mentioning the problem-based teacher-learning approach.

In problem-based learning there should be many parts: understanding problems, understanding solutions and also the learning about how to apply those solutions in teaching. These discussions and learning should be connected and done together. Otherwise many teachers will not understand properly (2ET2).

n) Efficient time management

Technology enhanced teacher-learning activities can be time consuming for many participating teachers. Teachers of rural Bangladeshi schools may initially require a long time to learn to operate technological equipment and also when participating in any teacher-learning activities (2HT2). It is therefore important to allocate sufficient time to these teachers to learn, practise and perform comfortably in such activities (2HT1).

o) Trust and respect

Trust and respect are two key requirements for the success of technology enhanced teacher-learning pedagogies. Here teachers and teacher-trainers, of different ages and experiences, are connected from distant locations to work and learn together which requires a respectful and understanding learning environment (4TT). Collaboration or group activities are basically the team work where teachers need to share reflections to find solutions of the problems of professional practices (1ET1). While sharing and reflecting ideas and opinions in this type of activity participants should be patient and tolerant to their co-learners (1ET1).

p) Constant monitoring and evaluation

Technology can help monitor the participating teachers' performances in regular basis. According to 4ET1, teachers can assess the work of their co-learners, freely share their understanding with them and discuss the issues they think important (4ET1). 6TT suggested that there should be the record of the participants' performances (for example, their use of Blackboard material or participation in conversations or group work). 4ET1 thought that there should be a system in the technology enhanced teacher-learning schemes where every participating teachers receive the evaluation of their performances and get feedback for further development.

8.5.6 Operational policies

The focus group participants suggested a number of policies for the effective implementation of technology enhanced teacher-learning schemes. These are categorised and reported under the following three levels.

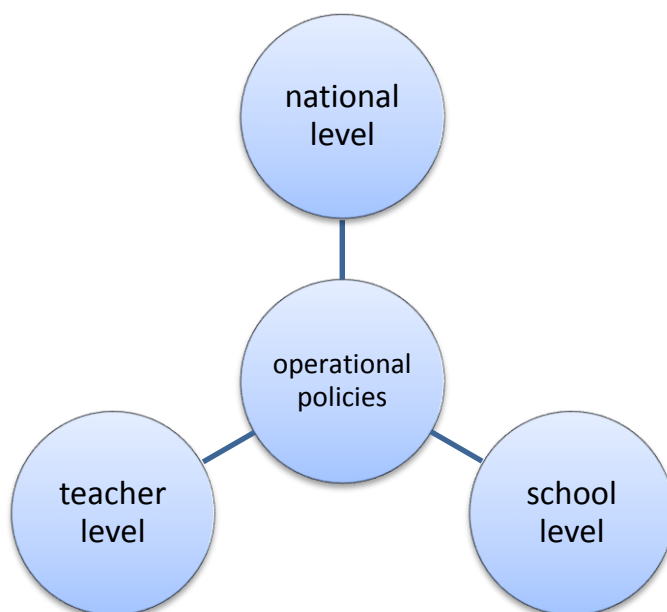


Figure 8.12: Operational policies

a) National level

Firstly, the Bangladesh government should ensure that there is a proper information and communication infrastructure so that rural Bangladeshi teachers and trainers remain connected for the professional learning (5TT). Considering the 'geographic locations of the rural areas and the weather and flood situations' alternative technological facilities should also be provided (5ET2). Secondly, there should be proper guidelines about the responsibilities of teachers while receiving teacher-learning and these should be monitored by the government's educational departments (2HT1). Moreover, there should be clear policies to include women and vulnerable teachers of rural schools in the teacher-learning schemes (6HT1).

b) School level

The school authority (including the school management committee members) should provide their teachers with adequate time and motivation for taking part in teacher-learning activities (3ET2). 4HT1 said to 4HT2 (who is a head teacher) that,

... you cannot ignore your role Sir. If you keep your teachers busy in taking classes all the time, what can these poor fellows do? You have to give them enough opportunity for their personal development (4HT1)

At the same time, the head teachers should be involved in monitoring the teaching performances of their teachers and give feedback on how the teacher-learning can be implemented properly (2TT). It will also be effective if the head teachers sometimes attend the technology enhanced teacher-learning sessions as guests to see what their teachers are doing (3TT). They should regularly evaluate what their teachers know and what they need to know (2HT1). They should also know who are connected to their teachers in the teacher-learning programme (3HT2). According to 3HT2,

They should sometime ask teachers to share what they have discussed and what they have learned from the [technology enhanced teacher-learning] activities (3HT2).

Moreover, the school authority can also form a network of a few schools where the teachers teaching the same subjects can create learning-groups (3HT2).

c) Teacher level

Teachers will play the main role in any technology enhanced teacher-learning scheme in rural Bangladesh. They should gain the proper knowledge and skills to begin learning in any technology supported teacher-learning environment (5ET2). They should also remain connected to their learning-group (4ET1). For the effective participation and productive contribution teachers should follow the provided guidelines (4TT). They should also keep their school authority informed about their learning progression in a regular manner (5HT1). By mentioning the case-based teacher-learning pedagogy 4TT stated that,

My advice will be that the teachers should share the cases with their heads of school so that they know what you are going to implement and why you are doing so (4TT).

Additionally, in the learning evaluation and monitoring activities they should also have opportunities to play their active role (6ET1).

8.5.7 Implementation procedures

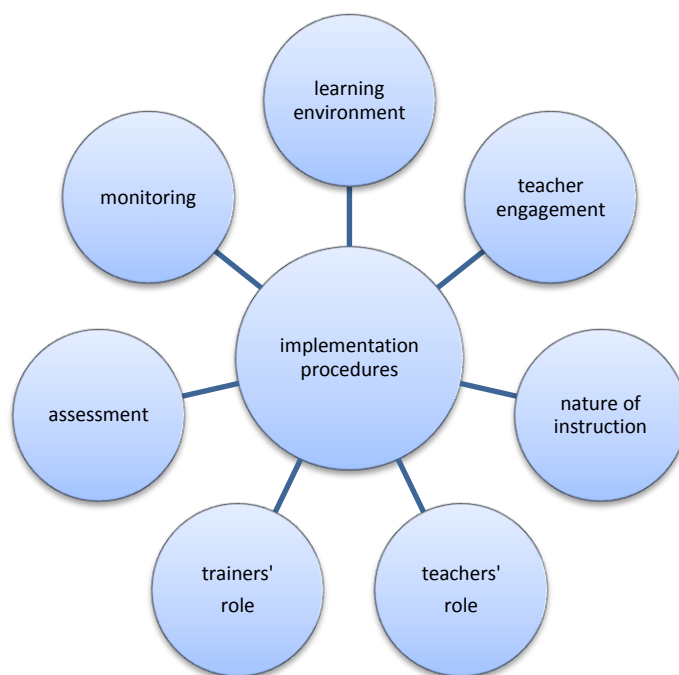


Figure 8.13: Implementation procedures

a) Learning environment

Technology enhanced teacher-learning programmes should offer a suitable learning environment for improving the professional capacity of the teachers of English of rural Bangladesh. The nature of the environment should be discussion-oriented, action-based and collaborative (6ET1). There should be regular interactive discussion sessions with the trainer and experts (3HT1). The activities should create opportunities for thinking (4HT1), observing effective teaching practices (5ET1), and also for sharing personal teaching and learning experiences (4HT2). They should also encourage questions from participants (5ET1). The learning should be flexible (6TT), on-going and workplace based (6ET2). For regular communication, teachers should have the facility to be connected via online and phones (4ET1).

4HT2 suggested that, according to the common academic objectives the participating teachers can form small interest-groups. For example, if a teacher prefers case-based learning he/she can join a group where all participants are interested to learn through cases (4HT2). The activities should be based on some certain professional learning objectives (6TT). While discussing

interactive and collaborative teacher-learning activities 5TT mentioned an apprenticeship-based activity where the trainer shows how a lesson plan can be prepared and used for teaching. 5ET1 mentioned interactive vocabulary and grammar learning, and 6HT1 said about the project-based lesson planning activity. Additionally, they mentioned about the importance of integrating multiple pedagogical approaches, academic syllabus-based activities, participation guidelines, reflection and experience based discussions, and the use of English language as part of the teacher-learning environment (discussed more in 8.5.5.3 of this chapter).

b) Teacher engagement

In technology enhanced teacher-learning communicating and collaborating among the participating teachers will be easy. While discussing the project-based teacher-learning activities 6ET1 stated that the teachers and the trainers can be connected via the Internet and mobile phones which should be managed by the school authority or the local education office. 4HT1 also reinforced the importance of engaging the education department to these activities to ensure proper monitoring of the schemes and their quality.

With the help of technology teacher trainers and training-monitoring authority (such as education departments) can engage teachers for continuing teacher-learning activities in various ways. 5HT1 explained the following plan for organising the teacher community and their collaborative learning.

... I think, we should have a learning circle like a club where we can practise English and discuss our professional problems, and this can be done by using the Internet where we can write something together or discuss our teaching related issues... (5HT1).

6ET2 stated that there are some weeks in the year when the teachers remain less busy and during this period they can attend the teacher-learning schemes. According to him, teachers can do this while staying at home and alongside the regular work, thus it would not cost very much. This however will require the school to have technological facilities such as computers, phones, printers and the Internet (6ET2). Both the head teachers (HT1 and HT2) however mentioned that 'the importance of teacher-learning should be understood by

the teachers themselves' (5HT2) and 'they should take the initial responsibilities to improve their [professional] knowledge and skills' (5HT1).

The focus group discussion also revealed that the technology enhanced teacher-learning will work effectively if the teachers are grouped according to their academic and pedagogical interests (4HT2). While giving an example of dialogic activities 3HT1 stated that 'teachers who teach English should be involved in this type of activity, because other teachers will not understand many things of this and will create problems in the discussion'. 4HT2 however mentioned that the teachers can attend many groups to meet their diverse professional interests and needs (4HT2).

The focus group participants were divided in opinions about mixed-group collaboration (in terms of age, gender and experience). While 2ET1 and 2TT thought that diversity among group members helps gain diverse knowledge and experiences, 2HT1 expressed his concern that the age or experience difference may create confusions and questions during any discussions or collaborative work. 6ET2 did not find any problem in group-work if teachers do not know each other because, 'teachers can very easily extend their relationship and professional connection by working with any unknown learning mates'.

The participants also suggested that the activities should be guided but flexible in nature to ensure the teachers' long-term engagement. 5ET2 thought that 'rural [Bangladeshi] teachers have time for professional learning, but if it is too regular then many of them may lose interest on it'. Conversely, 5HT2 stated that 'if [the activities] are too flexible, many teachers will feel bored and skip it. Thus, they should have the timetable and some clear targets'. Regarding the timetable 5ET1 however said that it is helpful, but if it runs for long time then maintaining it will become difficult.

c) Nature of instruction

The focus group discussion data provided a number of guidelines about the nature of learning instructions for the teachers of English. The participants mainly preferred synchronous and collaborative discussions, and online observations for their professional learning (2HT2 and 5ET2). According to 2HT2,

Group work is needed for understanding the problems [in problem-based teacher-learning pedagogy]. Through sharing ideas and experiences teachers can find solutions of their teaching related problems. It can give more ideas and more opportunities for sharing... (2HT2).

The participants (for example, 3ET1, 3TT and 4HT2) also mentioned the usefulness of the text and video based learning material.

Regarding the content of the teacher-learning programmes 4HT2 was rigid as he did not support the idea of including any content which is about non-teaching related issues. According to him, this 'will waste the time and not bring any good result' (4HT2). His view was however opposed by 2ET1 and 2ET2 who said that a part of the content can be used to increase the general knowledge of the world, and even to provide some entertainment that can remove the monotony while learning.

In the discussion the participants emphasized the use of English for the training and learning. 5ET1 believed that the use of English in conversations will improve the teachers' English language skills. She also said that,

English teachers have to take English lessons in English and students can learn this language by following what and how their teachers speak. If teachers can practise English in their training, it will greatly help develop their teaching qualities (5ET1).

4TT stated that online discussion and reflection sessions are effective opportunities for teachers to practise English. He however mentioned that only the training sessions cannot make the teachers competent English language users, they will have to regularly practise this. 4HT2 provided his opinion that 'initially teachers can discuss in Bangla, and when they know about the content well they can try to participate in English'. He also said that 'many teachers are very knowledgeable, but they are not good in speaking in English' (4HT2).

d) Teachers' role

Teachers play a central role in any technology enhanced teacher-learning scheme. They therefore should have the interest to learn and implement the learning in teaching. According to 4HT2 'if the teachers do not want it, no

policies will work'. 6HT1 explained this further through the following statement.

This type of learning will require teachers' dedication and interest. This is not a traditional teacher training activity where trainers supply a hand-out for activity. Here, teachers will have to take the responsibilities for their development. They will have to think about their profession, teaching etc. and share those with others for receiving advice and guidelines (6HT1).

Additionally, 'whatever the teachers do or learn, they should try to implement that in their classes, otherwise, there is no benefit of these schemes' (6HT2). It will also be beneficial if the teachers know the backgrounds of their learning mates (6HT1). 6HT1 stated that 'sometimes teachers of the schools situated in towns think they know more than the teachers working in the village schools. It may be true in some cases but not always'.

Rural Bangladeshi teachers will need to use the computer, especially the typing and the Internet, along with basic troubleshooting skills (6HT2 and 6RF).

Additionally, they will need to practise thinking critically (5ET1), participate the sessions regularly (2HT2) and keep contact with experienced teachers and teacher trainers regularly to share educational problems and solutions (2ET1).

The teachers need to be able to explain personal ideas to the peers and 'sometimes they will have to argue on a point and show logics' (4HT1). They will also be required to possess good social skills such as being supportive, helpful, patient and respectful to others (6HT2).

Technology enhanced teacher-learning will be more effective if 'the decisions [on content and activity] are taken by the trainers as they are the experts' (5RF). 5HT2 however criticised 5RF's opinion and mentioned that,

May be it is good... they have the experience and they know the problems, but sometimes the training cannot be effective as it is not practical. After receiving a training sometimes my teachers reported me that many things they have learned from the training are not applicable (5HT2).

By referring to several teacher-learning pedagogies the focus group participants also shared their views on teachers' role in technology enhanced teacher-learning activities. For example, 4TT suggested that in case-based

pedagogy the participating teachers should personalise the cases which will help them understand the subject according to their personal circumstances (4TT). According to 6HT1, in any project-based learning activity teachers should try to solve the given educational problems intelligently and with patience. In this type of activity 'if they find any solutions, they should be able to explain that to other group members clearly' (6HT1).

e) Trainers' role

In technology enhanced teacher-learning schemes the trainers' role is not just limited to providing training material and guidelines to teachers, they also have to constantly observe whether there is any improvement in the capacity of the teachers through the training (4HT1). 'The main responsibility to monitor the activities of any training programme lies with the trainers' (3HT1). Trainers should advise the teachers 'what [they] can teach, how to do that and what not to do' (4ET1). They should also check whether the teachers can face problems efficiently and solve those in their teaching (2ET2).

In an effective technology enhanced teacher-learning scheme the trainer is a committed professional (4ET1) and responsible to explain in what situation how teachers should apply a solution (2HT1). 4ET1 shared her experience through the following statement.

... sometimes we see that the trainer is not committed. He/she just wants to finish the topic. A teacher trainer must have adequate patience and commitment while conducting a session (4ET1).

The trainers are also required to be responsible for carefully handling the weak teachers (4HT1). They need to be available for their training participants to provide regular feedback on their opinions and responses (3TT and 4ET2). 2HT1 in this connection gave the following example of problem-based teacher-learning pedagogy.

Without understanding the problem [of teachers] trying to solve it will not be successful... I think, when the teachers will learn about problems and their solutions, the trainer should give detailed advice and opinions explaining what may happen in real life if they apply those solutions... (2HT1)

6TT, by indicating the project-based pedagogy, mentioned the following responsibilities of trainers in technology enhanced teacher-learning programmes.

To become a trainer of the project-based teacher training looks very challenging. If I become a trainer of this type of activity, I will first try to provide all the learning materials or websites to my teachers. I know that the teachers will have many queries, they will have concerns and problems which I will have to solve regularly. It is really important that as a teacher trainer I will have to monitor my teachers' performances at every stage of the project, from very beginning to the final result (6TT).

To organise successful teacher-learning activities trainers will also be required to confirm that the teachers are collaborating and working as part of an active teacher community (2RF). They should carefully form the learning-groups to ensure the synergy among the group members (2TT). In some situations they may find low participating teachers and in that situation they should provide them individual support (3ET2). They should also give continuous guidance and feedback to teachers which should not only be on the outcomes of the group work, but also how the work is done (6HT1).

The trainer should also explain and show different methods of teaching activities and inform their benefits (5HT1 and 5ET2). They should be knowledgeable and efficient communicators (3HT2). While discussing the approaches of technology enhanced and reflection based teacher-learning pedagogy 3HT2 said that 'teaching teachers through discussion and conversation is not very easy' and thus the trainers should possess a high level of communication skills. They should also have the skills for analysing the texts and the videos used for teacher-learning (4ET2).

In technology enhanced teacher-learning programmes trainers will require proper preparation. For example, in apprenticeship-based pedagogy the trainers will have to act well (5TT) and thus they will need adequate rehearsal for demonstrating any activity flawlessly (5HT2). They can also involve assistants in this type of work (5HT2). In dialogic pedagogy they will need the high efficiency in using verbal and non-verbal dialogues for professional knowledge building (3ET1).

f) Assessment

[Effective learning] is not possible without any organised training programme. The programme should be designed for step by step development of teachers. Participants also need to follow the lessons or instructions serially, otherwise they will not understand anything, and the training will not help them at all (5HT1).

Assessing the learning and development of teachers in any technology enhanced teacher-learning seems to be difficult (4HT1 and 4ET1). Discussion, collaboration and reflections are the key to this approach, and 'assessing these will be difficult as different trainers will consider their [teachers'] opinions differently' (4HT1). Additionally, observing the applications of the teacher-learning from remote places will not be very easy (4TT).

For assessment purpose the 'first thing the trainer can do is to check whether the teachers understand the learning point and its impact' (2TT). Then the focus should be on the state of teachers' engagement in the learning activities (1ET1). To do this the 'self-assessment' activities can be used (1ET1). The trainer or any teacher can also time to time evaluate his/her group members' performances (6ET1). Another major assessment area should be how the teachers implement their learning in the teaching (6TT). According to 6TT, 'it is not good if we learn something useful for teaching, but do not apply. If we assess the applications of our learning, we can also assess how well we have learned it'.

The focus group participants suggested some approaches to assess different technology enhanced teacher-learning activities. For example, they suggested assessing teachers' reflections on cases (4HT2), solutions of educational problems (2ET1) and applications of the learning from a project in teaching (6HT1). The participants however provided dissimilar opinions regarding the nature of the assessment procedures. According to 4HT2, some restrictions and regular assessment procedures are needed for the effective participation and learning of the rural Bangladeshi teachers of English. 4TT supported this view and mentioned that 'if there is no deadline for work or no routine, teachers will not understand what they are doing and when they will do other things' (4TT). In contrast, 4ET1 warned that 'too much flexibility will not work'

and cause a lack of interest among the participating teachers. 4ET1 therefore gave her decision that ‘the programme should neither be strict nor very flexible’. Similarly, 6HT2 suggested that the assessment should be formal, like the traditional examinations, by step-by-step, so that the school authority knows the level of their teachers. This was verbally opposed by 6TT and 6ET2 who considered that this will create negative impact on teachers as they will feel insecure in their profession. Besides, this will demotivate them to share ideas freely and enjoy their professional learning. 1TT also recommended that the head teachers should be part of the assessment process as without involving them just education officers or the trainee teachers cannot assess the teacher-learning accurately.

g) Monitoring policy

The monitoring of the learning and development in technology enhanced teacher-learning programmes should be mainly done by the trainers and the participating teachers (6HT2 and 6ET1). It is also important to involve the head teachers and local education officers in the process (such as 5TT and 6ET1).

While describing the role of the trainers in monitoring the teacher-learning activities 6TT suggested that this will be better to be done via technology, for example, through weekly or monthly meeting using Skype or Zoom, or the group regularly emailing their work or project or submitting them via an online learning management system. Moreover, trainers should regularly discuss individual teachers to check their learning progression (6TT). 6HT2 however mentioned that the head teachers are generally very busy with various administrative and teaching activities, thus may not have adequate time to be involved in such teacher-training programmes. 6HT1 supported this by saying that they have to attend various social and non-school based activities too.

By giving the example of the project-based teacher-learning approach 6ET1 said that a number of teachers will work on a project in a group where they can evaluate the work and performances of their team members (6ET1). 6HT2 suggested to inform the updates to the head teachers about the activities. 6ET2 clarified this idea further by mentioning that,

The teachers should regularly inform their head teachers what they are doing and what they have learned. This process should be short and

simple, but it would help build a good professional understanding between the teachers and the school management team (6ET2).

Additionally, 6HT2 recommended to share the teacher-learning developments with the local education department officials which he considered benefiting for the career of the teachers and the future of their schools.

8.6 Conclusion

The workshop-led focus group discussion data illustrate the stakeholders' attitudes and opinions about technology enhanced teacher-learning programmes in rural Bangladesh. Although the activities and conversations of the sessions were concentrated on six technology enhanced teacher-learning pedagogies, the information covers various aspects of the teacher-learning culture, the state of technological facilities and the future direction of designing and implementing effective teacher-learning schemes in rural Bangladesh. The data also help realise the possible benefits rural Bangladeshi teachers of English may receive from technology enhanced teacher-learning schemes, and the challenges they may face in the process.

The gained information also complements the survey data and clarifies the stakeholders' motivations, preferences and concerns about technology enhanced teacher-learning approaches. Additionally, the datasets elucidate the socio-economic circumstances and workplace conditions related to professional development of the rural Bangladeshi teachers of English. The information ultimately answers the research questions of my thesis.

In the next chapter I address all the research questions of this thesis and answer those through the survey and focus group data findings.

Chapter 9: Value of findings and concluding remarks

9.1 Introduction

The survey and workshop-led focus group findings provide individual and collective insights into the professional learning culture of rural Bangladeshi secondary teachers of English and their attitudes about the application of technology for professional development. The findings also provide realistic directions on pedagogy and management related procedures for technology enhanced teacher-learning schemes in rural Bangladesh context.

The critical analysis of the research findings with the relevant theories, applied evidences and my practical experiences delivers answers to all the research questions of this thesis. It also helps review the critical realist approaches of investigation, which I follow in this research, and the initially developed theoretical framework of technology enhanced teacher-learning programmes (discussed in Section 9.2 of this Chapter).

In this concluding chapter I organise my discussion in three areas namely the ‘professional learning culture of rural Bangladeshi teachers of English’ (discussed in Section 9.3), ‘attitude of teachers and affordances of technology in teacher-learning’ (discussed in Section 9.4) and ‘effective and sustainable approaches of technology enhanced teacher-learning in rural Bangladesh’ (discussed in Section 9.5). Additionally, in each area I provide a list of relevant recommendations (in Section 9.3.6, 9.4.4 and 9.5.3) which I believe would help initiate and improve technology enhanced teacher-learning programmes for the rural Bangladeshi teachers of English.

9.2 Evaluating research approaches and areas

By extending the traditional behavioural and cognitive views of learning, the post-constructivist approaches (namely social constructivism and connectivism) define the roles of the contextual elements such as society, culture and network in learning processes (explained in Chapter 3 in relation to the

historical developments of the learning paradigms). Theoretically these learning concepts are applicable in the learning programmes for the adults and professionals (argued in Chapter 3). The approaches are also adjustable to technology enhanced learning environment particularly in the forms of learning community and collaboration (explained in Chapter 4 connecting to the theoretical base of technology enhanced teacher-learning).

To explore the effective and sustainable approaches of post-constructivist and technology enhanced teacher-learning programmes for rural Bangladeshi teachers of English I considered researching the personal (such as affective factors like motivation and attitude), contextual (such as professional learning culture and professional networks) and communal (such as collaboration and experience sharing) features in the critical and realistic manner (please refer to Section 4.4 of Chapter 4 and Section 6.4 of Chapter 6 for the detailed discussion on these three areas and my approaches to investigate those). My initial theoretical framework (see Figure 9.1 below) addresses these three aspects of teacher-learning. Additionally, it includes the interactive technology enhanced learning environment which is generated by learners' information or knowledge, self-evaluation of professional thoughts and actions, and participation in learning activities (the areas are mentioned as 'knowing', 'reflecting' and 'doing' in Figure 9.1).

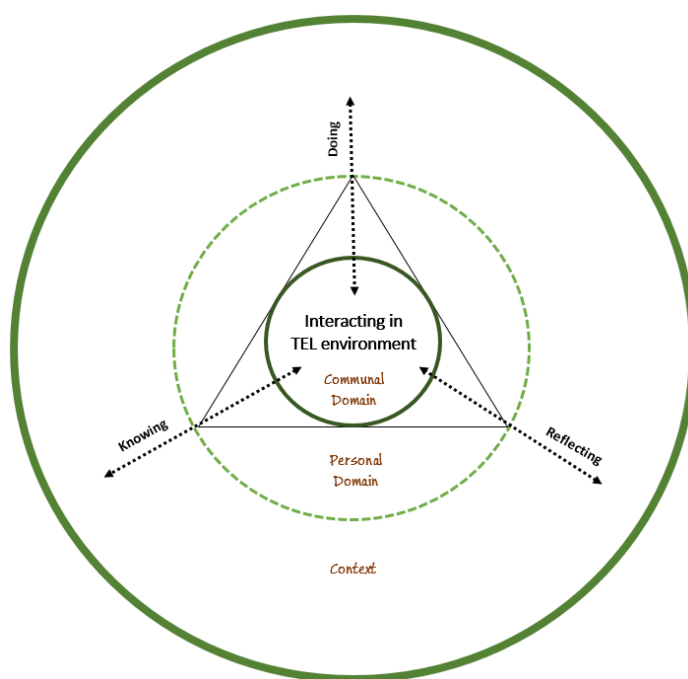


Figure 9.1: Initial theoretical framework

The survey findings of this research (reported in Chapter 7) show statistical correlations among the learning context, and the personal and professional domains of learning of the secondary teachers of English of rural Bangladeshi schools. This proves the consistency of the theoretical claim that there is an interweaving relationship among the personal, contextual and communal factors and processes of learning. The survey and focus group findings further identify four factors (namely the pedagogical approach, technological intervention, application of learning in teaching, and monitoring and assessment policies) which influence and determine the form and nature of the technology enhanced teacher-learning environment (in Figure 9.1 and 9.2 I mention this as TEL Environment).

9.2.1 Review of the theoretical framework

Based on the survey and focus group findings I have modified my initial theoretical framework to the next one (please see Figure 9.2)

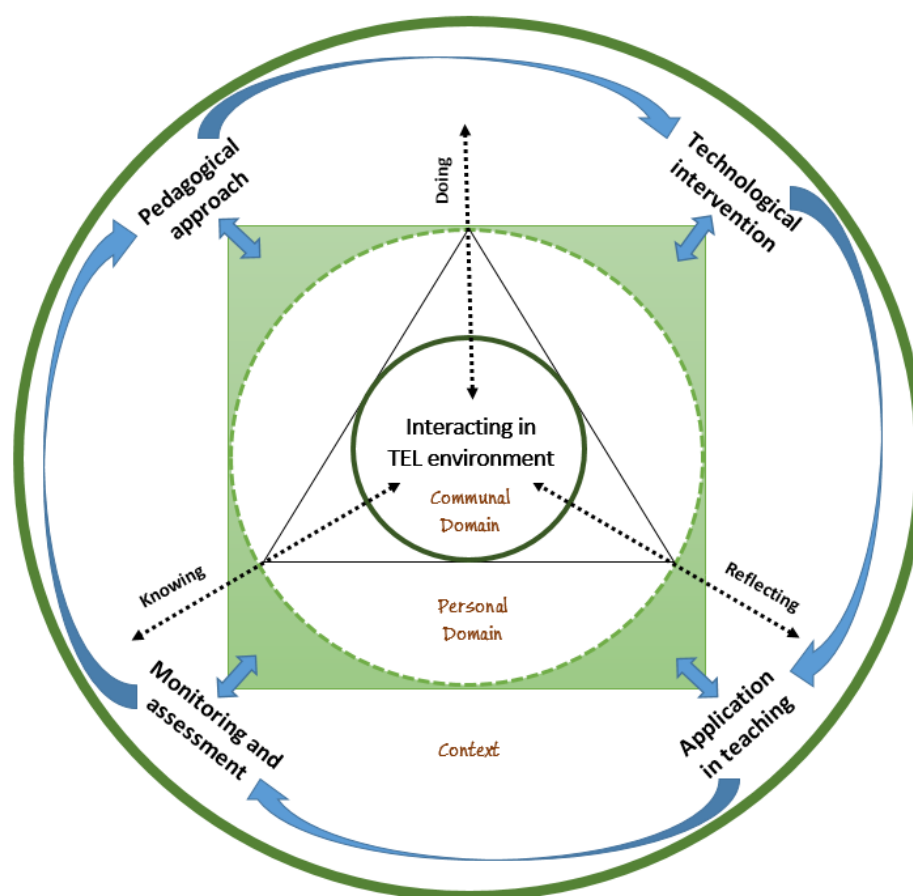


Figure 9.2: Modified theoretical framework

My research findings on the professional learning culture of rural Bangladeshi teachers (reported in Section 9.3 of this chapter), their attitudes about the use of technology in teacher-learning (reported in Section 9.4 of this chapter) and the effective and sustainable technology enhanced teacher-learning strategies (reported in Section 9.4 of this chapter) show the reciprocal influence of pedagogical approaches, technological interventions, applications of learning in teaching, and monitoring and assessment policies with the learning context, and the personal and communal domains of learning. Consequently, the initially designed theoretical framework gains the applied features, including relevant operational stages and guidelines, of the technology enhanced teacher-learning. With the modified framework I claim that in any technology enhanced teacher-learning environment learners gain effective learning through the activities that involve their knowledge, reflections and performances within systematic pedagogical approaches and via appropriate technological interventions. In the case of teacher-learning the application of the learning in teaching and reviewing the impact help ensure the practicality and sustainability of the schemes. Moreover, the process follows the step-by-step and cyclical approach where the pedagogies determine the nature of technological interventions.

9.3 Professional learning culture of rural Bangladeshi teachers of English

Understanding the professional learning culture of rural Bangladeshi teachers of English was one of my major objectives (please refer to Chapter 1 for the research questions of this thesis). To explore this area I investigated the following research questions under Theme 1 entitled ‘learning culture’.

- a) How do secondary English teachers of rural Bangladesh prefer to receive professional learning?
- b) What professional knowledge and skill areas do they need to develop?
- c) Who are connected to their professional learning processes?
- d) What personal and work-place related advantages do they receive while engaging in professional learning?

- e) What personal and work-place related challenges do they face while engaging in professional learning?

Based on the survey and focus-group findings I analysed the five aspects of professional learning culture of rural Bangladeshi teachers of English (in sub-sections 9.3.1 to 9.3.5) which respond to the five research questions of the 'learning culture' themes. The sub-sections and their corresponding research questions are listed below (please see Table 9.1).

Table 9.1: Sub-sections and corresponding Theme 1 research questions

Sub-sections with titles/aspects	Corresponding research questions
(9.3.1) Teachers' professional learning preferences	Theme 1 (a)
(9.3.2) Teachers' professional learning needs	Theme 1 (b)
(9.3.3) Teachers' professional learning network and communication	Theme 1 (c)
(9.3.4) Motivation and support for teacher-learning and professional development	Theme 1 (d)
(9.3.5) Challenges in professional development	Theme 1 (e)

In addition to answering the research questions I also provide a number of recommendations in sub-section 9.3.6 which I believe would help improve the professional learning culture of rural Bangladeshi secondary teachers of English.

9.3.1 Teachers' professional learning preferences

The post-constructivist approaches of learning emphasises the learning preferences of learners, for example, their preferred learning strategies and activities, for achieving successful learning outcomes (discussed in Chapter 3). Ajzen and Fishbein's Theory of Reasoned Action and Davis' Technology Acceptance Model also explain the importance of learners' interest and preferences for ensuring effective engagement in technology enhanced learning schemes (discussed in Chapter 4). Moreover, there can be various forms of learners' involvement in different technology supported pedagogical

processes which can address different learning interests and strategies of different learners (discussed in Chapter 5).

The survey data (reported in Section 7.5.1 of Chapter 7) describe the various professional learning preferences of the rural Bangladeshi secondary teachers of English. The teachers have positive perceptions about reading, participation in training, using experience and reflections, and interacting with group members to gain professional learning. The experienced teachers however exhibit higher level of preferences about traditional teacher training programmes, and the use of experience and reflections in the learning activities. The teachers who have not attended any teacher training programmes prefer using reflections. However, the teachers who have attended a few computer training also prefer this for their professional learning and development. These two contradictory findings propose that both the trained and new teachers of rural Bangladesh will probably accept the use of reflections in teacher-learning schemes.

The survey findings also indicate that most of the rural Bangladeshi teachers of English prefer workplace-based teacher-learning approaches and want to learn through observations and examples (reported in Sections 7.5.6 and 7.5.7 of Chapter 7). They do not have any reservation about working with any known or unknown teachers, and they want to be assessed regularly by tasks and assignments. The findings however show that both the teachers having access to information and communication technology and those who have received a few computer training prefer group-work and collaborative learning activities. These teachers' interest about collaborative work indicates that their initial exposures to learning technology are motivating towards forming and running technology enhanced teacher-learning communities for professional development.

Through the focus group discussion (reported in Section 8.5.5 of Chapter 8) I learned that, at the initial stage of collaborative and reflective learning activities, the female teachers may hesitate to participate and thus may take more time to be fully engaged in, particularly with the teachers who are not known to them. The participants however consider that learning groups or communities will work better if they have the diversity among the participants in terms of gender, age and professional experiences (reported in Section 8.5.1

of Chapter 8). The stakeholders indicated that the rural Bangladeshi teachers are friendly and supportive to their co-learners and the school authorities and teacher educators are flexible to work with any mixed teacher groups. Moreover, the teachers are willing to contribute in designing teacher-learning plans and are positive about continuing nature of technology enhanced teacher-learning schemes.

9.3.2 Teachers' professional learning needs

The educational backgrounds of the rural Bangladeshi teachers of English are generally poor and many teachers do not have adequate professional training (please refer to Chapter 2 for the discussion on the state of English teachers and the English teaching in Bangladesh). Moreover, because of the lack of resources and the limited number of teaching staff many rural secondary schools cannot offer sufficient professional learning opportunities to their teachers. However, the participants of my research indicated that they are well aware of the teaching and learning objectives of the English text books and skilled enough to prepare and deliver English lessons successfully (reported in Sections 7.5.5 of Chapter 7). These claims however contradict with the teachers' and schools' performances documented by Chowdhury, Hamid, Baldauf and Rahman (discussed in Chapter 2). I assume that, the survey participants do not have enough experience to compare their professional knowledge and skills with other experienced and successful teachers and their best teaching/ learning practices. As a result, they are not able to compare the levels of their professional capacity and consequently consider themselves prepared enough for successful teaching. Yet, based on the focus group findings (reported in Sections 8.5.4 of Chapter 8), I can list a number of professional learning needs of these teachers and elaborately explain the state of their teaching in rural Bangladeshi secondary schools.

In rural Bangladeshi schools the unavailability of teacher/learning materials and the lack of effective training and trainers are common. Consequently, the teachers, particularly those who teach English, cannot provide quality teaching to the students which negatively impacts on the overall education of the country. The poor state of the rural Bangladeshi teachers thus demand for the systematic professional growth of these teachers through continuing learning

and skills development practices. Based on the focus group discussions (reported in Sections 8.5.5.1 of Chapter 8) I realise that the technology enhanced teacher-learning approaches can help these teachers meet their professional needs by improving their understanding of teaching related content knowledge; by providing practical examples of best teaching/ learning practices; and through developing their observation, decision making and problem solving skills. The approaches would create the scope for continuing learning practices for rural Bangladeshi teachers and help them meet the new professional needs and challenges collaboratively and with the guidelines of expert teachers and teacher trainers.

The survey findings also divulge the professional needs of rural Bangladeshi secondary teachers of English based on their gender and access to technology. The male teachers, the teachers who work in the schools having a computer with Internet connection, and the teachers who can operate a computer have the higher ability to use English as the medium of instructions along with higher level of awareness about teaching and learning objectives of the English lessons they teach. The teachers who have attended a few computer training have the higher level of understanding of the contents of English lessons including the teaching/ learning objectives, and the higher capability of planning English lessons for teaching. These findings lead me to the decision that the availability of technological facilities in rural Bangladesh and the teachers' access to them are helpful to overcome the teaching related drawbacks and challenges.

9.3.3 Teachers' professional learning network and communication

For various professional purposes (such as for teaching related issues, professional development and administrative reasons) teachers need to maintain regular communication with the different people associated to their job, workplace and the learning. The post-constructivist approaches of teacher-learning suggest that, as professional learners the teachers gain meaningful learning when they converse, reflect and collaborate on various professional issues with others (please refer to Siemens' role of 'networks' in learning in Section 3.4.2 and the meaningful learning model proposed by Jonassen et al. in Section 3.5 of Chapter 3). The focus group participants also echoed several times (for example, see Sections 8.5.5.3 and 8.5.6 of Chapter 8) the need for

proper communication among the stakeholders of technology enhanced teacher-learning programmes. They particularly mentioned that, to ensure the success of any technology enhanced teacher-learning programmes in rural Bangladesh the teachers need to have regular communication with their head teacher and the colleagues who teach English in the same school, the co-learners of the same learning community, teacher trainers, education experts and education officers.

By analysing the survey data (in Section 7.5.2 of Chapter 7) I understand that the rural Bangladeshi teachers of English generally maintain regular communication with their head teacher and the teachers of English of the same school, but their communication with the teachers of English of other schools, education officers, education experts and teacher trainers is limited. The findings indicate that the rural teachers' professional network is mostly workplace-centred and they do not want or get opportunities to take help from external sources (such as the education officers and teacher trainers) for improving their professional qualities.

The communication of rural Bangladeshi teachers with the non-school based people varies in terms of their gender, experience and exposure to teacher training, and the level of access to information and communication technology (discussed in Section 7.5.2 of Chapter 7). Comparatively the young teachers of English maintain the highest communication with the teachers of English of the same school, the head teachers, non-government education officers and government teacher trainers. Although the senior teachers maintain a regular communication with the government teacher trainers, their communication with the colleagues who teach English subject in the same school and the heads of school is low. I assume that either the senior teachers generally do not face problems in teaching of English and thus they do not need to communicate with their young colleagues for teaching/ learning purposes, or they may consider learning with the junior colleagues as a matter of shame and thus avoid it. However, the higher communication of the senior teachers with the teacher trainers indicates that they have various professional needs and therefore they need to have the teacher trainers' assistance. The data also identify that the teachers having teacher training exposures have the higher professional communication with the local government education officers, the

head of the school and the education experts. Additionally, the teachers who had exposure to computer operation maintain the regular communication with the teachers of English and of other subjects of other schools, non-government education officers and government teacher trainers. Through these findings I assume that teacher development schemes and computer training enhance the confidence and communication skills of the teachers and consequently create scopes for networking with various profession related people. My claim is reinforced as the survey findings show that the teachers who have attended a few computer training maintain a higher communication with their head of schools, the teachers of English and of other subjects of the same and other schools, education experts, non-government education officers, government teacher trainers, local government education officer, and with own family members for professional learning purposes (reported in Section 7.5.2 of Chapter 7). The findings lead me to the assumption that the exposure to the information and communication technology has an impact on rural Bangladeshi teachers in their professional network building. Another important discovery of the survey is that the female teachers of English maintain higher professional communication with their head teacher and the colleagues who teach English and other subjects in the same school. Compared to the male teachers they are even more connected to the professionals who are not based in their workplace. This finding shows that the female teachers of English in rural Bangladeshi secondary schools are not lagging behind in communicating with the people associated to their profession and learning.

9.3.4 Motivation and support for teacher-learning

Learners' motivation is vital in teacher-learning (discussed in Chapter 3). Through this research I understand that the level of motivation and the support the teachers of English of rural Bangladeshi schools receive from their family and workplace is generally high (reported in Section 7.5.3 of Chapter 7). According to the findings, the teachers are also eager to participate in teacher-learning programmes. The focus group participants however described the practical situations of rural secondary schools and a number of reasons that discourage the teachers not to participate in any long-term professional development programmes (reported in Section 8.5.4 of Chapter 8). The reasons include the lack of support from family and the school authority,

inapplicability of the training in teaching practices and lack of competent trainers which together indicate the possible challenges in implementing technology enhanced teacher-learning programmes in rural Bangladesh.

The survey data (reported in Section 7.5.3 of Chapter 7) identified a number of aspects about motivation and support that the rural Bangladeshi teachers' receive for professional development. For example, senior teachers get the higher support from their school authority which, I assume, is because they are the confirmed staff (which means they will surely continue their job and implement their learning in the teaching) and/or they are experienced (which means they will be able to successfully attend the teacher-learning sessions and implement their learning in teaching). I see that the female teachers, teachers who have attended several teacher training programmes and those whose schools have a computer with Internet connection get higher support from their family. Similarly, the teachers of non-government high schools also receive higher motivation from their family than the teachers of Madrasa. Although it is difficult to infer why the teachers' gender, experience of teacher training, school types and access to information and communication technology increase the motivation from family, I believe these teachers are professionally more stable and their schools' infrastructural and economic conditions are better which provide them the higher satisfaction in work.

I also found a number of mixed responses about the learning environment of the teachers' home and the school (reported in Section 7.5.3 of Chapter 7). Firstly, the male teachers, the teachers who have only a few Teachers of English in their school, the teachers having the long English teaching experience and those having no teacher training exposure consider their home as a convenient learning place. Perhaps the reason for not considering the home as a better place for learning by the female teachers is because they have to perform various family responsibilities and thus do not get enough free time to be engaged in professional learning there. Then again, the teachers with extensive English teaching experience may feel themselves autonomous enough to do professional learning at home. Similarly, the teachers having no teacher training exposure possibly do not recognise the need of sharing and the discussion with colleagues for effective learning and thus prefer home for personal studies. On the other hand, the teachers who

have only a few colleagues who teach English in the same school may not find their workplace and colleagues adequately helpful for any professional learning support and thus prefer home for their personal learning and development.

Through the survey findings I also understand that the female teachers of English receive more support and encouragement from their family to participate in professional training. This is a positive indication for the women teachers of rural Bangladesh as the country is greatly patriarchal, religion dominated and conservative, and therefore the women are not equally empowered at home and in the society. Moreover, with this finding I assume that the rural female teachers' higher status in the society and their financial contribution to the family are increasingly being recognised by their family members.

9.3.5 Challenges in professional development

In rural Bangladesh most of the secondary schools and their teachers (in this thesis I particularly explore the situations of the teachers of English) face several challenges in developing professional capacities. Most of the teachers are low paid and the school facilities (such as infrastructures and teaching/learning material) are not sufficient for effective teaching practices. The academic and professional qualities of the teachers of English are poor and thus the quality of English teaching in these schools is unsatisfactory (depicted in the government and non-government organisations' reports, and various research findings in Chapter 2). As a trainer of these rural teachers I personally observed their lack of essential professional knowledge and skills. While visiting the rural schools to observe their teaching I also saw their poor work conditions including insufficient space for personal learning and working, inadequate number of teaching staff causing extra professional burden to them, and the very limited scope for professional capacity building. My understanding of these teachers' problems and challenges were reinforced while I went to several schools to conduct my survey and witnessed their conditions. I believe, the practical situation of the teachers and the workplaces mainly create challenges in their professional growth. The focus group data (reported in Section 8.5.4 of Chapter 8) also list a number of challenges about rural Bangladeshi teachers' professional development, particularly through

technology enhanced teacher-learning approaches, which broadly explain and supplement my observations of the rural Bangladeshi secondary schools.

Based on the discussion of the focus group participants I realise that the lack of motivation and support from the school authority and even family members will be a great challenge for them to attend any continuing professional development schemes (Section 9.3.4 of this chapter discusses this issue in more detail). Many teachers may not feel encouraged to improve their professional capacity as they are not the subject-teachers (which means they are not assigned to teach any particular subject) and therefore do not need to expertise in any particular subject area. The teachers' lack of knowledge and skills about information and communication technology (such as the computer and the Internet) will be another barrier to effective participation in any technology based teacher-learning programmes. Moreover, in technology enhanced teacher-learning a large number of technologically and pedagogically qualified teacher trainers will be required for the successful application of the schemes. To prepare this type of efficient trainer in sufficient number will require a significant amount of time, cost and effort. The trainers will also need to upgrade their skills and knowledge, thus they will be required to participate in continuing professional development activities. It will also be necessary to ensure that the technology enhanced teacher-learning schemes and the activities are focused to the teachers' professional needs and interests, and the learning they receive are applicable in their real teaching practices.

9.3.6 Recommendations

Based on the findings of the rural Bangladeshi teachers' professional learning culture particularly their learning preferences, learning needs, learning network, state of motivation, and challenges in professional development I propose the following recommendations. These would help improve the existing teacher-learning culture of rural Bangladeshi teachers of English through the use of technology.

- (i) School-based technology enhanced teacher-learning will be suitable in rural Bangladesh. In this approach the school authority should ensure that they have the required technological facilities and the teachers participating in the teacher-learning programmes are

receiving essential support, for example, time and encouragement. In my research the use of tablet computers has been proved successful in professional knowledge sharing and skill building. Among the stakeholders of technology enhanced teacher-learning programmes the teachers can therefore be given such technological devices if they and their school authority are economically solvent. The school authority can conduct follow-up sessions and invite other teachers of the same learning community to interact face to face. This type of professionally connected learning community can help improve the teacher-learning culture of rural Bangladesh.

- (ii) To allow the rural Bangladeshi teachers of English to concentrate and expertise English they should be given the provision to become subject-based teachers or the teachers of English. This would help create the learning communities among teachers of English where the participants' learning needs and interests will be similar.
- (iii) The schools should have an individual teacher-learning space where the teachers will get technological facilities such as computers and the Internet. This place does not need to be specious, but it should be safe for storing the technological devices. It should also have suitable seating arrangements for a number of teachers, reading and writing desks, and reference books (for example, on English language teaching and computer operation techniques). However, to establish this type of small and inexpensive study room the rural Bangladeshi secondary schools will require necessary financial support and the willingness of the school authority. In Bangladesh, presently several government and private organisations are running a number of projects related to technological interventions in education (examples are provided in Chapter 2). I would suggest the organisations to raise funds to establish such technology supported reading rooms for teachers which would be the resource centre for their professional learning practices.
- (iv) The participants are of different ages, gender and experience will make the learning communities and groups more vibrant and fruitful. However, if the teachers' learning preferences and

expectations are significantly different, learning activities will be hampered. The teacher trainers will therefore need to assess whether their learning community or group members are ready to work together.

- (v) To maintain the national standard of the teaching the teachers of different learning communities should have the opportunity for occasional interaction. For example, they can share their lesson plans and assessment practices using online communication systems. This will help them compare their strengths and drawbacks of teaching in national level.
- (vi) To enhance the communication and the collegiality among the co-learners of the learning-community the teachers should have the opportunity to share the information which is not directly related to their professional learning (for example, any social or school management issues) but which can help build professional relationships. It is important to consider that gender, teaching experiences and teacher training exposure have impact on teachers' professional network building. It is the responsibility of the teacher trainers, head teachers and the education officers to create opportunities for all teachers so that they can enjoy, contribute and learn from the teacher-learning schemes.
- (vii) While designing and facilitating teacher-learning activities the teacher trainers and the training authorities should consider various aspects such as gender and age of the participants, and the availability of technological facilities in their school along with the number of colleagues they have in their workplace teaching the same subject. The trainers should also assess the teachers' requirements of training on information and communication technology and provide them guidelines to fulfil those requirements.
- (viii) Application of the knowledge and skills gained from any technology enhanced teacher-learning schemes in the practical teaching is imperative. To document and assess the implementation of a training teachers can produce and submit reflective journals and

electronic reports via online, and can also maintain personal electronic portfolio. It is however vital that, besides the participating teachers, the teacher trainers and head-teachers should have access to these documents.

- (ix) In addition to improving teachers' professional capacities, the technology enhanced teacher-learning schemes should create the scope for the highly performed teachers and the head teachers to contribute in teacher-learning schemes with greater responsibilities. The extended opportunities will not only motivate these professionals, but will also create capable teacher-learning professionals. Here I recommend a flowchart (please see Figure 9.3) which shows the examples of career development opportunities for the highly performed teachers and head teachers.

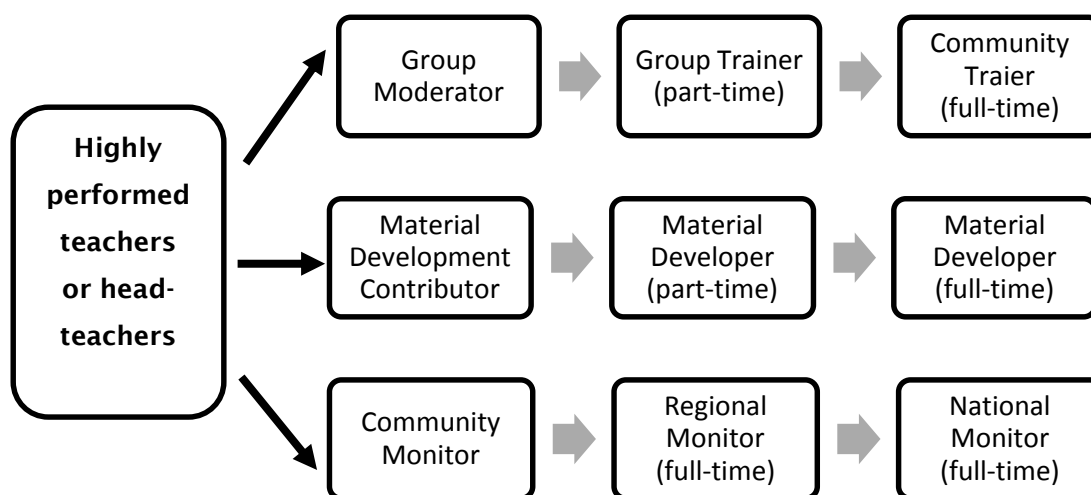


Figure 9.3: Career development pathways for stakeholders in technology enhanced teacher-learning

The IT teachers of the secondary schools can also be engaged in the technology enhanced teacher-learning schemes. They can support the teachers of English in operating the computer and relevant technological applications. Among them the deserving teachers can even work regionally or in national level. The professional growth of the teachers, head-teachers and the computer teachers of the secondary schools of rural Bangladesh will however require the government's teacher development policies and their operational framework.

9.4 Attitudes of teachers and affordances of technology in teacher-learning

The second theme entitled ‘attitudes and affordances’ is another major investigation area of my thesis (please refer to Chapter 1 for the complete list of the research questions). The theme contains the following research questions.

- a) What is the present state of technology in the learning and professional development of the rural Bangladeshi secondary English teachers?
- b) What is the attitude of the teachers towards the use of technology in learning?
- c) What forms of technological interventions do they consider motivating, engaging and productive for professional learning?

The following sub-sections (from 9.4.1 to 9.4.3) discuss three aspects related to the attitudes of teachers and affordances of technology in the teacher-learning in rural Bangladesh which address the three research questions of Theme 2 of this thesis (please see Table 9.2).

Table 9.2: Sub-sections and corresponding Theme 2 research questions

Sub-sections with titles/ aspects	Corresponding research questions
(9.4.1) Present state of technology in professional learning	Theme 2 (a)
(9.4.2) Teachers’ attitudes about the use of technology for professional learning	Theme 2 (b)
(9.4.3) Effective forms of technological interventions in teacher-learning	Theme 2 (c)

After answering to the research questions of Theme 2 I also provide a number of recommendations in the sub-section 9.4.4 which I believe would enhance the positive attitudes of rural Bangladeshi secondary teachers of English about the use of varied applications of technology in teacher-learning schemes.

9.4.1 Present state of technology in professional learning

The Bangladesh government is committed to ensuring the applications of technology in all educational areas (government's related policies and initiatives are discussed in Chapter 3). However, the overall technological readiness of the country, particularly for the rural teachers' professional development via technology enhanced teacher-learning, is not adequate (please see the description of the present ICT infrastructures and facilities in Chapter 2). Consequently, no large-scale technology enhanced teacher-learning schemes have yet been implemented here. This state of poor technological facilities and usage have also resulted in the shortage of efficient teacher trainers and administrators who can successfully run the technology enhanced teacher-learning schemes.

The availability and the use of the computer and the Internet is very low in both the urban and the rural areas of Bangladesh (shown in Figure 2.2 and 2.3 of Chapter 2). Broadband and WiMAX (Worldwide Interoperability for Microwave Access) based Internet facilities are available only in some major cities. However, the country is almost fully covered with the mobile phone network and all the mobile phone operators provide the Internet facilities through it. However, presently the Internet via the mobile phone network does not provide the faster Internet speed which is needed for browsing, downloading and screening of the heavier contents (such as audio and video clippings). The price of the Internet is also high in the country.

Through my research I realise that most of the rural Bangladeshi secondary teachers do not have the minimum knowledge and skills to operate the computer although most of the schools have computers, and many of those have an Internet connection (reported in Section 7.2 of Chapter 7). Although the government has recently supplied computers to many secondary schools, most of the schools do not use them (reported in Section 8.5.2 of Chapter 8). The lack of infrastructure for establishing a computer lab, lack of teachers who can operate the computers well and lack of funds for paying the maintenance costs and the Internet bills are the reasons for this reluctance. The data also reveal that, apart from the computer, the secondary schools in rural Bangladesh generally do not have other educational technology such as audio and video players.

9.4.2 Teachers' attitudes to technology enhanced professional learning

For the effective use of technology and successful participation in technology enhanced teacher-learning schemes teachers are required to have a higher level of self-efficacy and motivation (please see the relevant discussions of Bandura, DuBrin, Schiefele and Vermunt in Chapter 3). The positive attitude about technology and its use in teaching/learning practices can enhance their self-efficacy and motivation, and also increase the level of acceptance towards technology enhanced teacher-learning (please see the relevant theoretical explanations of Ajzen, Fishbein and Davis in Chapter 4).

The survey findings (reported in Section 7.5.4 of Chapter 7) show that the rural Bangladeshi secondary teachers' perception of the use of technology for teaching and professional knowledge gaining is highly positive. They also indicate that most of the teachers are eager to learn the computer to enhance their professional capacity. Similarly, the focus group data reveal that the rural teachers and the school authorities are optimistic about using technology for teaching and learning of teachers (reported in Section 8.5.3 of Chapter 8). According to the participants, technology enhanced teacher-learning will not only improve rural Bangladeshi teachers' teaching practices and students' learning experiences, but will also help them build the dynamic personality and broaden their social views. Additionally, they have a positive perception that technology enhanced teacher-learning will make the professional learning convenient, wider and sustainable for rural Bangladeshi secondary teachers of English by ensuring flexible and continuous access to learning for all types of teacher. They are also hopeful that the technology driven approaches will be easy to monitor by the trainers and the educational administrators and thus the continuing quality control of teacher development will be possible.

One important finding of the survey (reported in Section 7.5.4 of Chapter 7) is that the teachers having some knowledge and skills of computer have stronger confidence about the technology enhanced approaches of teacher-learning than those who do not have any knowledge and skills of the computer. Again, aged and experienced teachers have shown more positive attitude to these approaches. These two findings indicate that the sufficient orientation and experience of teaching and the use of technology can enhance positive

motivation among the teachers to use those for teacher-learning. In support of this claim I can refer to my observations of the information dissemination and hands-on practice sessions of the workshop-led focus group where the participants showed their enthusiasm and curiosity about using computers and the Internet for gaining professional knowledge (reported in Section 8.3 of Chapter 8). They expressed their joy while learning to operate the iPads and using those for various learning activities such as video recording, communicating via Skype and Internet browsing. Their spontaneous engagement, inquiries and affirmative expressions indicate their deep interest to learn and use the technology. Although they expressed concerns regarding the difficulties in using computers in efficient manner, this shows their awareness of personal drawbacks about using technology for learning and, at the same time, their willingness to overcome those limitations. All the participants of the focus group however showed their optimism for learning and using the computer and the Internet which indicate their higher level of motivation for participating in any technology enhanced teacher-learning schemes.

9.4.3 Effective forms of technological interventions in teacher-learning

The overall ‘networked readiness’ and infrastructural facilities of information and communication technology (ICT) in Bangladesh is poor (discussed in Chapter 2). Particularly in rural areas, the availability of electricity, a vital requirement for operating ICT, and technology-related manpower are greatly limited. However, the country is almost fully covered with the mobile phone network (more than 95% of the land area) and the use of mobile phones is also comparatively high. The survey findings (reported in Section 7.2 of Chapter 7) show that most of the secondary schools in rural Bangladesh have computers and many of those are connected to the Internet. The teachers, the head teachers and the teacher trainer of the focus group, who are the future stakeholders of any technology enhanced teacher-learning schemes in rural Bangladesh, are also positive about the use of computers and the Internet for teachers’ professional learning and development (reported in Sections 8.3 and 8.5 of Chapter 8). Based on the state of the ICT facilities and the stakeholders’ views the mobile phone network based Internet seems to be a suitable form of technology enhanced teacher-learning in rural Bangladesh.

Yet, applications of technology in any teacher-learning schemes will depend on the nature of pedagogies and the volume of teachers' participation. The rural Bangladeshi stakeholders of future technology enhanced teacher-learning schemes provided several guidelines on suitable pedagogical approaches (documented in Section 9.5.1 of this chapter). Besides, the literature review on the post-constructivist views of technology enhanced teacher-learning (discussed in Section 4.2 and 4.3 of Chapter 4) address the following requirements and approaches of technological interventions for the effective teacher-learning in rural Bangladesh.

a) Preparations

The forms of technological interventions will depend on the levels of the users' skills and knowledge of operating the computer and the Internet. For effective engagement in technology enhanced teacher-learning schemes the rural Bangladeshi teachers and the other stakeholders (such as the teacher trainers and the head teachers) will first need to be trained to operate the computer and Internet efficiently. The material developer of this type of teacher-learning will need to be efficient in designing the learning material based on the learners' expectations and needs. The teacher trainers should be competent in facilitating technology enhanced teacher-learning activities and also in learning assessment and monitoring procedures. It is essential that they know the basic 'trouble shooting' techniques as software, operating system and hardware related problems are normal, and sometimes frequent in technology enhanced learning. Moreover, because of the continuing nature of this type of teacher-learning, the participating teachers, the teacher trainers and the head teachers will need the continuing technological support via online or through the expert hands available locally.

b) Format of content

Because of the varied learning preferences of the rural Bangladeshi school teachers (reported in Section 7.5.1 of Chapter 7) different forms of teacher-learning content will need to be made available for them (please refer to Chapter 5 for various examples of different pedagogical approaches and the relevant technological interventions). In the focus group, after participating in the information dissemination and the hands-on practice sessions on several

computer and online based applications (please refer to Appendix 3 for the list of the programmes covered in each of the six sessions) the stakeholders suggested to include the following types of teacher-learning material (reported in Section 8.5.3 of Chapter 8).

- Text:** This type of material will provide reading-based professional learning opportunities. Blogs, email generated reading material, information on webpages and social media (such as Facebook) can be used to deliver teacher-learning texts to the participants. Texts can be used in various teacher-learning activities such as to disseminate instructions and guidelines (for example, in project-based pedagogy), and views and reflections (for example, in reflection-based pedagogy). The participating teachers can also produce and review texts using the Internet applications such as Realtimeboard while participating in project-based teacher-learning activities.
- Audio:** Both recorded (asynchronous) and live (synchronous) audio material can be used in technology enhanced teacher-learning schemes. For example, various individual and collaborative learning practices of reflection-based and dialogic pedagogies can be arranged where teachers can participate in online conversations via the Internet conferencing applications such as Skype or Zoom.
- Video:** Like audio content this type of teacher-learning material can be both synchronous and asynchronous. By using video cases from repositories such as Vimeo and Youtube teachers can observe and learn best teaching practices by following case- or apprentice-based pedagogies. Teachers can also record or share their teaching activities online and receive practical feedback from their co-learners, trainers, education officers and the school authority.

c) Learning management and monitoring strategies

According to the various evidence of successful technology enhanced teacher-learning schemes (documented in Chapter 5), the delivery of learning content and instructions, learners' participation and the monitoring of their developments can be conveniently done using the Internet. In my fieldwork in a remote district of Bangladesh I found the Internet services suitable enough for browsing the websites on tablet computers. During the information dissemination and hands-on practice sessions the participants browsed several text and video based websites (for example, Youtube, and a blog on teacher-learning designed by me) without any major disruption. The video conversation with the faculty members of the University of Southampton also went efficiently. I however consider that the Internet package that I used in my fieldwork was an expensive one (about £4.5 for 1 Gigabyte data for 30 days). It is noteworthy that, although in 2009 Bangladesh Telecommunication Regulatory Commission (BTRC) reduced the wholesale Bandwidth price to BDT 18,000 (approximately £155) per Megabit per second, the retail prices are still high which requires to be controlled by the government of Bangladesh ("Bangladesh: ONI Country Profile," 2012).

From the study I realised that, to ensure the inclusive and participatory nature of any technology enhanced teacher-learning (the concepts are defined in Chapter 6) the technological interventions will need to address the diverse learning needs and preferences of the learners, and provide various forms of teacher-learning pedagogies. It will therefore be essential to manage and document the teacher-learning materials, trainers' instructions, teachers' performances and progression reports in systematic manner. The focus group participants considered the 'Blackboard' platform (an online learning management system) of the University of Southampton useful for managing the teacher-learning instructions and resources. They however suggested to simplify its layout (in terms of language and the density of information) and operational procedures (such as the audio/video player, space for reflections and assignment submission option in the same page of the application). They also recommended including the head teachers and the education officers in the online learning management system so that they can monitor the teachers' participation and development, and provide useful feedback.

9.4.4 Recommendations

By evaluating the state of technological orientation of the rural Bangladeshi teachers and their attitudes about the use of technology for professional learning I propose the following recommendations for the realistic design and implementation of technology enhanced teacher-learning schemes in rural Bangladesh.

- (i) By reviewing the existing mobile phone coverage in the country and through my practical experience of using this network for accessing the Internet facilities for teacher-learning activities in a rural location of Bangladesh, I suggest adopting the online-based teacher-learning programmes in rural Bangladesh. However, because of the weak Internet speed and high price, initially the teacher-learning content should be compatible to the present Internet facilities. Based on the commitment and the recent initiatives of Bangladesh government for improving ICT facilities I am confident that the Internet services will improve in the near future which will allow to apply more variety of teacher-learning contents and activities.
- (ii) The present state of the technological facilities and rural Bangladeshi teachers' limited capacity to take benefits from the situation indicates the need of rigorous preparatory stages for designing and implementing realistic technology enhanced teacher-learning schemes. Through this research I understand that the stakeholders of the future technology enhanced teacher-learning should receive sufficient orientation (in the form of training and practice) and experiences (both teaching and technology related) for becoming reflective, autonomous and collaborative learners. These schemes should also develop and involve those learning material developers who are expert in pedagogy and also knowledgeable about information and communication technology.
- (iii) After reviewing the cost and the convenience (such as portability) of various ICT devices, the laptops and tablet computers seem feasible for teacher-learning in rural Bangladesh. The research participants highly preferred iPads for its easy-to-operate facilities (such as touch screen and small size which can be comfortably handled). I also

consider that tablet computers will be more realistic in rural Bangladesh context as they can be electrically charged for running for 3/4 hours and some renowned brands have built-in antivirus facility which lessens troubles while operating. Another benefit of using tablet computers will be their easy-to-carry facility which will allow the teachers to borrow their workplace's tablet computers for professional learning at home or at other places.

- (iv) The technology enhanced teacher-learning schemes should contain varied forms (such as text, audio and video material) of learning content for the same learning objectives. The pedagogies should also be wide-ranging so that the teachers have options to choose any approaches for achieving their professional learning objective. As it is important to realise and address the teachers' learning preferences, in the schemes an approach or tool can be developed to understand those. For example, teachers' may maintain their electronic portfolio or can complete an online form mentioning their learning preferences.
- (v) An organised and learner-friendly management system should be followed in technology enhanced teacher-learning programmes to avoid teachers' demotivation and difficulties. I analyse my findings on these areas in Section 9.5.3 below.

9.5 Effective and sustainable approaches of technology enhanced teacher-learning in rural Bangladesh

To realise the suitable pedagogical approaches and the effective management procedures of technology enhanced teacher-learning in rural Bangladesh I had set the following three research questions under Theme 3 entitled 'pedagogy and management'.

- a) What pedagogical approaches of technology enhanced teacher-learning do the teachers consider feasible for their professional learning? Why do they think so?

- b) What pedagogical approaches of technology enhanced teacher-learning schemes do the school administrators and teacher educators consider effective and sustainable for teacher-learning? Why do they think so?
- c) What administrative and management procedures do they consider essential for implementing any technology enhanced teacher-learning schemes? Why do they think so?

In the following two sub-sections (9.5.1 and 9.5.2) I analyse three aspects of technology enhanced teacher-learning pedagogies and the management procedures of the teacher-learning approaches in rural Bangladesh which answer the three research questions of the theme 'learning culture'. The sub-section and the corresponding research questions are listed below:

Table 9.3: Sub-sections and corresponding Theme 3 research questions

Sub-sections with titles/aspects	Corresponding research questions
(9.5.1) Pedagogical approaches: considerations and recommendations of teachers, teacher educators and head teachers	Theme 3 (a) and (b)
(9.5.2) Administrative and management procedures	Theme 3 (c)

In addition to answering the research questions I also provide a number of recommendations in Section 9.3.6 which would help improve the pedagogical applications and management procedures of the technology enhanced teacher-learning schemes in rural Bangladesh.

It is important to mention that, in focus group discussions, the views and the recommendations of the teachers, the teacher trainer and the head teachers on pedagogical applications and management procedures were parallel. I therefore decided to discuss their common views together and the differences in a separate sub-section (in Section 9.5.1.1)

9.5.1 Pedagogical approaches: considerations and recommendations

Various technology enhanced pedagogical approaches seem to be suitable for teacher-learning of the rural Bangladeshi secondary teachers of English (please refer to Section 8.5.5 of Chapter 8 for relevant opinions and guidelines

provided by the focus group participants). In the focus group discussion sessions the participants shared their views on six technology enhanced pedagogical approaches namely reflection-based, problem-based, dialogic, case-based, apprenticeship-based and project-based pedagogies for teacher-learning. The views which the participating teachers, the teacher educator and the head teachers agreed on are reported below.

a) Principles of approaches

The major objectives of any technology enhanced teacher-learning schemes in rural Bangladesh should be to create a continuing and collaborative learning environment where teachers can receive the experience-based, application-focused, example-driven, practice-oriented and reflective teacher-learning facilities. The schemes should be designed to provide practical guidelines to the teachers to improve their teaching related problem solving capacity, decision making skills and confidence in teaching practices. The overall aim of these schemes will be to standardise the professional capacity of rural Bangladeshi teachers and keep them engaged in the sustainable professional development practices.

To achieve the educational aims of the technology enhanced teacher-learning schemes there may be several possible challenges to overcome (reported in Section 8.5.5.2 of Chapter 8). The teachers' lack of skills to operate the technological devices and lack of experience about this new type of teacher-learning activity will be major difficulties. This may also lead to hesitation, and also to a lack of motivation and commitment for participating in these schemes. The participating teachers' age, experience and gender can also be factors determining their learning interest. As these teacher-learning approaches will require effective communication skills and critical thinking practices, many teachers may find these incompatible with their personality type. The collaborative and discussion-oriented learning sessions (which will be mainly learner-centred and flexible) may become lengthy where achieving the learning goals will be difficult and many teachers may find the process tiresome and not interesting. Moreover, because of the newness of this type of teacher-learning approach in Bangladesh, there may be the shortage of qualified teacher trainers, particularly in the beginning stage of the schemes.

b) Nature of activities

Based on the principles and the anticipated challenges of the technology enhanced teacher-learning programmes for rural Bangladeshi teachers of English the post-constructivist definitions and approaches of learning seem to be suitable for the schemes. These approaches to teacher-learning will not only be capable of combining the knowledge, activities and reflections of the teachers for gaining the effective professional learning; they will address the situational needs of the learners' socio-cultural surroundings, their psychological conditions, and the features of technology-enabled learning environment (please refer to Chapter 3 for the description of the post-constructivist approaches of learning, Chapter 4 for the theoretical framework for these approaches, and the focus group data findings in Section 8.5.7 of Chapter 8 for the stakeholders' relevant views). Moreover, as the technology enhanced teacher-learning pedagogies will engage various forms of technology, the learning will be more inclusive, flexible and varied (please refer to Section 8.5.3 of Chapter 8 for the discussion on the advantageous features of the technology enhanced teacher-learning). However, the pedagogical approaches should be designed according to the learning needs of the rural Bangladeshi teachers (reported in Section 7.5.5 of Chapter 7) along with their learning preferences and strategies (reported in Section 7.5.1 of Chapter 7).

In the focus group discussion sessions (reported in Section 8.5.5 of Chapter 8) the stakeholders of future technology enhanced teacher-learning schemes in rural Bangladesh indicated that any single pedagogical approach will not ensure all the different teacher-learning goals, thus various pedagogical approaches should be integrated for the effective professional development of teachers. I received several examples of pedagogical approaches which can be applied to achieve particular professional objectives of rural Bangladeshi teachers of English. For example, the teachers can achieve critical comprehension about various real educational problems through case-based pedagogy, can identify the problems of teaching English and their solutions through problem-based pedagogy, and can share and learn best teaching practices through reflection-based pedagogy (please refer to Section 8.5.5 of Chapter 8 for the benefits, challenges and solutions of six different pedagogical approaches described by the focus group participants). I however learned that, while designing any teacher-learning activity by following any

pedagogical approach, the scope for observation, discussion and reinforcement should be ensured. It is important that the teacher-learning programmes are clearly organised in systematic stages (or efficiency-based levels) and the learning activities justifiably balance the individual and the group practices.

c) Operational procedures

The applications of technology will play a vital role in any technology enhanced teacher-learning pedagogies in rural Bangladesh. The use of information and communication technology will provide several pedagogical benefits such as varied forms (for example, text, audio and video) of learning content, flexibility in participation (for example, learners can attend both synchronous and asynchronous learning activities) and reliable monitoring of learning progression as learners' participation is observed electronically and continuingly (please refer to Section 9.4.3 of this chapter for the discussion on various forms of technological interventions in technology enhanced teacher-learning schemes). However, with the appropriate technological support a pedagogical approach can become successful if it is facilitated by the trained and dynamic teacher trainers who are capable to provide clear guidelines to the learners and can enhance their participation. Additionally, while delivering this type of pedagogy it will be essential to manage the time properly, build trust and respect among the learners, and keep a clear focus on the syllabus and curriculum that the teachers follow for teaching their students. Moreover, the operational procedures of these pedagogies and their impact on teachers' teaching should be reviewed time to time through constant monitoring and assessment procedures (reported in Section 8.5.7 of Chapter 8).

9.5.1.1 Conflicting views

In the focus group sessions the participating teachers, the teacher trainer and the head teachers agreed on most of the discussion points. This reflects the resemblance of their perceptions about educational situations of rural Bangladesh. They were however divided in some minor issues. For example, the head teachers initially emphasised individual learning, but gradually started reflecting positively on various collaborative approaches. Similarly, while the head teachers argued for including only teaching related content in

the teacher-learning programmes, the teachers expressed their interest in non-academic and entertaining materials. Besides, the head-teachers were in favour of formal and strict assessment policies which was opposed by the teacher trainer who considered that this could demotivate the teachers. Moreover, the head teachers were not interested to be regularly engaged in the technology enhanced teacher-learning schemes as they said they do not have sufficient time for doing this. The teachers and the teacher trainer however stated that the presence of the head teachers in teacher-learning programmes is essential.

By reviewing the differences of opinions among the stakeholders I realise that these can be easily minimised through following a balanced approach. For example, technology enhanced teacher-learning programmes can use non-academic and entertaining materials for professional learning purposes such as to explain any lesson of the text book they teach. Then, teachers' progress in teacher-learning can be flexibly evaluated but regularly monitored. Moreover, the limited but efficient involvement of the head teachers in technology enhanced teacher-learning programmes can be adjusted to their academic and administrative responsibilities.

9.5.2 Administrative and management procedures

One of the two major management tasks of the technology enhanced teacher-learning schemes in rural Bangladesh will be dealing with the technological infrastructures and the supply of the required technical facilities to the stakeholders. The availability of computers and the Internet, and also the ongoing technical support, for the teachers (many of them who work at remote places) will need to be assured. The other important task will be to manage the engagement of the learners and the learning communities in the learning processes, monitor their progress and ensure the applications of learning in their teaching. The management systems will include the proper documentation and reporting of these two aspects of technology enhanced teacher-learning. For the successful implementation of the programmes the academic personnel and the information and communication workforces will need to work in partnership. The clear policies and guidelines on participation and assessment should be made available to all the stakeholders.

The focus group participants suggested managing the technology enhanced teacher-learning in rural Bangladesh in three levels (please see Section 8.5.6 of Chapter 8). Firstly, the overall teacher-learning policies, the availability of trainers and training resources to the stakeholders and effective quality control measures should be conducted nationally by the secondary education department. Then, there should be a number of management responsibilities of the schools and the trainers where they will ensure teachers' participation, monitor their progress both in learning and its implementation in teaching. Finally, teachers' who are engaged in the teacher-learning will manage their own learning activities, assess their professional developments, and actively contribute in planning and designing of new technology enhanced teacher-learning approaches.

Based on the focus group findings (please refer to Section 8.5.7 of Chapter 8) I recognise a number of management responsibilities of the teacher trainers, the head teachers and the education officers in technology enhanced teacher-learning programmes. Firstly, the teacher trainers will need to manage the training/learning objectives and the time efficiently. As the post-constructivist approaches of education will be suitable for teacher-learning in rural Bangladesh, the activities would be mainly collaborative, discussion-based and reflection-oriented. The teacher trainers therefore will need to keep the learning activities focused to the practical learning needs of the teachers. Teachers will also manage their professional learning through flexible but structured study plan, evaluate their personal learning progression, and report their achievements and failure to their trainers, school authority and the education officers. In fact, in the technology enhanced teacher-learning programmes in rural Bangladesh the active involvement of the school authority and the education departments is vital, and the engagement of these bodies will need to be on-going and collaborative.

9.5.2.1 Implementation guidelines

The survey and focus group findings suggest that the teachers, teacher educators and head teachers of rural Bangladesh consider the collaborative, continuing, flexible, assessed and monitored approaches of technology enhanced teacher-learning suitable for the professional development of the

rural Bangladeshi secondary teachers of English. Here, based on the research participants' views and my reflections on the literature review, a number of relevant technology enhanced teacher-learning guidelines and strategies are discussed.

a) Creating collaborative learning environment

Technology enhanced teacher-learning schemes for rural Bangladeshi secondary teachers of English will first require the creation of a learning environment that encourages sharing, discussions and collaboration among the participants. The focus group findings show (please refer to Section 8.5.7 of Chapter 8) that observations, inquiries and reflections would be effective for teachers' learning. The requirements seem similar to the post-constructivist theories (such as Lave and Wenger, 1991; and Laurillard, 2002) which advocate for the critical, democratic and collaborative technology enhanced teacher-learning approaches (please refer to Chapter 4 for the detailed discussion). The study however reveals that, for efficient collaboration it will be necessary to form groups which are based on the participants' learning interests and levels of experiences. Yet, according to the survey findings (please refer to Section 7.5.6 of Chapter 7), these groups may include teachers having different ages or experiences, both from the school they are working or from other schools, which will enhance the scope for exchanging diverse skills and knowledge among the new and experienced teachers.

b) Recognising roles and responsibilities of stakeholders

Based on the concepts of learning communities (please refer to Chapter 4) and the opinions of the focus group participants the on-going and organised collaboration and support among the teachers, teacher educators and the local education department will be required for building any effective learning communities in rural Bangladesh. However, for gaining the benefits and sustainability of these communities it will be essential to define the role of the participating teachers and the other stakeholders. In the survey findings (please see Section 7.5.2 of Chapter 7) I see that, for professional learning and development purposes Bangladeshi rural secondary teachers of English interact in different frequencies with the teachers and the administrative authority (including the head and assistant head teachers) of their own school, teachers of English of other schools, the local government and non-government

education officers, education experts and the teacher trainers. The focus group findings (please see Sections 8.5.4 and 8.5.7 of Chapter 8) explain these professional connections and list a number of responsibilities that the teachers, the teacher trainers, school heads and the educational authority should perform.

According to the focus group findings, in any technology enhanced teacher-learning programmes for the rural Bangladeshi teachers of English, the participating teachers will play a key role and take control of their own learning and development. In many occasions they will take decisions by themselves, make plans and implement those according to their own guidelines. For participating in collaborative and interactive learning activities these teachers will need to have the ability to work with the modern information and communication technology, such as the computer and the Internet, and should also have high communication skills. Additionally, they should be ready to work with any known or unknown teachers and teacher educators, and be accommodative to different pedagogical approaches for gaining the professional learning (please see 8.5.5 of Chapter 8 for further discussion).

The focus group discussions also suggest that the role of the teacher trainers will be wide-ranging. They will work as managers (because they will regularly manage the time, resources, assessment activities and feedback), facilitators (because they will provide the learning plans and materials, guide the participants while learning, and show the procedures of implementing the learning in their profession) and monitors (because they will observe and assess the progress of the teachers' learning) in teacher-learning schemes. The role of the teacher trainers in technology enhanced teacher-learning environment will also change according to the requirements of pedagogical approaches and the types of technological intervention (please see Chapter 5 for a number of examples of technology enhanced pedagogical approaches of teacher-learning). As technology enhanced teacher-learning will create the scope for professional learning for the teachers working in remote locations of Bangladesh, the teacher trainers will need to understand the learning cultures of their participants along with their experiences and professional capacities. The trainers should also be capable of facilitating, controlling and monitoring them from remote locations (for example, online and on mobile phones).

Moreover, they will have to be skilled in moderating the collaborative activities, and also in ensuring the learners' continuous engagement in the process.

c) Designing mixed and flexible learning instructions

The survey findings show the positive attitude of the secondary teachers of English of rural Bangladesh to various forms of learning such as by reading, through attending traditional training, and by sharing experiences and reflections in the collaborative learning environment (please see Section 7.5.1 of Chapter 7). The focus group findings also elaborate the attitudes of the participants and provide their suggestions on the nature of technology enhanced teacher-learning instructions they consider effective for the rural Bangladeshi teachers of English. According to their views, the synchronous and collaborative discussions, particularly the reflections on practical experiences, would be viable for the teachers' knowledge building. Besides, they can conduct various problem-based and exploratory educational projects and observe best teaching practices of others via online or recorded videos. The focus group findings also suggest using both the text-based and audio-visual learning materials in the teacher-learning schemes. Regarding the medium of trainers' instructions and conversations among teachers the participants mentioned the need for prioritising the use of English as, according to them, this would enhance the capacity of the teachers of English particularly to conduct English classes using English language. The participants however suggested increasing the use of English in the teacher-learning sessions gradually as most of the rural Bangladeshi teachers are weak in this language and initially they will take longer time and regular practice to develop this habit.

As discussed in Chapter 3, teachers are adult learners and they have to maintain the comprehensive and up-to-date knowledge of the subject they teach. Most of the rural Bangladeshi teachers' educational background is poor and they are economically vulnerable (please see Chapter 2 for the detailed description on the state of the teachers of English in Bangladesh). They require flexible, short but regular, and economically viable professional learning options. The technology enhanced social constructivist and connectivist approaches of learning, which I refer to as the post-constructivist approaches of learning in Chapter 3, can offer this type of professional development

opportunity. These approaches (please refer to the descriptions of post-constructivist approaches by researchers such as Bruner, Vygotsky, Collin, Lave, Wenger, Laurillard and Siemens in Chapter 3) would promote the experience-based discussion, reflection sharing and group work. If post-constructivist learning approaches are followed and the use of technology is ensured, the teachers can participate in the activities remotely and in their own time. They can also receive instructions, guidelines and learning material regularly and can collaborate with their peers using various technological media. These all facilities can ensure flexibility in their learning practices where they can establish their autonomy, personal attachment and critical thinking ability in the democratic but monitored learning environment.

d) Ensuring continuous engagement and participation

With the help of modern technology the networked and Internet-based connections can assist rural Bangladeshi schools and the teachers of English to be linked and to form effective learning communities. This type of learning group can include the school authority, most importantly the head teachers, and the government education department for ensuring proper guidelines and monitoring of the teachers' progress (please see Section 8.5.7 of Chapter 8). The focus group participants suggested that the schools of the participating teachers can be the resource centres for any teacher-learning activities and technological facilities. This school-based teacher-development approach is recommended by many educational researchers and the organisations involved in teacher development (please refer to Section 1.2 of Chapter 1 for the detailed discussion).

The focus group discussion findings (please see Section 8.5.7 of Chapter 8) also suggest that the rural Bangladeshi teachers should have the option to choose the learning communities which match with their academic and pedagogical interests. These communities should run during the whole year but have intense and monitored teacher-learning activities during the time of the year when teachers are less busy. The findings also indicate that the flexible but supervised approaches of teacher-learning in terms of participation and assessment would ensure the participating teachers' accountability and

long-term engagement in professional capacity development schemes in rural Bangladesh.

Besides the teachers and the teacher trainers, the school authority (the school management committee and the head teacher) and the educational department have an important role in technology enhanced teacher-learning schemes in rural Bangladesh (please see sections 8.5.4 and 8.5.7 of Chapter 8 for further discussion). Without the encouragement and support of the school authority it will not be possible for the teachers to participate in a school-based and continuing learning scheme. The involvement of the head teachers can also ensure proper monitoring of their teachers' contribution and performances. Similarly, the engagement of the educational department will help receive all the learning and technological facilities, and also to formulate and implement realistic technology-enhanced teacher-learning policies.

e) Following systematic monitoring and assessment procedures

The focus group findings indicate the need for systematic and on-going monitoring of teachers' learning and the development of the professional capacity for ensuring effective outcomes of any technology enhanced teacher-learning programmes in rural Bangladesh (please see Section 8.5.7 of Chapter 8). The participants however warned that most of the teaching/learning activities in the post-constructivist teacher-learning schemes should be based on discussions, reflections and collaborative activities, and so the assessment processes will greatly require non-traditional assessment approaches. Yet, the transparent and disciplined monitoring and assessment of participants' ongoing learning and professional development will be required for establishing the acceptance and sustainability of the programmes.

The findings recommend that the technology enhanced teacher-learning programmes should be offered in different stages and the teachers should have options to choose the stage they consider suitable for them. In any programme, both the teachers and the trainers should be responsible for monitoring the learning progression and their implementation in real teaching. Additionally, the educational department and the school authority should have their role in the monitoring process. The involvement of the school authority particularly the head teachers will improve the quality of monitoring and also the participation of the school management system in the course.

In technology enhanced learning communities the trainers and the education officers will generally need to carry out the monitoring and assessment activities from remote locations. To do this they can take the facilities of the information and communication technology which is able to continuously and accurately monitor learners' engagement and performances in the educational activities (see Chapter 4). For example, they can check how frequently and how long each of the participants have participated in the learning activities. Besides, the trainers can check the learning of the teachers through online discussions, quizzes and assignments (both individual and group based). The monitoring and the assessment procedures should not only consider the performances of the groups or the collaborative work, but also the individual progress. The participating teachers should also be given the opportunity to monitor their own development and the development of the learning community they are involved in. Comprehensive checklists of the assessment areas (the areas may include the ability to understand trainers' instruction, levels of individual and group participation and the quality of learning outcomes of group/collaborative work) should also be used by the trainers and the teachers in all learning activities.

9.5.3 Recommendations

Based on the stakeholders' views and suggestions about suitable pedagogical approaches and administrative procedures in technology enhanced teacher-learning for rural Bangladeshi teachers of English I propose the following recommendations.

- (i) Technology enhanced teacher-learning schemes in rural Bangladesh will require functionalising two sets of administrative and management policies. The first set will be on educational aspects such as learning pedagogies and the applications of teachers' learning in teaching. The second set will be on the supply and maintenance of the technological facilities such as computers, the Internet, and technology-based learning contents. A proper cooperation between these two management bodies should be maintained for the successful implementation of any technology enhanced teacher-learning schemes in rural Bangladesh.

- (ii) For the effective management of technology enhanced teacher-learning schemes I suggest three management levels: (i) learner and workplace, (ii) learning community, and (iii) regional and national level (please refer to Figure 9.4).

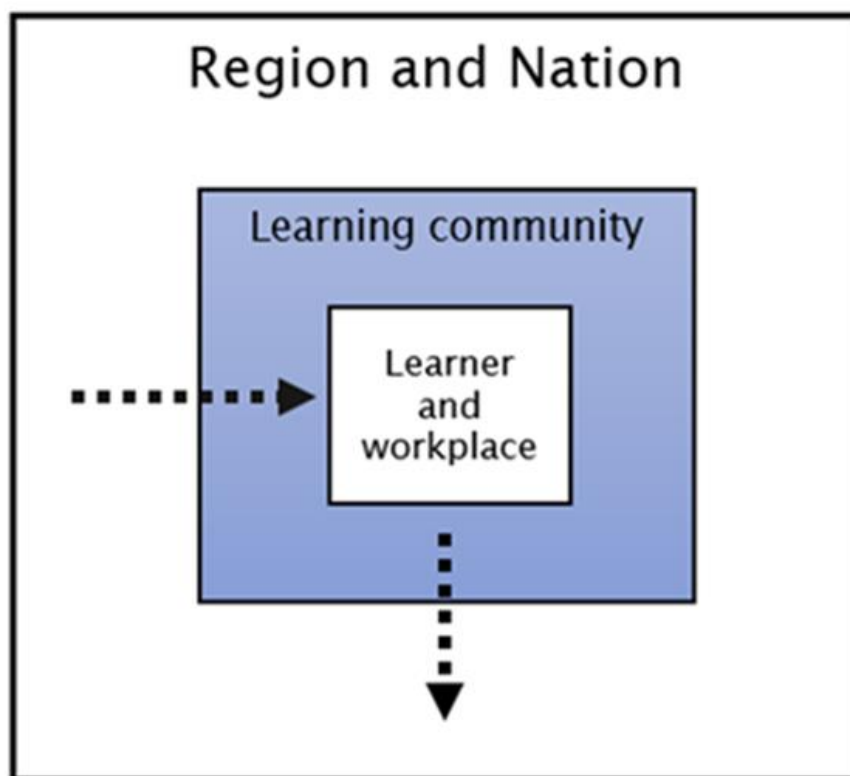


Figure 9.4: Management levels of technology enhanced teacher-learning

In the teacher and school level the participating teachers will work with their head teachers. In a learning community these two professionals will build the professional learning network with the teacher trainers and education officers. Then the learning communities will be managed and monitored by the academics, programme managers and policy makers.

The study findings suggest that the rural teachers of English are mostly connected (in many cases they have to depend on) to their head teachers and teacher-trainers for professional purposes. For managing any successful technology enhanced teacher-learning schemes these trios need to work together. As the teachers and the trainers will be mainly responsible for pedagogical practices and their implementation in teaching, the head teachers can be engaged

in monitoring the teachers' attendance, performance and progress. A management system should be developed where these three bodies can regularly interact and share relevant feedback.

In technology enhanced teacher-learning schemes there should be the practical strategies and tools for effective communication among the stakeholders within the learning community. It is important to clearly distribute the roles and responsibilities among them so that they know who should be contacted for what purposes. As this type of learning will be mainly in distant mode and via online interactions, it will be essential to ensure that the stakeholders know where to get support in case of difficulties and how to avail that.

- (iii) Technology enhanced teacher-learning approaches will be a new practice for rural Bangladeshi teachers, and this should be addressed properly in the management systems. In the beginning stages of the programme the participating teachers should be made familiar with the features and the strategies of this new approach. There should be regular feedback and review processes to cater for the needs and preferences of the target teachers. The administrative and management authorities of the technology enhanced teacher-learning schemes in rural Bangladesh will be required to acknowledge frequent changes and adjustments in management procedures of such innovative teacher-learning programmes. In this regard, I believe that the 'flexible' to 'controlled' approaches of management will be viable. In the 'flexible' stages the teachers' difficulties in using the technology, their need of positive motivation, and extended participation in the learning community will be considered. In opposition, in 'controlled' stages the teachers will work for achieving certain teacher-learning goals within the set time table, and their achievements and applications of learning in teaching will be assessed through structured procedures.
- (iv) The learning communities in technology enhanced teacher-learning schemes will involve participants with diverse levels of professional knowledge and capacities. This diversity is expected in a

collaborative learning environment, but any significant differences of the qualities of learners may hamper the overall learning practices. It should be an important management responsibility to identify (with the help of teacher trainers) any participants unsuitable in any learning communities and to place him/her to an appropriate one.

- (v) The administrative and management bodies of technology enhanced teacher-learning should focus on two major aspects of the schemes namely the relevance of the activities to participants' teaching practices and implementation of their learning in teaching. The monitoring and assessment procedures of these schemes should therefore be in two major areas: (a) teacher-learning objectives, contents and pedagogical approaches; (b) classroom teaching and students' learning experiences.
- (vi) The focus group participants, who are in fact the stakeholders of the future technology enhanced teacher-learning schemes in rural Bangladesh, came up with a number of operational strategies (please see Section 9.5.2.1 of this chapter for the detailed discussion) which they considered helpful to operationalise any technology enhanced teacher-learning schemes successfully with the rural Bangladeshi teachers of English. Their suggestions provide several useful strategies for managing the technology enhanced teacher-learning schemes. For example, they suggested various approaches on how to create a collaborative learning environment, ensure teachers' continuous engagement and organise systematic monitoring and assessment procedures. Their suggestions seem to be parallel to the post-constructivist learning theories and the globally recognised concepts of technology enhanced learning. For the effective management of any technology enhanced teacher-learning schemes in rural Bangladesh I recommend to address these stakeholders' relevant views and practical suggestions in the technology enhanced teacher-learning policies and practices (please refer to Section 9.5.2.1 of this chapter for the suggestions of the stakeholders).

9.6 Concluding remarks and further research directions

My research, detailed in this doctoral thesis, provides several new insights on educational research methods and teacher development plans. Although I focus my studies on the educational context of rural Bangladesh, the findings are transferrable to similar educational perspectives and those can potentially lead to new research initiatives.

a) Personal gains

The social and educational study described in this doctoral thesis provides me with several valuable learning experiences. Exploring the research area during my four years' scholastic journey has been beneficial personally, educationally and professionally. The process has improved my personal qualities such as independent and critical thinking capacities along with the problem solving skills to analyse complex situations and ideas. The educational benefits include my understanding of social science research methods through diverse approaches including reading, fieldwork and the collaboration with my research supervisors; and applying this in different research areas. I also gained professional benefits through enriching various marketable skills such as the leadership, communication and project management abilities particularly in the fields of educational research and tertiary level teaching.

b) Contributions

Although the context-driven approaches of research is common in educational studies, the on-going research practices on technology enhanced teacher-learning generally do not reflect on the sociological and cultural aspects. The issues like learning culture, technological applications in learning, pedagogical approaches and programme management procedures are often examined individually whereas the impact of technological applications generally receives priority in those research projects. Consequently, the findings and the recommendations of these studies do not provide any comprehensive and functional guidelines. In this thesis I explore the personal (such as behavioural and attitude related), social (such as learning culture and learning network), technological (such as affordances and types of intervention) and pedagogical (both educational and management features) issues of technology enhanced

teacher-learning and identify their intertwining relationship in critical manner. Consequently, I propose an overall operational structure of teacher-learning scheme for rural Bangladeshi secondary teachers of English.

In this thesis I made three unique contributions.

Firstly, I propose a critical and realistic research framework for exploring the feasibility and sustainability of technology enhanced teacher-learning approaches. The framework initially derived from the major learning theories, but based on the guidelines of the research data and their analysis it now contains the applied features of technology enhanced teacher-learning schemes. As a result, this framework is supported by both the learning theories and their operational procedures.

Secondly, this research serves as the baseline study for any technology enhanced teacher-learning programmes in rural Bangladesh. Although Bangladesh government is committed to incorporate technological interventions in all educational aspects, there is still no significant technology enhanced teacher-learning scheme visible in the country. As a critical realist investigator I explore the contextual elements such as personal, social, workplace and technological aspects of rural Bangladeshi teachers of English and propose a number of practical guidelines for designing and implementing technology enhanced teacher-learning schemes.

Thirdly, I suggest and apply an ‘empowering’ data collection method in my research where I educate my research participants on technology enhanced teacher-learning approaches (by covering both the pedagogical and technological issues), provide them relevant practical experiences of using technological devices and applications (by using computer and the Internet), and enable reflections, opinions and suggestions. The approach has been successful in gaining context-driven and realistic research data.

c) Transferability

The external validity or the transferability of any research is the key to understand the extent of its applicability in a different context or setting (Merriam, 1998). As every context is unique, the measurement of transferability of research is generally difficult (even not possible as claimed by Erlandson, Harris, & Skipper, 1993). However, the individual findings can

provide relevant examples and explanations of broad situational perspectives (Denscombe, 2014). To enhance the scope of transferability the researchers need to provide the detailed description of the research context and the research boundaries (Firestone, 1993). Validating the findings with the stakeholders of the concerned context is another approach, particularly in the educational research (Bassey, 1981).

In this research, one of my key investigation areas is the teacher-learning culture of rural Bangladeshi teachers of English. Based on my educational background on English Language Teaching (ELT) and professional experiences of working as a teacher trainer in rural Bangladesh I find these teachers' professional needs (for example, the requirement of gaining content knowledge in English which is a foreign language and the specific pedagogical approaches to teach the English subject to students), motivations and professional challenges different from the teachers of other subjects. I therefore narrowed down my investigation area and focused on the teachers of English only. However, in rural secondary schools the teachers teaching other subjects generally have the similar educational and teacher-learning backgrounds and they work in similar workplace conditions. Therefore, several findings with the rural Bangladeshi teachers of English such as their professional learning preferences, learning network and the attitude to the use of technology for professional development are comparable to the teachers of other subjects. Yet, the teachers of urban schools in the country or even in different regions may have different considerations about technology enhanced teacher-learning programmes. Moreover, in the case of a different country or geographic location the government's policies, teachers' learning culture, and the state of educational and technological facilities may determine the practicality of the technology enhanced teacher-learning procedures that I identify in this thesis. I however claim that the framework I have developed contains both the theoretical base and the implementation procedures of the technology enhanced teacher-learning, and thus it can be followed to gain the essential baseline information for technology enhanced teacher-learning initiatives in any comparable educational context.

d) Future directions

The research methodology and the findings of this thesis unfold various research options. For example, by showing the systematic connections among the teacher-learning pedagogies, technological interventions, application of learning in teaching, and the assessment of the teacher-learning it creates the scope to design, implement and study a phase of technology enhanced teacher-learning scheme. While implementing the scheme the stakeholders' motivations, achievements and learning applications can be assessed individually or collectively. Although in this research my focus is on teachers' professional learning and development, future studies can explore non-professional aspects such as how or to what extent technology enhanced teacher-learning enhances its stakeholders' social capital or job satisfaction. Those studies can also investigate the dynamics of teachers' professional learning networks and explain what helps or limits those to become collaborative and sustainable. Besides, the features of democratic practices and gender sensitivity in technology enhanced teacher-learning can be realised through further investigations. Another research option can be the review of Bangladesh government's teacher development policies and to compare those with the approaches of technology enhanced teacher-learning which I recommend for the rural Bangladeshi teachers of English.

Although various research projects can be conducted on technology enhanced teacher-learning, the important step I consider should be the initiation of such programmes in careful manner. This thesis provides the baseline information to design and implement effective technology enhanced teacher-learning programmes in rural Bangladesh. It is vital that the components and stages of these programmes are thoroughly researched by the educational investigators who can suggest the necessary adjustments according to the demands of the context and the outcomes of the programmes.

Appendices

Appendix 1: Survey Questionnaire with Cover Letter (in English)

Questionnaire (translated)

Dear participant,

I would appreciate if you could participate in this research and contribute by responding to the questionnaire attached. The study is a part of my doctoral research at the University of Southampton, UK.

This is for your information that in my research entitled "Technology enhanced teacher-learning in a developing country" I am trying to explore a suitable teacher development approach for the secondary English teachers of rural Bangladesh where technology can be used for professional learning purposes. For this, I am trying to study the existing learning culture of rural Bangladesh and the learning styles of the secondary English teachers who are working there. By using this questionnaire I am expecting to collect some valuable data which can interpret the mentioned learning related features of the secondary English teachers of rural Bangladesh.

This questionnaire contains the following eight sections:

- Section A has ten items which are personal and profession-related questions.
- Section B has five items which are related to your learning preferences.
- Ten items of Section C are about the people you contact or meet for discussing your teaching or learning related issues, or for taking any professional help/ permission.
- Five questions of Section D deals with the personal and work-place related advantages and challenges you experience while attending any teacher training programme.
- Section E has five questions dealing with your perceptions about using technology for learning.
- Ten questions of Section F deal with your learning needs for teaching English.
- Section G has five questions which are about teacher training procedures.
- The final ten questions of Section H are about the suitability of teaching/ learning activities in your context.

All the items of the questionnaire have a number of options to choose for answering, and you just need to put a tick mark on one which you consider best describes your situation. The questionnaire should take about 25 minutes to complete.

I would like to confirm you that your responses in this questionnaire only inform the features of your learning environment and learning styles. I would also like to ensure that the data collected from this questionnaire will be used for research purposes only.

Thank you in advance for taking the time to fill in this questionnaire and providing your valuable contribution to my research.

Sincerely,

Md Golam Jamil
The researcher

Dr Martin Dyke and Dr John Schulz
Supervisors of the Study

Section A

Your personal information:

1. Gender: ☐ Male ☐ Female
2. Age: ☐ below 30 years ☐ 30-50 years ☐ above 50 years
3. Total teaching experience: ☐ less than 10 years ☐ 20-30 years ☐ more than 30 years
4. Teaching English for: ☐ less than 10 years ☐ 20-30 years ☐ more than 30 years
5. Number of teacher training programmes attended: ☐ Nil ☐ 1-3 ☐ more than 3
6. Number of computer training received: ☐ Nil ☐ 1-3 ☐ more than 3
7. Which statement is true for you:
 - ☐ I can operate a computer well.
 - ☐ I have recently started learning to operate a computer.
 - ☐ I started learning to operate a computer, but stopped it for some reasons.
 - ☐ I do not know how to operate a computer and I never started to learn it.

Your school related information:

8. The educational institution where I teach is a
 - ☐ Government High School
 - ☐ Non-government High School
 - ☐ Government Madrasa
 - ☐ Non-government Madrasa
9. The number of English teachers in my school is
 - ☐ only me
 - ☐ 2-4
 - ☐ more than 4
10. The following statement is true for my school:
 - ☐ My school has a computer with Internet connection.
 - ☐ My school has a computer without Internet connection.
 - ☐ My school does not have any computer.

Questionnaire (translated)

Section B**Which option best describes your situation:**

11. I like reading teacher training related books for improving my professional qualities.

☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

12. Teacher training programmes are generally useful for my teaching profession.

☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

13. By analysing my previous teaching activities I can improve my teaching performances.

☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

14. Other teachers can learn from my personal teaching experiences.

☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

15. I have no problem in attending group discussions with other teachers.

☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

Section C

How often do you meet or contact these people for discussing your teaching or learning related issues, or for taking any professional help/ permission?

16. English teachers who teach at my school

☐ Very often
☐ Regularly
☐ Sometimes
☐ Once or twice
☐ Never

17. English teachers who teach at other schools

☐ Very often
☐ Regularly
☐ Sometimes
☐ Once or twice
☐ Never

18. Teachers teaching other subjects at my school

☐ Very often
☐ Regularly
☐ Sometimes
☐ Once or twice
☐ Never

19. Teachers teaching other subjects at other schools

☐ Very often
☐ Regularly
☐ Sometimes
☐ Once or twice
☐ Never

20. District/ Thana Education officers

☐ Very often
☐ Regularly
☐ Sometimes
☐ Once or twice
☐ Never

Section D

Which option best describes your situation:

21. Any known education experts

- ☐ Very often
- ☐ Regularly
- ☐ Sometimes
- ☐ Once or twice
- ☐ Never

22. Education officers of local non-government organisations (NGOs)

- ☐ Very often
- ☐ Regularly
- ☐ Sometimes
- ☐ Once or twice
- ☐ Never

23. Government Teacher Trainers

- ☐ Very often
- ☐ Regularly
- ☐ Sometimes
- ☐ Once or twice
- ☐ Never

24. Headmaster or Assistant Headmaster of my school

- ☐ Very often
- ☐ Regularly
- ☐ Sometimes
- ☐ Once or twice
- ☐ Never

25. Any family members

- ☐ Very often
- ☐ Regularly
- ☐ Sometimes
- ☐ Once or twice
- ☐ Never

26. My school authority encourages me to attend teacher training programmes.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

27. My family members will not discourage me if I decide to take a teacher training course.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

28. I have no problem in attending any teacher learning activities at any venue outside my district.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

29. I can comfortably study or work (such reading, writing and script checking) at my residence.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

30. I can comfortably study or work (such reading, writing and script checking) at my school.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly disagree

Questionnaire (translated)

Section E

What do you think about the following statements. Choose a suitable option for giving your opinion:

31. By using a computer and Internet teachers can gain all professional knowledge for teaching.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree
32. By using a computer teachers can develop all required teaching skills.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree
33. Learning to operate a computer is not very difficult.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree
34. A teacher teaching any subject needs to know how to operate a computer.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree
35. If I get a chance to learn computer now, I will take the opportunity.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

Section F

Which option best describes your situation?
 Here, EFT means English for Today books.

36. I can easily teach _____ of the EFT lessons with a little or no preparation:
- ☐ All
☐ Most
☐ Some
☐ Only a few
☐ None
37. _____ of the vocabulary of EFT books is known to me.
- ☐ All
☐ Most
☐ Some
☐ Only a few
☐ None
38. I completely understand _____ of the subject matters of the EFT books.
- ☐ All
☐ Most
☐ Some
☐ Only a few
☐ None
39. I generally keep _____ of my class time for student activities such as group work, pair work and silent reading.
- ☐ All
☐ Most
☐ Some
☐ Only a few
☐ None
40. I know the teaching/ learning objectives of _____ of the EFT lessons.
- ☐ All
☐ Most
☐ Some
☐ Only a few
☐ None

Section G

Which option of the following statements do you consider best suits your situation ?

41. I myself can decide suitable teaching and learning activities for _____ of the EFT lessons:

☐ All
☐ Most
☐ Some
☐ Only a few
☐ None

42. In _____ of my classes I feel satisfied in managing students and their activities in disciplined way.

☐ All
☐ Most
☐ Some
☐ Only a few
☐ None

43. In _____ of my classes I can easily ensure my students' attention and motivation for the lesson.

☐ All
☐ Most
☐ Some
☐ Only a few
☐ None

44. I can give _____ of my class instructions in English.

☐ All
☐ Most
☐ Some
☐ Only a few
☐ None

45. I allow my students to reflect, analyse and give personal opinions in _____ of my classes.

☐ All
☐ Most
☐ Some
☐ Only a few
☐ None

46. Teachers at my school are knowledgeable enough to answer my teaching related queries.

☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

47. Teachers of other schools in my district are knowledgeable enough to answer my teaching related queries.

☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

48. Teachers should decide the content and activities of a teacher training programme they participate.

☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

49. In a professional discussion group teachers of all ages and designations can be the members.

☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

50. Teacher training should be on-going.

☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

Questionnaire (translated)

Section H

Which option of the following statements do you consider best suits your situation ?

51. I will prefer a training course to participate which will allow me to stay at my residence and teach at my school.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree
52. There should be a full-time teacher trainer whom I can contact to share my teaching/ learning issues.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree
53. I prefer sharing my teaching related problems/ queries only with the teachers who are known to me.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree
54. I believe I can learn best teaching practices by observing other teachers' teaching.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree
55. I am not hesitant while sharing my teaching/learning related problems with the teachers who are not known to me.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree
56. In a teacher training programme some good examples of class teaching should be presented.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree
57. I believe it is possible to learn best teaching practices from other teachers' teaching experiences.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree
58. In a teacher training programme individual teachers' teaching and learning related problems should be discussed.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree
59. In a teacher training programme the participants should be assessed on the quality of their participation.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree
60. In a teacher training programme teachers' should be given tasks or assignments in a regular basis.
- ☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

Appendix 2: Survey Questionnaire with Cover Letter (in Bangla)

প্রিয় শিক্ষক,

শুভেচ্ছা নিবেন। শিক্ষার মান উন্নয়নে গবেষণা অত্যন্ত জরুরি। এ লক্ষ্যে আমরা একটি গবেষণা কর্ম হাতে নিয়েছি। অনুগ্রহ করে সংযুক্ত প্রশ্নপত্রের উত্তর প্রদান করে আমাদের সহযোগিতা করবেন। গবেষণার মূল প্রতিপাদ্য বিষয় হচ্ছে ‘উন্নয়নশীল দেশে প্রযুক্তি নির্ভর শিক্ষক প্রশিক্ষণ’। যার উদ্দেশ্য বাংলাদেশের গ্রামীণ মাধ্যমিক বিদ্যালয়গুলির ইংরেজি শিক্ষকদের পেশাগত দক্ষতা বৃদ্ধির উপায় উদ্ভাবন করা। এই লক্ষ্যে আমরা বাংলাদেশের গ্রামীণ অঞ্চলে শিক্ষার ধরন ও শিক্ষকদের শিক্ষা গ্রহণের সনাতন পদ্ধতিগুলি জানার চেষ্টা করবো। আশা করছি আপনার দেয়া উত্তরসমূহের মাধ্যমে উক্ত বিষয়গুলি সম্পর্কে আমরা মূল্যবান তথ্য সংগ্রহ করতে সক্ষম হবো।

প্রশ্নপত্রে নিম্নোক্ত আটটি অংশ রয়েছে :

- প্রথম অংশে দশটি প্রশ্ন রয়েছে যেগুলি আপনার ব্যক্তিজীবন ও পেশা সম্পর্কিত।
- দ্বিতীয় অংশে পাঁচটি প্রশ্ন রয়েছে যেগুলির বিষয়বস্তু শিক্ষাগ্রহণ বিষয়ে আপনার সম্পর্কিত ব্যক্তিগত পছন্দ/অপছন্দ বিষয়ক।
- তৃতীয় অংশের দশটি প্রশ্ন আপনার পেশাগত শিক্ষার সাথে জড়িত ব্যক্তিবর্গ সম্পর্কিত যাদের কাছ থেকে আপনি বিভিন্ন সময়ে পেশাগত সহযোগিতা কিংবা নানা বিষয়ে অনুমতি নিয়ে থাকেন।
- চতুর্থ অংশের পাঁচটি প্রশ্ন শিক্ষক প্রশিক্ষণ বিষয়ক এবং তদসংক্রান্ত আপনার ব্যক্তিগত ও প্রাতিষ্ঠানিক সুবিধা ও অসুবিধা সম্পর্কিত।
- পঞ্চম অংশে পাঁচটি প্রশ্ন রয়েছে যেগুলি প্রযুক্তি নির্ভর শিক্ষার প্রতি আপনার অনুভূতি ও মতামত সম্পর্কিত।
- ষষ্ঠ অংশের প্রশ্ন সংখ্যা দশ এবং প্রশ্নগুলি আপনার ইংরেজি শিক্ষাদানের ক্ষেত্রে যেসকল চাহিদা রয়েছে তদসম্পর্কিত।
- সপ্তম অংশে পাঁচটি প্রশ্ন রয়েছে যেগুলির বিষয়বস্তু শিক্ষক প্রশিক্ষণের ধরন সম্পর্কিত।
- সর্বশেষ অষ্টম অংশের দশটি প্রশ্ন টেকসই শিক্ষক প্রশিক্ষণ কৌশল বিষয়ক।

প্রশ্নপত্রে অন্তর্ভুক্ত প্রতিটি প্রশ্নের উত্তর প্রদানের জন্যে সম্ভাব্য কতগুলি উত্তর দেয়া আছে, যেগুলি থেকে আপনি উপযুক্ত একটি উত্তর বেছে নিয়ে টিক চিহ্ন প্রদান করবেন। আশা করি সবগুলি প্রশ্নের উত্তর দিতে আপনার আনুমানিক পঁচিশ মিনিট সময় লাগবে।

এই প্রশ্নপত্রের ব্যাপারে আপনি নিশ্চিত থাকতে পারেন যে, প্রশ্নগুলি শুধুমাত্র আপনার ব্যক্তিগত শিক্ষাগ্রহণ এবং শিক্ষার পরিবেশ সম্পর্কিত। তাছাড়া আপনার সদয় অবগতির জন্য আরো জানানো যাচ্ছে যে, আপনার দেয়া উত্তরগুলি শুধুমাত্র গবেষণার কাজে ব্যবহৃত হবে।

কষ্ট করে প্রশ্নসমূহের উত্তর ও মূল্যবান মতামত প্রদান করলে আপনার প্রতি আমরা অশেষ কৃতজ্ঞতায় আবদ্ধ থাকবো।

ধন্যবাদান্তে

মুহাম্মদ গোলাম জামিল

ইউনিভার্সিটি অব সাউদামপ্টন, যুক্তরাজ্য

শিমুল মিলকী

গবেষণা সহকারী

প্রথম অংশ

ব্যক্তিগত তথ্য :

১. লিঙ্গ : ☐ পুরুষ ☐ মহিলা২. বয়স : ☐ ৩০ বছরের কম ☐ ৩০- ৫০ বছর ☐ ৫০ বছরের উপর৩. সর্বমোট শিক্ষাদানের অভিজ্ঞতা : ☐ ১০ বছরের কম ☐ ১০ - ২০ বছর ☐ ২০ বছরের অধিক৪. সর্বমোট ইংরেজি শিক্ষাদানের অভিজ্ঞতা : ☐ ১০ বছরের কম ☐ ১০ - ২০ বছর ☐ ২০ বছরের অধিক৫. শিক্ষক প্রশিক্ষণ কার্যক্রমে অংশগ্রহণ করেছেন : ☐ একটিও না ☐ ১ - ৩ টি ☐ ৩ টির অধিক৬. কম্পিউটার প্রশিক্ষণ গ্রহণ করেছেন : ☐ একটিও না ☐ ১ - ৩ টি ☐ ৩ টির অধিক

৭. নিম্নের কোন তথ্যটি আপনার জন্য অধিক প্রয়োজ্যঃ

☐ আমি ভালভাবে কম্পিউটার চালাতে পারি।☐ আমি সম্প্রতি কম্পিউটার চালানো শিক্ষিতে শুরু করেছি।☐ আমি কম্পিউটার চালনা শিখতে শুরু করেছিলাম, তবে কয়েকটি কারণে এগুতে পারিনি।☐ আমি কখনও কম্পিউটার চালনা শিখতেও শুরু করিনি এবং জানিও না এটি কিভাবে চালাতে হয়।

বিদ্যালয় সম্পর্কিত তথ্য :

৮. আমি যে বিদ্যালয়ে পড়াই তা একটি :

☐ সরকারি উচ্চবিদ্যালয়☐ বেসরকারি উচ্চবিদ্যালয়☐ সরকারি মাদরাসা☐ বেসরকারি মাদ্রাসা

৯. আমার বিদ্যালয়ে ইংরেজি পড়ান এমন শিক্ষকের সংখ্যা :

☐ শুধুমাত্র আমি ☐ ২ - ৪ জন ☐ ৪ জনের অধিক

১০. আমার বিদ্যালয়ের ক্ষেত্রে প্রযোজ্য :

☐ ইন্টারনেট যুক্ত কম্পিউটার আছে।☐ কম্পিউটার আছে তবে তা ইন্টারনেটযুক্ত নয়।☐ আমার বিদ্যালয়ের কম্পিউটার ও ইন্টারনেট সম্পর্কিত তথ্য আমার জানা নাই।

২য় অংশ

কোন উত্তরটি আপনার জন্য বিশেষভাবে প্রযোজ্য ?

১১. নিজের পেশার মান উন্নয়নের লক্ষ্যে আমি শিক্ষক প্রশিক্ষণের উপর লেখা বই পড়তে পছন্দ করি।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

১২. শিক্ষক প্রশিক্ষণ কার্যক্রমগুলি (সরকারি কিংবা বেসরকারি) আমার পেশাগত মান উন্নয়নে সহায়তা করতে সক্ষম।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

১৩. আমার অতীত শিক্ষাদান কর্মকাণ্ড পর্যালোচনা করে আমি আমার ব্যক্তিগত শিক্ষাদান পদ্ধতির উন্নয়ন সাধন করতে পারি।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

১৪. অন্যান্য শিক্ষকবৃন্দ আমার ব্যক্তিগত শিক্ষাদান কার্যক্রম পর্যালোচনা করে শিক্ষাদান বিষয়ক জ্ঞান অর্জন করতে পারেন।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

১৫. অন্যান্য শিক্ষকদের নিয়ে একসাথে বসে আলোচনা করতে আমার কোন সমস্যা নেই।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৩য় অংশ

নিম্নোক্ত ব্যক্তিবর্গের সাথে আপনি আপনার ব্যক্তিগত শিক্ষাদান বা শিক্ষাগ্রহণের সম্পর্কে, পেশাগত সহযোগিতা বা অনুমতির প্রয়োজনে কখন যোগাযোগ কিংবা দেখা সাক্ষাৎ করেন।

১৬. আমার বিদ্যালয়ের ইংরেজি শিক্ষকবৃন্দের সাথে:

- ☐ প্রায় সব সময়
☐ নিয়মিত
☐ মাঝেমধ্যে
☐ কদাচিৎ
☐ কখনই নয়

১৭. অন্য বিদ্যালয়ের ইংরেজি শিক্ষকবৃন্দের সাথে:

- ☐ প্রায় সব সময়
☐ নিয়মিত
☐ মাঝেমধ্যে
☐ কদাচিৎ
☐ কখনই নয়

১৮. আমার বিদ্যালয়ের অন্যান্য বিষয়ের শিক্ষকবৃন্দের সাথে:

- ☐ প্রায় সব সময়
☐ নিয়মিত
☐ মাঝেমধ্যে
☐ কদাচিৎ
☐ কখনই নয়

১৯. অন্য বিদ্যালয়ের অন্যান্য বিষয়ের শিক্ষকবৃন্দের সাথে:

- ☐ প্রায় সব সময়
☐ নিয়মিত
☐ মাঝেমধ্যে
☐ কদাচিৎ
☐ কখনই নয়

২০. জেলা/উপজেলা শিক্ষা কর্মকর্তার সাথে:

- ☐ প্রায় সব সময়
☐ নিয়মিত
☐ মাঝেমধ্যে
☐ কদাচিৎ
☐ কখনই নয়

২১. পরিচিত কোন শিক্ষা বিষয়ক অভিজ্ঞ কিংবা বিশেষজ্ঞ ব্যক্তির সাথে:

- ☐ প্রায় সব সময়
☐ নিয়মিত
☐ মাঝেমধ্যে
☐ কদাচিৎ
☐ কখনই নয়

২২. স্থানীয় বেসরকারি প্রতিষ্ঠানের শিক্ষা কর্মকর্তা অথবা শিক্ষক প্রশিক্ষকবৃন্দের সাথে:

- ☐ প্রায় সব সময়
☐ নিয়মিত
☐ মাঝেমধ্যে
☐ কদাচিৎ
☐ কখনই নয়

২৩. সরকারি শিক্ষক প্রশিক্ষকবৃন্দের সাথে:

- ☐ প্রায় সব সময়
☐ নিয়মিত
☐ মাঝেমধ্যে
☐ কদাচিৎ
☐ কখনই নয়

২৪. আমার বিদ্যালয়ের প্রধান শিক্ষক এবং সহকারি প্রধান শিক্ষকের সাথে:

- ☐ প্রায় সব সময়

☐ নিয়মিত

- ☐ মাঝেমধ্যে
☐ কদাচিৎ
☐ কখনই নয়

২৫. আমার পরিবারের কোন সদস্যের সাথে:

- ☐ প্রায় সব সময়
☐ নিয়মিত
☐ মাঝেমধ্যে
☐ কদাচিৎ
☐ কখনই নয়

চর্চা অংশ

কোন উত্তরটি আপনার ক্ষেত্রে প্রযোজ্য ?

২৬. শিক্ষা কার্যক্রমে অংশগ্রহণ করতে আমার বিদ্যালয়

কর্তৃপক্ষ আমাকে উৎসাহ প্রদান করেন:

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

২৭. আমি যদি কোন শিক্ষক প্রশিক্ষণ কার্যক্রমে অংশগ্রহণ করতে চাই তাহলে আমার পরিবারের সদস্যরা আমাকে বাধানিষেধ করবেন না।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

২৮. নেত্রকোণার বাইরে অনুষ্ঠিত কোন শিক্ষক প্রশিক্ষণ কার্যক্রমে অংশগ্রহণ করতে আমার সমস্যা নেই।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না

☐ দৃঢ়ভাবে না

২৯. আমি ঝামেলাবিহীনভাবে বাসায় বসে ব্যক্তিগত পড়াশোনা, বিদ্যালয়ের কাজ যেমন: ছাত্রদের খাতা দেখা ইত্যাদি সম্পন্ন করতে পারি।

☐ দৃঢ়ভাবে হ্যাঁ

☐ হ্যাঁ

☐ হ্যাঁও নয়, নাও নয়

☐ না

☐ দৃঢ়ভাবে না

৩০. আমি ঝামেলাহীনভাবে আমার কর্মক্ষেত্র বিদ্যালয়ে ব্যক্তিগত পড়াশোনা ও বিদ্যালয়ের কাজ যেমন: ছাত্রদের খাতা দেখা ইত্যাদি সম্পন্ন করতে পারি।

☐ দৃঢ়ভাবে হ্যাঁ

☐ হ্যাঁ

☐ হ্যাঁও নয়, নাও নয়

☐ না

☐ দৃঢ়ভাবে না

পঞ্চম অংশ

নিম্নোক্ত কোন উত্তরটি আপনার জন্য প্রযোজ্য?

৩১. কম্পিউটার এবং ইন্টারনেট ব্যবহারের মাধ্যমে শিক্ষকবৃন্দ সব ধরনের পেশাসম্পর্কিত জ্ঞান আহরণ করতে পারেন।

☐ দৃঢ়ভাবে হ্যাঁ

☐ হ্যাঁ

☐ হ্যাঁও নয়, নাও নয়

☐ না

☐ দৃঢ়ভাবে না

৩২. কম্পিউটার ব্যবহারের মাধ্যমে শিক্ষকবৃন্দ শিক্ষাদান সম্পর্কিত প্রয়োজনীয় সকল কৌশলের উপর দক্ষতা অর্জন করতে পারেন।

☐ দৃঢ়ভাবে হ্যাঁ

☐ হ্যাঁ

☐ হ্যাঁও নয়, নাও নয়

☐ না

☐ দৃঢ়ভাবে না

৩৩. কম্পিউটার চালানো শেখা কঠিন কোন বিষয় নয়।

☐ দৃঢ়ভাবে হ্যাঁ

☐ হ্যাঁ

☐ হ্যাঁও নয়, নাও নয়

☐ না

☐ দৃঢ়ভাবে না

৩৪. যে কোন বিষয়ে শিক্ষাদানের জন্য একজন শিক্ষককে কম্পিউটার চালানায় শিক্ষা গ্রহণ করা প্রয়োজন।

☐ দৃঢ়ভাবে হ্যাঁ

☐ হ্যাঁ

☐ হ্যাঁও নয়, নাও নয়

☐ না

☐ দৃঢ়ভাবে না

৩৫. আমি যদি এই মুহূর্তে কম্পিউটার চালানায়

শিক্ষাগ্রহণের সুযোগ পাই সুযোগটি গ্রহণ করবো।

☐ দৃঢ়ভাবে হ্যাঁ

☐ হ্যাঁ

☐ হ্যাঁও নয়, নাও নয়

☐ না

☐ দৃঢ়ভাবে না

ষষ্ঠ অংশ

নিচের কোন উত্তরটি আপনার জন্য প্রযোজ্য। এখানে

EFT হচ্ছে English for Today বইসমূহ, যে বইগুলি আপনি ক্লাসে পড়ান।

৩৬. আমি সহজেই ----- EFT lesson সামান্য প্রস্তুতি কিংবা বিনা প্রস্তুতিতে পড়াতে পারি।

☐ সবগুলি

☐ প্রায়সব

☐ কিছু

☐ অল্প কিছু

☐ একেবারেই নয়

৩৭. Eft বইগুলির ----- ইংরেজি শব্দের মানে

আমার জানা আছে।

☐ সবগুলি

☐ প্রায়সব

☐ কিছু

☐ অল্প কিছু

☐ একেবারেই নয়

৩৮. আমি Eft বইগুলির ----- lesson এর

বিষয়বস্তু সম্পূর্ণভাবে বুঝি।

☐ সবগুলি

☐ প্রায়সব

☐ কিছু

☐ অল্প কিছু

☐ একেবারেই নয়

৩৯. আমি সাধারণত ----- lesson এ ছাত্রছাত্রীদের

জন্য দলগত খাতা Pair work, ক্রত Silent reading এর মতো কাজগুলি রাখি।

☐ সবগুলি

☐ প্রায়সব

☐ কিছু

☐ অল্প কিছু

☐ একেবারেই নয়

৪০. আমি Eft বইগুলির ----- lesson এর

শিক্ষাদান কিংবা শিক্ষা লাভের উদ্দেশ্যগুলি (teaching learning objectives) জানি।

☐ সবগুলি

☐ প্রায়সব

☐ কিছু

☐ অল্প কিছু

☐ একেবারেই নয়

৪১. আমি নিজে নিজেই ----- Eft lesson গুলির

জন্য যথাযত শিক্ষাদান এবং ছাত্রছাত্রীদের উপযোগী শিক্ষাকার্যক্রম ঠিক করতে পারি।

☐ সবগুলি

☐ প্রায়সব

☐ কিছু

☐ অল্প কিছু

☐ একেবারেই নয়

৪২. আমার ----- ইংরেজি ক্লাসের নিয়ম শৃঙ্খলা

বজায় রাখার ব্যাপারে এবং ছাত্রছাত্রীদের শিক্ষাকার্যক্রম নিয়ন্ত্রণে আমি সন্তুষ্ট।

☐ সবগুলি

☐ প্রায়সব

☐ কিছু

☐ অল্প কিছু

☐ একেবারেই নয়

৪৩. ----- ইংরেজি ক্লাসে আমি ছাত্রছাত্রীদের

মনোযোগ আকর্ষণ এবং উদ্বুদ্ধকরণ সহজেই করতে পারি।

☐ সবগুলি

☐ প্রায়সব

☐ কিছু

☐ অল্প কিছু

☐ একেবারেই নয়

৪৪. আমি ----- ইংরেজি ক্লাসে ইংরেজিতে নির্দেশ ও

বর্ণনা (Lesson instruction) দিতে পারি।

☐ সবগুলি

☐ প্রায়সব

☐ কিছু

☐ অল্প কিছু

☐ একেবারেই নয়

৪৫. আমি ইংরেজ ক্লাসে ছাত্রছাত্রীদের শিক্ষা প্রতিফলন (Reflections) বিশ্লেষণ (analyses) এবং ব্যক্তিগত মতামত (personal opinions) দেয়ার সুযোগ রাখি।

- ☐ সবগুলি
☐ প্রায়সব
☐ কিছু
☐ অল্প কিছু
☐ একেবারেই নয়

সপ্তম অংশ

কোন মতামতটি আপনার জন্য সবচেয়ে বেশি প্রযোজ্য?

৪৬. আমার বিদ্যালয়ের শিক্ষকবৃন্দ শিক্ষাদান সম্পর্কিত আমার বিভিন্ন প্রশ্নের উত্তর দেয়ার জন্যে প্রয়োজনীয় জ্ঞান রাখেন।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৪৭. আমার তুলনায় অন্যান্য স্কুলের শিক্ষকবৃন্দ শিক্ষাদান সম্পর্কিত আমার বিভিন্ন প্রশ্নের উত্তর দেয়ার জন্যে প্রয়োজনীয় জ্ঞান রাখেন।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৪৮. একটি শিক্ষক প্রশিক্ষণ কার্যক্রমে অংশগ্রহণকারী শিক্ষকবৃন্দের উচিত প্রশিক্ষণটির বিষয়বস্তু ও কার্যক্রম কি হবে সে বিষয়ে সিদ্ধান্ত দেয়া।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৪৯. একটি পেশা সম্পর্কিত দলগত আলোচনায় সব বয়সের এবং সব পদবির শিক্ষকবৃন্দ অংশগ্রহণ করতে পারেন।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৫০. শিক্ষক প্রশিক্ষণ একটি চলমান প্রক্রিয়া হওয়া উচিত।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

অষ্টম অংশ

নিচের কোন উত্তরটি আপনার ক্ষেত্রে যথাযথ মনে করেন?

৫১) আমি এমন একটি শিক্ষক প্রশিক্ষণ কার্যক্রমে অংশগ্রহণ করতে চাই যা আমি ঘরে বসে করতে পারবো এবং প্রশিক্ষণ চলাকালীন সময়ে আমি বিদ্যালয়ে উপস্থিত থেকে শিক্ষাদান কার্যক্রম চালিয়ে যেতে পারবো।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৫২) এমন একজন শিক্ষক প্রশিক্ষক থাকা দরকার যার কাছে আমি আমার শিক্ষাদান কিংবা পেশাগত শিক্ষালাভ সম্পর্কিত বিষয় নিয়ে যেকোন সময় যোগাযোগ করতে পারবো।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৫৩. আমি আমার ব্যক্তিগত শিক্ষাদান সম্পর্কিত সমস্যাবলী আমার পরিচিত শিক্ষকদের সাথে আলোচনা করতে স্বাচ্ছন্দবোধ করি।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৫৪. আমি বিশ্বাস করি যে অন্য শিক্ষকদের শিক্ষাদান পদ্ধতি পর্যবেক্ষণ করে আমি উন্নত শিক্ষাদান পদ্ধতি সম্পর্কে জানতে পারবো।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৫৫. অপরিচিত শিক্ষকদের সাথে আমার শিক্ষাদান কিংবা শিক্ষাগ্রহণ সম্পর্কিত সমস্যাবলী আলোচনা করতে আমি সংকোচবোধ করিনা।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৫৬. শিক্ষক প্রশিক্ষণ কার্যক্রমে কিছু শিক্ষাদান সম্পর্কিত উদাহরণ সংযুক্ত করা উচিত।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৫৭. আমি বিশ্বাস করি যে, অন্যান্য শিক্ষকদের শিক্ষাদানের অভিজ্ঞতা থেকে উন্নত শিক্ষাদান পদ্ধতি সম্পর্কে জানলাভ করা যায়।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৫৮. একটি শিক্ষক প্রশিক্ষণ কার্যক্রমে শিক্ষকদের ব্যক্তিগত শিক্ষাদান এবং শিক্ষাগ্রহণ সম্পর্কিত সমস্যাবলী আলোচিত হওয়া উচিত।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৫৯. একটি শিক্ষক প্রশিক্ষণ কার্যক্রমে অংশগ্রহণকারী শিক্ষকদের অংশগ্রহণের মান যাচাইও অবহিত করা উচিত।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

৬০. একটি শিক্ষক প্রশিক্ষণ কার্যক্রমে শিক্ষকদের নিয়মিত অনুশীলনী পাঠ (assignment) দেয়া উচিত।

- ☐ দৃঢ়ভাবে হ্যাঁ
☐ হ্যাঁ
☐ হ্যাঁও নয়, নাও নয়
☐ না
☐ দৃঢ়ভাবে না

Appendix 3: Activity plan for workshop-led focus group discussion sessions

Technology enhanced teacher-learning in rural Bangladesh

Md Golam Jamil
PhD Student, Southampton Education School
University of Southampton, UK

Activity plan for

Workshop-led Focused Group Discussion Sessions

Dates:	25 th May-20 th June 2013
Location:	Netrakona, Bangladesh
Number of participants:	6
Number of sessions:	6 (two sessions/ week)
Duration of each session:	2 hours
Documentation type:	Video recording and note taking

Workshop-led Focused Group 1

Session 1 (45 minutes)

Objectives: The objectives of this session is to introduce the general features, advantages and challenges of reflection-based and technology-enhanced learning activities.

Preparation: Handouts, pens and papers

Discussion points : The participants will be made familiar with

- (a) the following features of reflection-based learning activities:
 - its nature of self-examination
 - difference from 'thinking' and
 - role of experience and context
- (b) the following advantages of reflection-based learning activities:
 - scope to link theories and practices
 - creating meaning from real life events
 - providing problem solving and flexible learning opportunities
 - enhancing thinking abilities to face workplace situations
- (c) the following challenges of reflection-based learning activities:
 - need to be systematic and focused to a certain practice
 - require to create space for all participants
 - need to incorporate multiple aspects
 - require confidence and openness

Session 2 (45 minutes)

Objectives: To introduce the application of the Internet and Online Discussion Forums, and let the participants observe how these tools can be used for reflection-based learning activities.

Preparation: One iPad (with Internet connection) for each participant, an assistant to help the participants while they practise learning activities with iPad.

Session 3 (30 minutes)

In a Focused Group discussion the feasibility of reflection-based and technology-enhanced learning activities in the participants' context will be discussed. The discussion will be focused on the following four areas:

- Participants' learning needs
- Participants' preferred learning approaches
- Role of learning network in this kind of learning activities
- Technological affordances

Workshop-led Focused Group 2

Session 1 (45 minutes)

Objectives: The objectives of this session is to introduce the general features, advantages and challenges of problem-based and technology-enhanced learning activities.

Preparation: Handouts, pens and papers

Discussion points : The participants will be made familiar with

- (a) the following features of problem-based learning activities:
 - how this approach of learning puts learners in a dilemma for exploring required knowledge, skills and suitable procedures
 - how it deals with complex and real world problems
 - features of computer-mediated, online and blended approaches
- (b) the following advantages of problem-based learning activities:
 - improves logical critical thinking, problem-solving and communication skills
 - encourages to use prior knowledge to build new knowledge through reflections and coordination
 - focuses on the need of individuals
 - meets the challenges of education-on-demand
- (c) the following challenges of problem-based learning activities:
 - appears to be over-ambitious
 - participants might feel the course disjointed
 - may take longer time
 - requires adequate resources and proper administrative support

Session 2 (45 minutes)

Objectives: To introduce the application of Emails and Online Blackboard learning management systems, and let the participants observe how these tools can be used for problem-based learning activities.

Preparation: One iPad (with Internet connection) for each participant, an assistant to help the participants while they practise learning activities with iPad.

Session 3 (30 minutes)

In a Focused Group discussion the feasibility of problem-based and technology-enhanced learning activities in the participants' context will be discussed. The discussion will be focused on the following four areas:

- Participants' learning needs
- Participants' preferred learning approaches
- Role of learning network in this kind of learning activities
- Technological affordances

Workshop-led Focused Group 3

Session 1 (45 minutes)

Objectives: The objectives of this session is to introduce the general features, advantages and challenges of dialogic and technology-enhanced learning activities.

Preparation: Handouts, pens and papers

Discussion points : The participants will be made familiar with

- (a) the following features of dialogic learning activities:
 - 'liberatory' or democratic communication, meaning making and social processes
- (b) the following advantages of dialogic learning activities:
 - highly effective for adult learners
 - happens in a real world setting
 - voice of the participating learners is established
 - discourses are built with 'situated meanings' and learners' attitudes, behaviours, values, and beliefs
- (c) the following challenges of dialogic learning activities:
 - involving personal experiences might be problematic
 - needs a suitable form of application
 - requires a Dialogic community
 - needs to be free from 'communicative anxiety'
 - needs a moderator or facilitator to ensure expected learning outcomes

Session 2 (45 minutes)

Objectives: To introduce and reinforce the application of Blogs and Online Discussion Forums, and let the participants observe how these tools can be used for reflection based learning activities.

Preparation: One iPad (with Internet connection) for each participant, an assistant to help the participants while they practise learning activities with iPad.

Session 3 (30 minutes)

In a Focused Group discussion the feasibility of dialogic and technology-enhanced learning activities in the participants' context will be discussed. The discussion will be focused on the following four areas:

- Participants' learning needs
- Participants' preferred learning approaches
- Role of learning network in this kind of learning activities
- Technological affordances

Workshop-led Focused Group 4

Session 1 (45 minutes)

Objectives: The objectives of this session is to introduce the general features, advantages and challenges of case-based and technology-enhanced learning activities.

Preparation: Handouts, pens and papers

Discussion points : The participants will be made familiar with

(a) the following features of case-based learning activities:

- partial and historical aspects
- real and artificially designed simulations
- complex social and professional situations

(b) the following advantages of case-based learning activities:

- generates context-specific knowledge
- motivates successful professional debates and discussions
- enhances self-critiquing skills
- improves higher order skills

(c) the following challenges of case-based learning activities:

- require problematic cases
- connecting theoretical understanding and practical experience might be difficult
- possibility of oversimplify case materials

Session 2 (45 minutes)

Objectives: To introduce and reinforce the application of Websites and Online Whiteboards, and let the participants observe how these tools can be used for case based learning activities.

Preparation: One iPad (with Internet connection) for each participant, an assistant to help the participants while they practise learning activities with iPad.

Session 3 (30 minutes)

In a Focused Group discussion the feasibility of case-based and technology-enhanced learning activities in the participants' context will be discussed. The discussion will be focused on the following four areas:

- Participants' learning needs
- Participants' preferred learning approaches
- Role of learning network in this kind of learning activities
- Technological affordances

Workshop-led Focused Group 5

Session 1 (45 minutes)

Objectives: The objectives of this session is to introduce the general features, advantages and challenges of apprenticeship-based and technology- enhanced learning activities.

Preparation: Handouts, pens and papers

Discussion points : The participants will be made familiar with

(a) the following features of apprenticeship-based learning activities:

- guided-experience and scaffolding
- master-novice dependence
- continuous communication and interaction

(b) the following advantages of apprenticeship-based learning activities:

- provides confidence, experience and expertise
- improves professional outputs
- facilitates authentic learning experiences
- can be designed with structured and sequenced learning activities

(c) the following challenges of apprenticeship-based learning activities:

- takes more time in observing and learning
- requires continuous communication
- needs to involve skilled and knowledgeable facilitators
- needs to incorporate cognitive knowledge

Session 2 (45 minutes)

Objectives: To introduce and reinforce the application of CD and Websites, and let the participants observe how these tools can be used for apprenticeship -based learning activities.

Preparation: One iPad (with Internet connection) for each participant, an assistant to help the participants while they practise learning activities with iPad.

Session 3 (30 minutes)

In a Focused Group discussion the feasibility of apprenticeship-based and technology-enhanced learning activities in the participants' context will be discussed. The discussion will be focused on the following four areas:

- Participants' learning needs
- Participants' preferred learning approaches
- Role of learning network in this kind of learning activities
- Technological affordances

Workshop-led Focused Group 6

Session 1 (45 minutes)

Objectives: The objectives of this session is to introduce the general features, advantages and challenges of project-based and technology- enhanced learning activities.

Preparation: Handouts, pens and papers

Discussion points : The participants will be made familiar with

- (a) the following features of project-based learning activities:
 - learning by doing
 - problem-based education
 - systematic construction of knowledge and skills
- (b) the following advantages of project-based learning activities:
 - engage in goal-based practical learning activities
 - emphasise collaboration and inquiry
 - create scopes for active learning and disciplined inquiry
 - help achieve social and cognitive aims, and decision making skills
 - provide a deeper understanding of contents or subject-matters
- (c) the following challenges of project-based learning activities:
 - raising self-awareness on autonomous learning processes
 - ensuring professionalism while working collaboratively
 - ensuring consciousness about social responsibilities
 - employing scientific measures to evaluate learning outcomes
 - supplying motivating questions and guidelines to meet pedagogical and professional objectives

Session 2 (45 minutes)

Objectives: To introduce and reinforce Blackboard learning management systems and Online Whiteboards, and let the participants observe how these tools can be used for project -based learning activities.

Preparation: One iPad (with Internet connection) for each participant, an assistant to help the participants while they practise learning activities with iPad.

Session 3 (30 minutes)

In a Focused Group discussion the feasibility of project-based and technology-enhanced learning activities in the participants' context will be discussed. The discussion will be focused on the following four areas:

- Participants' learning needs
- Participants' preferred learning approaches
- Role of learning network in this kind of learning activities
- Technological affordances

Appendix 4: Information sheet for survey participants



Participant Information Sheet for survey

Study Title: Technology enhanced teacher-learning in a developing country

Researcher: Md Golam Jamil

Ethics number: 5954

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

Who is the researcher and what is the research about?

I am a Senior Lecturer (on study leave) at BRAC University's Institute of Languages which is situated in Dhaka, Bangladesh. Presently, I am pursuing a PhD research programme at the University of Southampton, UK, and my studies here are partially funded by the university's research scholarships.

In his research I am exploring suitable technology enhanced learning approaches for secondary English teachers of rural Bangladesh. In this regard, I am conducting a survey with a questionnaire where there are sixty items for responding.

What does the survey contain?

The questionnaire contains eight sections which cover the following areas:

- Section A has ten items which are personal and profession-related questions.
- Section B has five items which are related to your learning preferences.
- Ten items of Section C are about the people you contact or meet for discussing your teaching or learning related issues, or for taking any professional help/ permission.
- Five questions of Section D deals with the personal and work-place related advantages and challenges you experience while attending any teacher training programme.
- Section E has five questions dealing with your perceptions about using technology for learning.
- Ten questions of Section F deal with your learning needs for teaching English.
- Section G has five questions which are about teacher training procedures.
- The final ten questions of Section H are about the suitability of teaching/ learning activities in your context.

Why have I been chosen?

In my research I am trying to explore the present state of the learning environment of rural Bangladesh and the learning styles of the secondary English teachers working there. Additionally, I am investigating the scope and procedures for the effective involvement of technology in these teachers' learning practices. I believe your voluntary participation and responses to this survey questionnaire as an English teacher of a rural Bangladeshi secondary school can provide appropriate and useful data for serving these purposes. Therefore, your voluntary participation is greatly desirable in this study.

Are there any other schools or teachers engaged in this survey?

Yes, I am expecting that about 200 English teachers from fifty schools in this district will participate in this survey.

What will happen to me if I take part?

You will be given a questionnaire which has sixty items for responding. All the items have a number of options (from 2 to 5) to choose for answering, and you just need to put a tick mark

Appendix 4

on one which you consider best describes your situation. The questionnaire should take about 25 minutes to complete. Your responses will be completely anonymous and there will be no means for me to identify who has responded the questionnaire. There will be no follow-up activity and therefore you will not be contacted for this survey purpose after you submit your completed copy. You will be given a local address where you can contact for receiving information on the findings of this research.

Are there any benefits in my taking part?

You might not get any personal benefit for participating in this study, but it can be expected that the findings of this study would benefit the greater teacher community and also the teacher trainers, school administrators and the researchers who particularly are interested about technology enhanced teaching and learning. I hope your participation in this study would provide you a scope to express your personal opinions regarding a number of teaching and learning related issues. I also believe that you will find an enjoyable opportunity to reflect upon your experiences and thoughts on the teaching and learning areas which this study covers.

Are there any risks involved?

There will be no risk involved when you participate in this study. Although you will need to provide your personal details (age, years of teaching experience, number of teacher training or computer training received) and responses on your perceptions and attitudes regarding teaching and learning practices, I can assure that your information will only be used for research purposes. Your responses will be completely anonymous as you will not be asked to write your name or the name of your school on any part of the questionnaire. Additionally, I will treat your responses confidential and store your data in a password protected computer which can be accessed by me only. Moreover, I will not share your completed questionnaire copy with any third parties.

Will my participation be confidential?

The data collected through your completed questionnaire will only be used for academic purposes. Your responses will be completely anonymous as you will not be asked to write your name or the name of your school on any part of the questionnaire. Additionally, your responses will be treated as confidential and the data will be stored in a password protected computer which can be accessed by me only. Moreover, your completed questionnaire copy will not be shared with any third parties.

What happens if I change my mind?

Your participation in this study is completely voluntary. You can withdraw your participation from this study at any time without any penalty.

What happens if something goes wrong?

If you have any concern or complaint about this study, you may contact Head of Research Governance, Dr Martina Prude via email at mad4@soton.ac.uk or call via this telephone number: 44-02380-595058.

Where can I get more information?

If you have any questions about this study and its findings, you may contact me via email at mgj1g11@soton.ac.uk. Alternatively, you can write letters or call to the following person who will quickly convey your queries to me. I will answer your queries via e-mail to my representative, and he will then provide you a print copy of it as soon as possible.

Shimul Milky

Journalist

Purba Paar, Choto Pukur, New Town

Netrakona Sadar, Netrakona

Bangladesh

Telephone number: 88-01717111468

Thank you.

Md Golam Jamil

Doctoral researcher, University of Southampton, UK

Appendix 5: Survey participants' consent form (in English and Bangla)



CONSENT FORM for SURVEY PARTICIPANTS

Study title: Technology enhanced teacher-learning in a developing country
Researcher name: Md Golam Jamil
Ethics reference: 5954

Please initial the box (es) if you agree with the statement(s):

I have read and understood the information sheet (19th April, Version 1) and have had the opportunity to ask questions about the study.

☐

I agree to take part in this research project and agree for my data to be recorded and used for the purpose of this study

☐

I understand that my responses will be anonymised in reports of the research

☐

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected

☐

Data Protection

I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study.

Name of participant (print name).....

Signature of participant.....

Date.....

গবেষণা জরিপে অংশগ্রহণকারীর সম্মতিপত্র

গবেষণার বিষয়: ‘উন্নয়নশীল দেশে প্রযুক্তি নির্ভর শিক্ষক প্রশিক্ষণ’।

(সম্মত হলে পাশের ঘরে স্বাক্ষর প্রদান করুন)

উক্ত গবেষণার বিষয়বস্তু সম্পর্কে আমি অবগত এবং এ সংক্রান্ত

- কোন প্রশ্ন থাকলে তা জিজ্ঞেস করার সুযোগ পেয়েছি।
- আমি এই গবেষণাতে অংশগ্রহণ করার সম্মতি প্রদান করছি এবং আমার তথ্যগুলি গবেষণার কাজে ব্যবহারের অনুমতি দিচ্ছি।
- আমি অবগত আছি যে উক্ত গবেষণার বিবরণীতে আমার তথ্য ব্যবহারের সময় আমার নাম কিংবা বিদ্যালয়ের নাম ব্যবহার করা হবে না।
- আমি আরও অবগত আছি যে এই জরিপে আমার অংশগ্রহণ সম্পূর্ণ স্বেচ্ছায় এবং আমি যেকোন সময় আমার অংশগ্রহণ প্রত্যাহার করার অধিকার রাখি।

নাম:

বিদ্যালয়:

স্বাক্ষর:

তারিখ:

Appendix 6: Focus group participants' consent form (in English and Bangla)



CONSENT FORM for WORKSHOP-LED FOCUSED GROUPS PARTICIPANTS

Study title: Technology enhanced teacher-learning in a developing country

Researcher name: Md Golam Jamil

Ethics reference: 5954

Please initial the box (es) if you agree with the statement(s):

I have read and understood the information sheet (19th April, Version 1) and have had the opportunity to ask questions about the study.

☐

I agree to take part in this research project and agree for my data to be video recorded and used for the purpose of this study.

☐

This researcher can use the footages for research dissemination (such as conference presentation) and academic (such as teaching) purposes.

☐

I understand that my responses will be anonymised in reports of the research

☐

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected

☐

Data Protection

I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study.

Name of participant (print name).....

Signature of participant.....

Date.....

ইউনিভার্সিটি অব সাউদামপ্টন, যুক্তরাজ্য

কর্মশালা উত্তর ফোকাসড গ্রুপে অংশগ্রহণকারীর সম্মতিপত্র

গবেষণার বিষয়: ‘উন্নয়নশীল দেশে প্রযুক্তি নির্ভর শিক্ষক প্রশিক্ষণ’।

গবেষক: মুহাম্মদ গোলাম জামিল

এথিক্স রেফারেন্স ৫৯৫৪

***সম্মত হলে পাশের ঘরে স্বাক্ষর করুন।**

১. উক্ত গবেষণার বিষয়বস্তু সম্পর্কে আমি অবগত এবং এ সংক্রান্ত কোন প্রশ্ন থাকলে তা জিজ্ঞেস করার সুযোগ পেয়েছি।

২. আমি এই উক্ত গবেষণাতে অংশগ্রহণ করার সম্মতি প্রদান করছি এবং আমার অংশগ্রহণ ভিডিও করা এবং আমার দেয়া তথ্যগুলি গবেষণার কাজে ব্যবহারের অনুমতি দিচ্ছি।

৩. এই গবেষক ভিডিও ফোটেজগুলি কনফারেন্সে উপস্থাপন এবং শিক্ষাদানে ব্যবহার করতে পারবেন।

৪. আমি অবগত আছি যে উক্ত গবেষণার বিবরণীতে আমার তথ্য ব্যবহারের সময় আমার নাম কিংবা বিদ্যালয়ের নাম ব্যবহার করা হবে না।

৫. আমি আরও অবগত আছি যে এই কর্মশালায় আমার অংশগ্রহণ সম্পূর্ণ স্বেচ্ছায় এবং আমি যেকোন সময় আমার অংশগ্রহণ প্রত্যাহার করার অধিকার রাখি।

- তথ্য সংরক্ষণ: আমি অবগত আছি যে, আমার দেয়া তথ্যগুলি একটি পাসওয়ার্ড সংরক্ষিত কম্পিউটারে সংরক্ষিত থাকবে এবং তথ্যগুলি শুধুমাত্র এই গবেষণা কাজে ব্যবহৃত হবে।

নাম:

বিদ্যালয়:

স্বাক্ষর:

তারিখ:

Appendix 7: Sample focus group transcription

FGD5: Apprenticeship-based teacher-learning

(continues).....

5RF

(... to HT2) Don't you think it is better if the decisions are taken by the trainers as they are the expert?

5HT2

(... to 5HT2) May be it is good... they have the experience, and they know the problems, but sometimes the training cannot be followed as they are not practical. After receiving training sometimes my teachers report me that many things they have learned from the training are not applicable.

5RF

Yes, this is a valid point. How can we solve this type of problem particularly when we arrange or participate in the technology enhanced and apprenticeship-based teacher-learning?

5ET2

The trainer should show different methods of teaching or conducting class activities.

5HT1

And, they should explain why they are doing so and what are the benefits of this.

5RF

Do you think it is beneficial if the trainer and the trainee teachers can learn through guidance and conversations?

5ET1

This is a good point. The trainee teachers need guidance; guidance on their teaching, their English knowledge etc., but I am not sure how apprenticeship-based teacher-learning can provide them guidance to solve their professional problems (shows signs of confusion). Conversation is fine, especially for asking questions to the teacher trainer and learning from their answers. I think, conversations are needed to be the part of apprenticeship-based teacher-learning.

5TT

In apprenticeship-based teacher-learning programmes guidance for better teaching and knowledge building should be provided. While demonstrating any teaching, or through conversations, set of relevant guidance should be provided. This will make this type of teacher-learning more meaningful.

5RF

(... to 5TT) What types of guidelines do you mean?

5TT

It can be on time management, how to arrange interesting activities, teaching textbooks.

5ET1

The guidelines should be based on teaching needs. If they are taught something they do not need, then this type of training will not work. First the trainers should know what the trainee teachers should know, and how those things can be taught to them.

5ET2

I support what ET1 has said. Apprenticeship-based teacher-learning should be based on current syllabus of English and the methods of teaching the curriculum suggest. It can have different stages or levels according to teachers' different types of professional needs.

5RF

What more preparations are needed for this type of teacher-learning?

5ET1

(thinking), practice

5HT2

The trainers should demonstrate a teaching or an activity perfectly, so they should do enough rehearsal. They may also need helpers, and ...

5HT1

And they should show how their demonstration works in the class or in teaching.

5HT2

They should also repeat their demonstrations so that teachers follow them many times. It is really difficult for English teachers to learn ELT easily from a trainer. It is also important for a trainer to check the learning of the trainees regularly.

5RF

How can be the regular checking of the participants' learning ensured?

5HT1

It is not possible without a much organised training programme. The programme should be designed for step by step development. Participants also need to follow the lessons or instructions serially, nevertheless they will not understand anything, and the training will not help them.

5RF

(... to TT) What do you think about this?

5TT

I also think this type of teacher training needs great preparation. The trainer has to be a good actor. It is very difficult to find adequate efficient trainers who can run this type of training (ET1 and HT2 show sign of agreement).

5HT2

I do not think there are sufficient qualified trainers for this type of training.

5RF

How should the apprenticeship-based teacher-learning be conducted using technology?

5TT

Technology can help overcome the challenges of apprenticeship-based teacher training. As the number of good teacher trainers is very limited, by using the Internet good teaching demonstrations and conversations between a trainer and trainees from different areas can be conducted.

5ET1

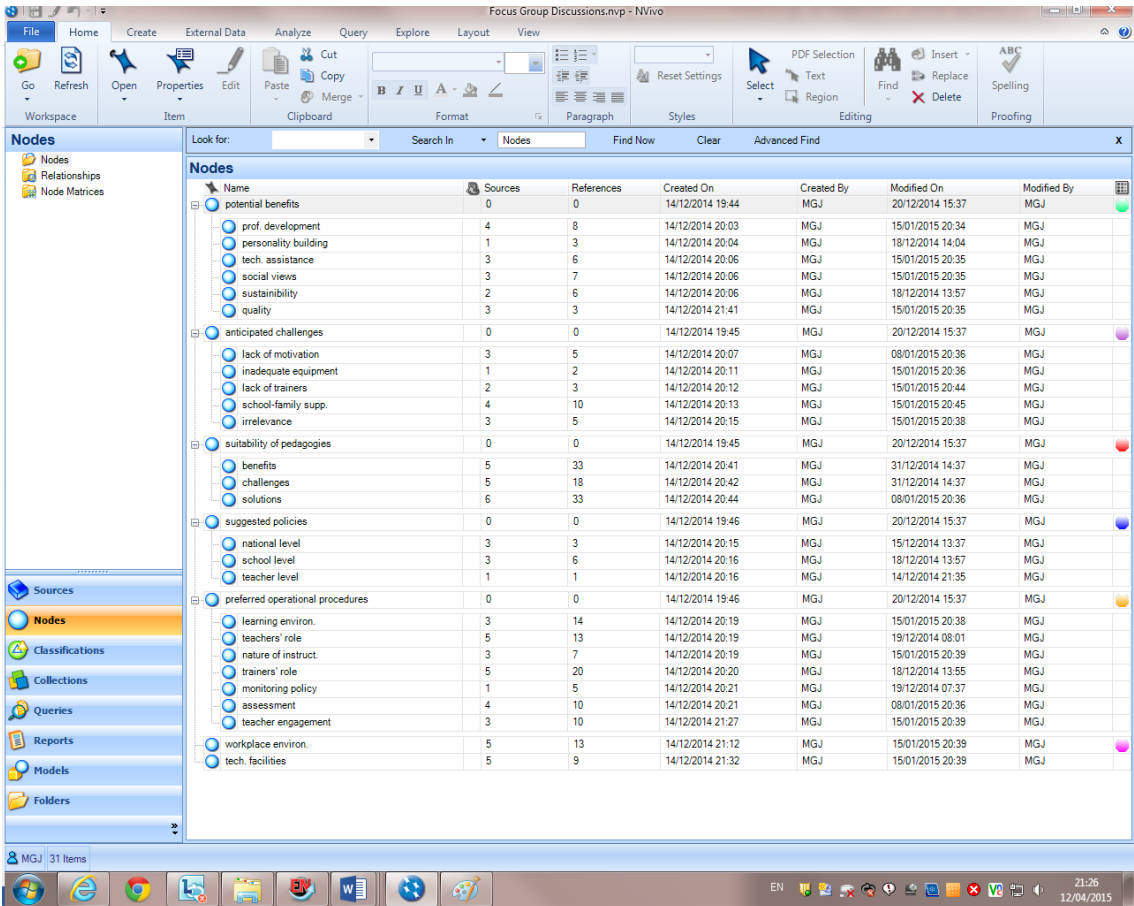
I think, by using technology the demonstrations and training can be recorded and be used by the trainees for several time. This is really helpful. The teachers can use these for developing their knowledge and skills at their convenient time.

5HT1

Can I ask a question? If a teacher faces any problem, whom can he/she convey this and how can this be solved?

(continues).....

Appendix 8: Computer screenshot of NVIVO coding



Appendix 9: Sample field notes

(participants' names are hidden for ensuring anonymity)

Focus Group 3

(Practice session) Dialogic & Technology enhanced Pedagogy

Q (~~Mr~~ Sir): If I want to create a blog of my school, what should I do?

① After 20 minutes all are using their iPads

② ~~Mr~~ Sir and ~~Madam~~ are happy as they have exchanged emails.

Diagram illustrating iPad use:

- ~~Mr~~ Sir: Logged in Ministry of education website
- ~~Mr~~ Sir: Showing to ~~Mr~~ Sir
- ~~Madam~~: Still having problem speaking
- ~~Mr~~ Sir: Reading the blog content

~~Mr~~ Sir; difficult to remember the process of creating blogs.

Q (~~Mr~~ Sir): How to print materials from website?

Q (~~Madam~~): Can we record the Skype Conversation?

Participant	Attitude	Developed
Mr Sir	***	blogs - Positive emails
Mr Sir	***	blogs - Very Positive
Mr Sir	***	Positive blogs - email
Madam	***	Positive blogs - Online discussion email forum
Mr Sir	***	Positive blogs - email discussion forum

Appendix 10

Appendix 10: Partial view of SPSS coded data

(variable view)

Variable View

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	gen	Numeric	8	0	respondent's ge...	(0, male)...	None	8	Right	Nominal	Input
2	age	Numeric	8	0	respondent's ag...	(1, below 30...	None	8	Right	Ordinal	Input
3	total_TeachE	Numeric	8	0	respondent's to...	(1, less tha...	None	8	Right	Ordinal	Input
4	En_TeachE	Numeric	8	0	respondent's E...	(1, less tha...	None	8	Right	Ordinal	Input
5	teach_train	Numeric	8	0	number of teach...	(1, Nil)...	None	8	Right	Ordinal	Input
6	comp_train	Numeric	8	0	number of com...	(1, Nil)...	None	8	Right	Ordinal	Input
7	comp_use	Numeric	8	0	respondent's le...	(1, I do not ...	None	8	Right	Ordinal	Input
8	sch_type	Numeric	8	0	type of school ...	(1, Governm...	None	8	Right	Nominal	Input
9	EnT_num	Numeric	8	0	number of Engli...	(1, only me)...	None	8	Right	Ordinal	Input
10	ICT_sch	Numeric	8	0	state of ICT in s...	(1, my scho...	None	8	Right	Ordinal	Input
11	read_pref	Numeric	8	1	preference to re...	(1,0, strongl...	None	8	Right	Ordinal	Input
12	train_pref	Numeric	8	0	preference to tr...	(1, strongly ...	None	8	Right	Ordinal	Input
13	reflect_pref	Numeric	8	0	preference to u...	(1, strongly ...	None	8	Right	Ordinal	Input
14	exp_pref	Numeric	8	0	preference to u...	(1, strongly ...	None	8	Right	Ordinal	Input
15	interact_pref	Numeric	8	0	preference to in...	(1, strongly ...	None	8	Right	Ordinal	Input
16	net_EnT_int	Numeric	8	0	with English te...	(1, never)...	None	8	Right	Ordinal	Input
17	net_EnT_ext	Numeric	8	0	with English te...	(1, never)...	None	8	Right	Ordinal	Input
18	net_nonEnT...	Numeric	8	0	with teachers ...	(1, never)...	None	8	Right	Ordinal	Input
19	net_nonEnT...	Numeric	8	0	with teachers ...	(1, never)...	None	8	Right	Ordinal	Input
20	net_govt_Ed...	Numeric	8	0	with local gover...	(1, never)...	None	8	Right	Ordinal	Input
21	net_EdExpts	Numeric	8	0	with education ...	(1, never)...	None	8	Right	Ordinal	Input
22	net_JGO_E...	Numeric	8	0	with non-govern...	(1, never)...	None	8	Right	Ordinal	Input
23	net_GovTT	Numeric	8	0	with government...	(1, never)...	None	8	Right	Ordinal	Input
24	net_SchHead	Numeric	8	0	with heads of s...	(1, never)...	None	8	Right	Ordinal	Input
25	net_family	Numeric	8	0	with own family...	(1, never)...	None	8	Right	Ordinal	Input
26	enco_sch	Numeric	8	0	encouragement...	(1, strongly ...	None	8	Right	Ordinal	Input
27	enco_family	Numeric	8	0	encouragement...	(1, strongly ...	None	8	Right	Ordinal	Input
28	dist_TrainCan	Numeric	8	0	perception rega...	(1, strongly ...	None	8	Right	Ordinal	Input
29	LearnEnviro...	Numeric	8	0	learning environ...	(1, strongly ...	None	8	Right	Ordinal	Input
30	LearnEnviro...	Numeric	8	0	learning environ...	(1, strongly ...	None	8	Right	Ordinal	Input
31	ICT_ProKnow	Numeric	8	0	perception rega...	(1, strongly ...	None	8	Right	Ordinal	Input
32	ICT_ProSkills	Numeric	8	0	perception rega...	(1, strongly ...	None	8	Right	Ordinal	Input
33	comp_learn...	Numeric	8	0	perception abo...	(1, strongly ...	None	8	Right	Ordinal	Input
34	comp_skills...	Numeric	8	0	perception abo...	(1, strongly ...	None	8	Right	Ordinal	Input
35	CompOpera...	Numeric	8	0	eagerness abo...	(1, strongly ...	None	8	Right	Ordinal	Input
36	EngLesson...	Numeric	8	0	readiness to te...	(1, none)...	None	8	Right	Ordinal	Input

(data view)

Data View

	gen	age	total_TeachE	En_TeachE	teach_train	comp_train	comp_use	sch_type	EnT_num	ICT_sch	read_pref	train_pref	reflect_pref	exp_pref	intei
1	0	2	2	2	3	1	2	2	3	2	4.0	4	4	4	4
2	0	2	1	1	3	1	2	2	3	3	4.0	5	5	5	5
3	1	2	1	1	2	1	1	2	3	3	4.0	4	4	4	4
4	1	2	2	1	2	1	1	2	3	3	5.0	4	4	4	4
5	1	2	1	1	2	1	2	2	3	3	5.0	4	4	5	4
6	0	3	3	3	3	1	1	2	3	3	5.0	5	4	4	4
7	0	2	2	1	3	1	1	2	2	2	4.0	5	5	4	4
8	0	2	1	1	3	1	1	2	2	2	4.0	4	4	4	4
9	0	3	3	2	3	1	3	2	2	2	4.0	5	5	4	4
10	0	3	3	1	3	1	2	2	3	3	5.0	5	4	5	5
11	0	3	3	3	3	1	1	2	2	2	4.0	4	4	4	4
12	1	2	1	1	3	1	1	2	2	2	4.0	5	4	4	4
13	0	1	1	1	2	1	2	2	2	2	3.0	4	4	4	4
14	0	2	2	2	2	1	3	2	2	2	4.0	5	2	4	4
15	0	2	2	2	2	1	1	2	2	3	5.0	5	2	4	4
16	0	2	2	2	2	1	1	2	2	3	5.0	5	2	4	4
17	0	2	2	2	3	1	1	2	2	2	4.0	5	2	4	4
18	1	2	1	2	2	1	1	2	2	2	4.0	5	2	4	4
19	0	2	2	2	3	1	3	2	2	1	4.0	5	4	4	4
20	0	3	3	3	3	2	2	2	2	1	5.0	5	5	5	5
21	0	2	2	2	3	2	2	2	2	1	5.0	5	5	5	5
22	0	2	2	2	3	1	4	2	2	3	4.0	5	4	5	5
23	0	2	2	2	3	1	1	2	2	1	5.0	5	4	4	4
24	0	3	1	1	3	2	4	2	2	3	4.0	4	4	4	4
25	1	2	3	2	3	2	4	2	2	3	4.0	5	5	3	3
26	1	2	2	1	2	1	2	2	2	2	5.0	5	5	4	4
27	1	2	2	2	3	1	2	2	2	3	5.0	5	4	4	4
28	0	2	2	1	2	2	2	2	2	3	5.0	4	4	4	4
29	1	2	3	2	2	1	2	2	2	3	5.0	5	4	4	4
30	0	2	1	1	1	1	3	2	2	1	5.0	5	5	4	4
31	0	2	2	2	2	1	1	2	2	1	5.0	5	5	4	4
32	0	2	1	2	2	2	4	2	3	3	5.0	4	4	3	3
33	1	2	2	1	2	1	3	2	2	3	3.0	5	4	4	4
34	0	2	2	2	2	1	4	2	2	3	3.0	5	3	3	3

Appendix 11 (a to g): Survey data reporting

Appendix 11 (a): Professional learning preferences

I explored the ‘professional learning preferences’ through five indicators (or questions) namely preferences to ‘reading’, ‘training’, ‘using experience’, ‘using reflections’, and ‘interacting with group members’ (please refer to Appendix 1). Table 11.1 shows the mean scores of these indicators.

Table 11.1: Mean scores of ‘professional learning preferences’ in descending order

	N	Minimum	Maximum	Mean	Std. Deviation	Interpretation of Mean score
preference to training for professional learning	204	2	5	4.75	.475	high
preference to reading for professional learning	204	2	5	4.54	.607	high
preference to interact with group members for professional learning	204	1	5	4.49	.809	high
preference to use reflections for professional learning	204	2	5	4.33	.809	high
preference to use experience for professional learning	204	2	5	4.25	.627	high
overall preference	204	2	5	4.4709	.46272	high

According to Table 11.1, the participating teachers’ preferences to ‘training’, ‘reading’, ‘interacting with group members’, and using ‘reflections’ and ‘experiences’ have ‘high’ mean scores.

To explore the association of ‘professional learning preferences’ with demographic features and the state of technological orientation I conducted the Independent-Samples *t* Test (when there are two groups of responses), ANOVA (when there are three or more groups of responses), and post hoc comparisons named Tukey’s HSD (honestly significant difference) for

Appendix 11

identifying the exact areas of difference. Here, in the Table 11.2 and Table 11.3, I report only the significant results where p-value is less than .05 (for the complete results of all the Independent-Samples *t* Test and ANOVA please refer to Table 12.i and 12.ii respectively in Appendix 12).

Table 11.2: Association of ‘professional learning preferences’ with gender, computer training, and number of English teachers at school (independent-Samples *t* Test results)

Indicator	Demographic features and state of technological orientation		N	Mean	SD	t-statistics	p-value
preference to reading for professional learning	computer training	Nil	144	4.48	.647	-2.517	.013
		1-3	60	4.68	.469		
preference to training for professional learning	number of English teachers	2-4	103	4.83	.445	2.460	.015
		More than 4	101	4.67	.492		
preference to use reflections for professional learning	gender	Male	135	4.24	.859	-2.090	.038
		Female	69	4.49	.678		
	computer training	Nil	144	4.18	.874	-5.307	.000
		1-3	60	4.68	.469		
	number of English teachers	2-4	103	4.17	.974	-2.797	.006
		More than 4	101	4.49	.559		
readiness to interact with group members for professional learning	computer training	Nil	144	4.38	.892	-3.896	.000
		1-3	60	4.75	.474		

In Table 11.2, p-value of the respondents’ preference to ‘reading’, ‘training’ ‘using reflections’ and ‘interacting with group members’ for professional learning is less than .05 in the cases of the number of computer training received, the number of English teachers of their own school, and gender. These mean that,

- In terms of ‘preference to reading for professional learning’ there is a significant difference between the teachers who have not attended any computer training and the respondents who have attended 1 to 3

computer training programmes. In this case, the mean score of the respondents who have attended 1 to 3 computer training programmes is higher.

- In terms of 'preference to training for professional learning' there is a significant difference between the respondents of the schools having 2 to 4 teachers of English and the respondents of the schools having more than 4 teachers of English. In this case, the mean score of the respondents of the schools having two to four teachers of English is higher.
- In terms of 'preference to use reflections for professional learning' there are significant differences in three areas. The first difference is between male and female respondents where the mean score of the female respondents is higher. Secondly, there is a significant difference between the teachers who have not attended any computer training and the respondents who have attended 1 to 3 computer training programmes. In this case, the mean score of the respondents who have attended 1 to 3 computer training programmes is higher. Thirdly, there is a significant difference between the respondents of the schools having 2 to 4 teachers of English and the respondents of the schools having more than 4 teachers of English. In this case, the mean score of the respondents of the schools having more than 4 teachers of English is higher.
- In terms of the 'readiness to interact with group members for professional learning' there is a significant difference between the respondents who have not attended any computer training and the respondents who have attended 1 to 3 computer training programmes. In this case, the mean score of the respondents who have attended 1 to 3 computer training programmes is higher.

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Table 11.3: Association of ‘professional learning preferences’ with age, total teaching experience, English teaching experience, number of teacher training received, school types and access to the computer and Internet (ANOVA test results)

Aspect	Indicator		Sum of Squares	df	Mean Square	F	Sig.
preference to training	total teaching experience	Between Groups	1.899	2	.950	4.354	.014
		Within Groups	43.846	201	.218		
		Total	45.745	203			
	English teaching experience	Between Groups	1.800	2	.900	4.116	.018
		Within Groups	43.945	201	.219		
		Total	45.745	203			
preference to use reflections	number of teacher training received	Between Groups	3.925	2	1.962	3.056	.049
		Within Groups	129.070	201	.642		
		Total	132.995	203			
	English teaching experience	Between Groups	7.762	2	3.881	6.229	.002
		Within Groups	125.233	201	.623		
		Total	132.995	203			
preference to use experience	age	Between Groups	2.784	2	1.392	3.636	.028
		Within Groups	76.961	201	.383		
		Total	79.745	203			
	total teaching experience	Between Groups	4.237	2	2.119	5.639	.004
		Within Groups	75.508	201	.376		
		Total	79.745	203			
	English teaching experience	Between Groups	2.358	2	1.179	3.062	.049
		Within Groups	77.387	201	.385		
		Total	79.745	203			
	number of teacher training received	Between Groups	3.461	2	1.731	4.560	.012
		Within Groups	76.284	201	.380		
		Total	79.745	203			
	school types	Between Groups	2.676	2	1.338	3.489	.032
		Within Groups	77.069	201	.383		
		Total	79.745	203			
preference to interact with group members	access to computer and Internet	Between Groups	5.085	2	2.542	3.997	.020
		Within Groups	127.871	201	.636		
		Total	132.956	203			

Based on Tukey's HSD test results I achieved the following findings.

- Regarding the 'preference to training for professional learning' there are two cases of significant differences of mean scores. First one is between the English teachers having 20 to 30 years' total teaching experience and the teachers having less than 10 years' total teaching experience (the mean difference is .210, and p is .015). The test also informs that the English teachers having 20 to 30 years' teaching experience have the higher mean score. The second difference is between the teachers having 20 to 30 years' English teaching experience and the teachers having less than 10 years' teaching experience (the mean difference is .175, and p is .040). In this case the teachers having 20 to 30 years' English teaching experience have the higher mean score.
- In the case of 'preference to use reflections for professional learning' again there are two significant findings. The first difference of mean scores between the English teachers who have not attended any teacher training programmes and the teachers who have attended 1 to 3 teacher training programme is significant (the mean difference is .442, and p is .038). The test informs that the English teachers who have not attended any teacher training programme have the higher mean score.

Then, there is a significant difference of the mean scores between the teachers having less than 10 years' English teaching experience and the teachers having 20 to 30 years' teaching experience (the mean difference is .121, and p is .003). According to this finding, the teachers having less than 10 years' teaching experience have the higher mean score. Regarding the English teaching experience, there is another significant difference of mean scores of those having more than 30 years' English teaching experience and the teachers having 20 to 30 years' English teaching experience. In this case, the mean score of the teachers having more than 30 years' English teaching experience is higher.

- Regarding the 'preference to use experience for professional learning' there are four cases of significant differences of mean scores (although the association of the 'professional learning preferences' with the

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'school types' is found significant in ANOVA test result, possibly because of the small sample size of the Government secondary schools and the government Madrasas, Tukey's HSD test result does not show any significant difference in this area).

Firstly, the difference of mean scores between the English teachers who are more than 50 year old and the English teachers who are 30 to 50 year old is significant (the mean difference is .295, and p is .035). The test also informs that the English teachers who are more than 50 year old have the higher mean score. Secondly, the difference of mean scores between the teachers having more than 30 years' total teaching experience and those having less than 10 years' total teaching experience is significant (the mean difference is .115, and p is .003). The test also informs that the English teachers having more than 30 years' total teaching experience have the higher mean score. Thirdly, the difference of mean scores between the teachers having more than 30 years of English teaching experience and the teachers having less than 10 years' English teaching experience is significant (the mean difference is .317, and p is .038). The test also informs that the English teachers having more than 30 years' English teaching experience have the higher mean score. Fourthly, the difference of mean scores between the English teachers who have attended more than 3 teacher training programmes and the teachers who have attended 1 to 3 teacher training programmes is significant (the mean difference is .262, and p is .015). The test confirms that the English teachers who have attended more than 3 teacher training programmes have the higher mean score.

- In the case of 'preference to interact with group members' for professional learning the difference of mean scores between the schools of the teachers which have a computer with the Internet connection and the schools which have a computer without the Internet connection is significant (the mean difference is .339, and p is .017). The test also informs that the schools having a computer with the Internet connection have the higher mean score.

Appendix 11 (b): Professional learning network

I tested the 'professional learning network' of my survey participants through ten indicators or questions namely professional connection with 'teachers of English of the same school', 'teachers of English of other schools', 'teachers of other subjects of the same school', 'teachers of other subjects of other schools', 'local government education officer', 'education experts', 'non-government education officers', 'government teacher trainers', 'heads of school' and 'own family members' (please refer to the questionnaire attached as Appendix 1).

Table 11.4: Mean scores of 'professional learning network' (in descending order)

	N	Minimum	Maximum	Mean	Std. Deviation	Interpretation of Mean scores
with heads of school	204	1	5	4.04	.745	high
with teachers of English of same school	204	2	5	4.02	.839	high
with teachers of other subjects of same school	204	1	5	3.73	.910	modest
with own family members	204	1	5	3.61	1.155	modest
with teachers of English of other schools	204	1	5	3.00	.891	modest
with local government education officer	204	1	5	2.95	1.013	average
with education experts	204	1	5	2.86	.705	average
with non-government education officers	204	1	5	2.84	.791	average
with teachers of other subjects of other schools	204	1	5	2.68	.744	average
with government teacher trainers	204	1	5	2.66	.787	average
Overall network	204	1.10	4.70	3.2402	.53604	modest

According to Table 11.4, the participating teachers' connections with 'head of school' and the 'English teachers of the same school' for professional learning have 'high' mean scores (4.04 and 4.02). The teachers' connections with the 'teachers of other subjects of the same school', with their 'family members' and 'teachers of English of other schools' have 'modest' mean scores (3.73,

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3.61 and 3.00). Their connections with other people are ‘average’ as the mean scores of these are less than 3.

For exploring the association of ‘professional learning network’ of the survey participants with their demographic features and the state of technological orientation I conducted the Independent-Samples *t* Test (when there are two groups of responses), ANOVA (when there are three or more groups of responses), and post hoc comparisons named Tukey’s HSD (honestly significant difference) for identifying the exact area of difference. Here, in Table 11.5 and Table 11.6, I report only the significant results (for the complete results of all the Independent-Samples *t* Test and ANOVA please refer to Table 12.iii and 12.iv respectively in Appendix 12).

Table 11.5: Association of ‘professional learning network’ with gender, computer training, and number of English teachers at school (independent-Samples *t* Test results)

Indicator	Demographic features and state of technological orientation		N	Mean	SD	t-statistics	p-value
with teachers of English of the same school	gender	Male	135	3.87	.832	-3.692	.000
		Female	69	4.32	.776		
	computer training received	Nil	144	3.98	.865	-2.896	.004
		1-3	60	4.28	.715		
with teachers of English of other schools	computer training received	Nil	144	2.88	.900	-3.306	.001
		1-3	60	3.32	.792		
with teachers of other subjects of the same school	gender	Male	135	3.61	.922	-2.578	.011
		Female	69	3.96	.848		
	computer training received	Nil	144	3.65	.889	-2.072	.040
		1-3	60	3.93	.936		
with teachers of other subjects of other schools	computer training received	Nil	144	2.56	.707	-3.782	.000
		1-3	60	2.98	.748		

with local government education officer	gender	Male	135	2.81	1.087	-2.896	.004
		Female	69	3.20	.797		
	computer training received	Nil	144	2.80	.943	-3.298	.001
		1-3	60	3.30	1.094		
with education experts	computer training received	Nil	144	2.75	.695	-3.476	.001
		1-3	60	3.12	.666		
with non-government education officers	computer training received	Nil	144	2.76	.813	-2.597	.011
		1-3	60	3.05	.699		
with government teacher trainers	computer training received	Nil	144	2.57	.799	-2.757	.007
		1-3	60	2.88	.715		
with heads of school	gender	Male	135	3.96	.762	-2.403	.017
		Female	69	4.22	.683		
	computer training received	Nil	144	3.94	.777	-3.241	.001
		1-3	60	4.30	.591		
with own family members	computer training received	Nil	144	3.46	.1194	-3.171	.002
		1-3	60	3.97	.974		
	number of English teachers in school	2-4	103	3.31	1.253	-3.845	.000
		More than 4	101	2.91	.960		

In Table 11.5 , p-value of the respondents' professional connection with all the indicators namely 'teachers of English of the same school', 'teachers of English of other schools', 'teachers of other subjects of the same school', 'teachers of other subjects of other schools', 'local government education officer', 'education experts', 'non-government education officers', 'government teacher trainers', 'heads of school' and 'own family members' are less than 0.05 in the cases of gender, computer training received and the number of the teachers of English of their own school. These mean that,

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- In terms of professional learning network with 'teachers of English of the same school' there are significant differences in two areas. Firstly, there is a significant difference between the male and the female teachers of English. In this case, the mean score of the female teachers of English is higher. On the other hand, there is a significant difference between the English teachers who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case the mean score of the teachers who have attended 1 to 3 computer training is higher.
- In terms of professional learning network with 'teachers of English of other schools' there is a significant difference between the teachers of English who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case the mean score of the teachers who have received 1 to 3 computer training is higher.
- In terms of professional learning network with 'teachers of other subjects of the same schools' there are significant differences in two areas. Firstly, there is a significant difference between the male and the female English teachers. In this case, the mean score of the female English teachers is higher. On the other hand, there is a significant difference between the English teachers who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case the mean score of the teachers who have received 1 to 3 computer training is higher.
- In terms of professional learning network with 'English teachers of other subjects of other schools' there is a significant difference between the teachers of English who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case the mean score of the teachers who have received 1 to 3 computer training is higher.
- In terms of professional learning network with 'local government education officer' there are significant differences in two areas. Firstly, there is a significant difference between the male and the female teachers of English. In this case, the mean score of the female teachers of English is higher. On the other hand, there is a significant difference

between the teachers of English who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case the mean score of the teachers who have received 1 to 3 computer training is higher.

- In terms of professional learning network with ‘education experts’ there is a significant difference between the teachers of English who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case the mean score of the teachers who have received 1 to 3 computer training is higher.
- In terms of professional learning network with ‘non-government education officers’ there is a significant difference between the teachers of English who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case the mean score of the teachers who have received 1 to 3 computer training is higher.
- In terms of professional learning network with ‘government teacher trainers’ there is a significant difference between the teachers of English who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case the mean score of the teachers who have received 1 to 3 computer training is higher.
- In terms of professional learning network with the ‘heads of school’ there are significant differences in two areas. Firstly, there is a significant difference between the male and the female teachers of English. In this case, the mean score of the female English teachers is higher. On the other hand, there is a significant difference between the teachers of English who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case the mean score of the teachers who have received 1 to 3 computer training is higher.
- In terms of professional learning network with ‘own family members’ there are two significant differences. The first one is between the teachers of English who have not received any computer training and

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those who have received 1 to 3 computer training. In this case the mean score of the teachers who have received 1 to 3 computer training is higher. Secondly, there is a significant difference between the teachers who have 2 to 4 teachers of English in their school and those having more than 4 teachers in their school. In this case the mean score of the teachers having 2 to 4 teachers of English in their school is higher.

Table 11.6: Association of 'professional learning network' with total teaching experience, English teaching experience, number of teacher training received, age, and school type (ANOVA test results)

Aspect	Indicator		Sum of Squares	df	Mean Square	F	Sig.
with teachers of English of the same school	age	Between Groups	7.754	2	3.877	5.767	.004
		Within Groups	135.123	201	.672		
		Total	142.877	203			
	English teaching experience	Between Groups	6.653	2	3.327	4.908	.008
		Within Groups	136.224	201	.678		
		Total	142.877	203			
with teachers of English of other schools	English teaching experience	Between Groups	5.742	2	2.871	3.717	.026
		Within Groups	155.253	201	.772		
		Total	160.995	203			
	level of computer usage	Between Groups	9.169	3	3.056	4.026	.008
		Within Groups	151.826	200	.759		
		Total	160.995	203			
with teachers of other subjects of the same school	English teaching experience	Between Groups	7.661	2	3.831	4.797	.009
		Within Groups	160.511	201	.799		
		Total	168.172	203			
	number of teacher training received	Between Groups	7.551	2	3.775	4.724	.010
		Within Groups	160.621	201	.799		
		Total	168.172	203			
with teachers of other subjects of other schools	total teaching experience	Between Groups	4.481	2	2.241	4.178	.017
		Within Groups	107.808	201	.536		
		Total	112.289	203			
	English teaching experience	Between Groups	5.781	2	2.891	5.455	.005
		Within Groups	106.508	201	.530		
		Total	112.289	203			

with local government education officer	level of computer usage	Between Groups Within Groups Total	9.101 103.188 112.289	3 200 203	3.034 .516	5.880	.001
	Age	Between Groups Within Groups Total	7.635 200.772 208.407	2 201 203	3.818 .999	3.822	.023
	English teaching experience	Between Groups Within Groups Total	7.215 201.192 208.407	2 201 203	3.607 1.001	3.604	.029
with education experts	access to computer and Internet	Between Groups Within Groups Total	7.234 201.173 208.407	2 201 203	3.617 1.001	3.614	.029
	number of teacher training received	Between Groups Within Groups Total	5.400 95.477 100.877	2 201 203	2.700 .475	5.684	.004
	English teaching experience	Between Groups Within Groups Total	5.976 121.004 126.980	2 201 203	2.988 .602	4.964	.008
with non-government education officers	level of computer usage	Between Groups Within Groups Total	7.818 119.162 126.980	3 200 203	2.606 .596	4.374	.005
	age	Between Groups Within Groups Total	6.687 118.974 125.662	2 201 203	3.344 .592	5.649	.004
	level of computer usage	Between Groups Within Groups Total	11.806 113.856 125.662	3 200 203	3.935 .569	6.913	.000
with government teacher trainers	English teaching experience	Between Groups Within Groups Total	3.762 108.841 112.603	2 201 203	1.881 .541	3.473	.033
	number of teacher training received	Between Groups Within Groups Total	4.280 108.323 112.603	2 201 203	2.140 .539	3.971	.020
	level of computer usage	Between Groups Within Groups Total	11.806 113.856 125.662	3 200 203	3.935 .569	6.913	.000
with heads of school	English teaching experience	Between Groups Within Groups Total	3.762 108.841 112.603	2 201 203	1.881 .541	3.473	.033
	number of teacher training received	Between Groups Within Groups Total	4.280 108.323 112.603	2 201 203	2.140 .539	3.971	.020
	level of computer usage	Between Groups Within Groups Total	11.806 113.856 125.662	3 200 203	3.935 .569	6.913	.000

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with own family members	English teaching experience	Between Groups	9.919	2	4.959	3.824	.023
		Within Groups	260.709	201	1.297		
		Total	270.627	203			
	Number of teacher training received	Between Groups	9.479	2	4.739	3.648	.028
		Within Groups	261.148	201	1.299		
		Total	270.627	203			
	school types	Between Groups	8.348	2	4.174	3.199	.043
		Within Groups	262.280	201	1.305		
		Total	270.627	203			

Based on ANOVA and Tukey's HSD test results I achieved the following findings.

- Regarding the participants' professional network 'with teachers of English of the same school' there are two significant differences of the mean scores: one is age and the other one is English teaching experience.

Firstly, there is a significant difference of the mean scores of the 30 to 50 year old teachers and the above 50 year old teachers (the mean difference is .519, and p is .003). The test also informs that the 30 to 50 year old teachers of English have the higher mean score. Then, there are two areas of significant differences of mean scores in the case of the English teaching experience of the teachers. The first one is between the teachers having less than 10 years' English teaching experience and the teachers having more than 30 years' English teaching experience (the mean difference is .439, and p is .028). The test informs that the teachers having less than 10 years' English teaching experience have the higher mean score. On the other hand, there is significant difference of the mean scores between the teachers having 20 to 30 years' English teaching experience and the teachers having more than 30 years' English teaching experience (the mean difference is .543, and p is .006). In this case the test informs that the teachers having 20 to 30 years' English teaching experience have the higher mean score.

- Regarding the participants' professional network 'with English teachers of other schools' there are two areas of significant differences of the

mean scores: one is English teaching experience and the other one is the level of computer usage.

Firstly, there is a significant difference of the mean scores between the teachers having less than 10 years' English teaching experience and the teachers having more than 30 years' English teaching experience (the mean difference is .457, and p is .034). The test also informs that the teachers having less than 10 years' English teaching experience have the higher mean score.

Secondly, there are two significant differences of mean scores in terms of the level of the participants' computer usage. The first difference is between the teachers who can operate a computer well and the teachers who do not know how to operate a computer and never started to learn it (the mean difference is .524, and p is .025). The test informs that the teachers who can operate a computer well have the higher mean score. The second difference is between the teachers who can operate a computer well and the teachers who started learning to operate a computer, but stopped it for some reasons (the mean difference is .584, and p is .010). The test informs that the teachers who can operate a computer well have the higher mean score.

- Regarding the participants' professional network 'with teachers of other subjects of the same school' there are two areas of significant differences of the mean scores: one is English teaching experience and the other one is the number of teacher training they have received.

Firstly, there is a significant difference of the mean scores between the teachers having less than 10 years' English teaching experience and the teachers having 20 to 30 years' English teaching experience (the mean difference is .421, and p is .007). The test also informs that the teachers having less than 10 years' English teaching experience have the higher mean score. Secondly, there are significant differences of the mean scores in two cases of the number of teacher training the participants have received. The first one is between the teachers who did not attend any teacher training programme and the teachers who have attended 1 to 3 teacher training programmes (the mean difference is .606, and p is

.008). Here the teachers who did not attend any teacher training programme have the higher mean score. The second one is between the teachers who did not attend any teacher training programme and the teachers who have attended more than 3 teacher training programmes (the mean difference is .548, and p is .023). According to the test the teachers who did not attend any teacher training programme have the higher mean score.

- Regarding the participants' professional network 'with teachers of other subjects of other schools' there are three areas of significant differences of the mean scores: total teaching experience, English teaching experience, and the level of computer usage.

Firstly, there is a significant difference of the mean scores of the teachers having less than 10 years' total teaching experience and the teachers having more than 30 years' total teaching experience (the mean difference is .364, and p is .023). The test also informs that the teachers having less than 10 years' of teaching experience have the higher mean score. Secondly, there is a significant difference of the mean scores between the teachers having less than 10 years' English teaching experience and the teachers having more than 30 years' English teaching experience (the mean difference is .478, and p is .005 which is less than .05). Here, the teachers having less than 10 years' English teaching experience have the higher mean score. Thirdly, in the case of the teachers' level of computer usage there are two significant differences of the mean scores. The first one is between the teachers who have recently started learning to operate a computer and the teachers who do not know how to operate a computer and never started to learn it (the mean difference is .480, and p is .011). The test informs that the teachers who have recently started learning to operate a computer have the higher mean score. The second one is between the teachers who can operate a computer well and the teachers who do not know how to operate a computer and never started to learn it (the mean difference is .543, and p is .002). The test informs that the teachers who can operate a computer well have the higher mean score.

- Regarding the participants' professional network 'with local government education officer' there are three areas of significant differences of the mean scores which are age, English teaching experience, and access of the teachers to computer and the Internet.

Firstly, there is a significant difference between 30 to 50 year old teachers and the teachers who are below 30 year old (the mean difference is .604, and p is .018). Here, the 30 to 50 year old teachers of English have the higher mean score. Secondly, there is a significant difference between the teachers having more than 30 years' English teaching experience and the teachers having 20 to 30 years' English teaching experience (the mean difference is .550, and p is .028). The test informs that the teachers having more than 30 years' English teaching experience have the higher mean score. The third difference is between the teachers whose schools do not have any computer and the teachers whose schools have a computer with the Internet connection (the mean difference is .584, and p is .03). The teachers whose schools do not have any computer have the higher mean score.

- Regarding the participants' professional network 'with education experts' there is a significant difference between the teachers who have attended more than 3 teacher training programmes and the teachers who did not attend any teacher training programme (the mean difference is .341, and p is .003). In this case the teachers who have attended more than 3 teacher training programmes have the higher mean score.
- Regarding the participants' professional network 'with non-government education officers' there are two areas of significant differences of the mean scores: one is English teaching experience and the other one is the level of computer usage.

The first significant difference is between the teachers having less than 10 years' English teaching experience and the teachers having 20 to 30 years' English teaching experience (the mean difference is .356, and p is .009). According to the test, the teachers having less than 10 years' English teaching experience have the higher mean score. The deference

regarding the level of computer usage of the teachers has two aspects. Firstly, there is a significant difference between the teachers who do not know how to operate a computer and never started to learn it and the teachers who started learning to operate a computer but stopped it for some reasons (the mean difference is .391, and p is .017). The test informs that the teachers who do not know how to operate a computer and never started to learn it have the higher mean score. The second difference is between the teachers who can operate a computer well and the teachers who started learning to operate a computer but stopped it for some reasons (the mean difference is .582, and p is .018). The test informs that the teachers who can operate a computer well have the higher mean score.

- Regarding the participants' professional network 'with government teacher trainers' there are two significant differences of the mean scores: one is age and the other one is the level of computer usage.

Firstly, there is a significant difference between the 30 to 50 year old teachers and the teachers of below 30 years (the mean difference is .566, and p is .003). In this case the 30 to 50 year old teachers of English have the higher mean score. The second significant difference is between the teachers who are more than 50 year old and the teachers who are below 30 years (the mean difference is .539, and p is .025). According to the test, the teachers who are more than 50 year old have the higher mean score.

Secondly, in the case of the level of computer usage, there are three significant differences. The first one is between the teachers who do not know how to operate a computer and never started to learn it and the teachers who have recently started learning to operate a computer (the mean difference is .519, and p is .008). The test informs that the teachers who do not know how to operate a computer and never started to learn it have the higher mean score. The second one is between the teachers who can operate a computer well and the teachers who started learning to operate a computer but stopped it for some reasons (the mean difference is .509, and p is .009). In this case the teachers who can operate a computer well have the higher mean score. The third

difference is between the teachers who can operate a computer well and the teachers who have recently started learning to operate a computer (the mean difference is .749, and p is .001 which is less than .05). Here also the teachers who can operate a computer well have the higher mean score.

- Regarding the participants' professional network 'with heads of schools' there are two areas of significant differences of the mean scores: one is the English teaching experience of the teachers and the other one is the number of teacher training they have received.

Firstly, there is a significant difference between the teachers having less than 10 years' English teaching experience and the teachers having 20 to 30 years' English teaching experience (the mean difference is .286, and p is .032). According to the test result, the teachers having less than 10 years' English teaching experience have the higher mean score. Secondly, there is a significant difference of mean scores between the teachers who have not attended any teacher training programme and the teachers who have attended 1 to 3 teacher training programmes (the mean difference is .459, and p is .015). The test also informs that the teachers who have not attended any teacher training programmes have the higher mean score.

- Regarding the participants' professional network 'with own family members' there are three areas of significant differences of the mean scores which are their English teaching experience, number of teacher training they have received and their workplace (school) type.

The first difference of the mean scores is between the teachers having less than 10 years' English teaching experience and the teachers having 20 to 30 years' English teaching experience (the mean difference is .457, and p is .025). The test also informs that the teachers having less than 10 years' English teaching experience have the higher mean score. The second difference is between the teachers who have not attended any training programme and the teachers who have attended 1 to 3 teacher training programmes (the mean difference is .654, and p is .029). The test reveals that the teachers who have not attended any

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training programme have the higher mean score. The third difference is between the teachers working in government high schools and the teachers working at non-government high schools (the mean difference is .859, and p is .033). The test also informs that the teachers working in the government high schools have the higher mean score.

Appendix 11 (c): Learning motivation and facilities

I tested my survey participants' 'learning motivation and facilities' through five indicators namely encouragement from 'school authority' and 'family', 'perception about receiving training at distant centre', and learning environment 'at home' and 'at workplace' (please refer to the questionnaire attached as Appendix 1).

Table 11.7: Mean scores of 'learning motivation and facilities' of English teachers (in descending order)

	N	Minimum	Maximum	Mean	Std. Deviation	Interpretation of Mean scores
encouragement from school authority	204	2	5	4.48	.591	high
encouragement from family	204	1	5	4.36	.923	high
learning environment at respondent's home	204	1	5	4.26	.857	high
perception about receiving training at distant centre	204	1	5	4.20	.895	high
learning environment at respondent's workplace	204	1	5	3.71	1.224	modest
Overall motivation	204	2.60	5	4.2010	.52278	high

According to Table 11.7, 'encouragement from school authority' and 'encouragement from family' have the highest mean scores (4.48 and 4.36). Conversely, 'learning environment at workplace' have the modest mean score (3.71).

To explore the association of 'learning motivation and facilities' of the survey participants with the demographic features and the state of technological orientation I conducted the Independent-Samples t Test (when there are two groups of responses), ANOVA (when there are three or more groups of

responses), and post hoc comparisons named Tukey's HSD (honestly significant difference) for identifying the exact area of difference. Here, in the Table 11.8 and Table 11.9, I report only the significant results (for the complete results of all the Independent-Samples *t* Test and ANOVA please refer to Table 12.v and 12.vi respectively in Appendix 12).

Table 11.8: Association of 'learning motivation and facilities' with gender, computer training, and number of English teachers at school (independent-Samples *t* Test results)

Indicator	Demographic features and state of technological orientation		N	Mean	SD	t-statistics	p-value
encouragement from family	gender	Male	135	4.24	1.018	-2.852	.005
		Female	69	4.58	.651		
learning environment at home	gender	Male	135	4.35	.776	2.075	.039
		Female	69	4.09	.981		
	number of English teachers	2-4	103	4.44	.605	3.024	.003
		more than 4	101	4.08	1.026		

In Table 11.8, p-value of 'encouragement from family' and 'learning environment at home' are less than 0.05 in the cases of gender and the number of teachers of English at their workplace. These mean that,

- In terms of the encouragement for professional learning the teachers of English receive from their family is significantly different between the male and the female teachers. In this case the mean score of the female teachers of English is higher.
- In terms of 'learning environment at home' there are two significant differences. The first one is between the male and the female teachers of English. In this case, the mean score of the male teachers of English is higher. On the other hand, there is a significant difference between the teachers of English who have 2 to 4 teachers of English at their

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workplace and the teachers having more than 4 teachers of English at their workplace. In this case the mean score of the teachers who have 2 to 4 teachers of English at their workplace is higher.

Table 11.9: Association of 'learning motivation and facilities' with total teaching experience, English teaching experience, number of teacher training received, age, and school types (ANOVA test results)

Aspect	Indicator		Sum of Squares	df	Mean Square	F	Sig.
encouragement from school authority	age	Between Groups	2.669	2	1.334	3.932	.021
		Within Groups	68.209	201	.339		
		Total	70.877	203			
	level of computer usage	Between Groups	7.106	3	2.369	7.429	.000
		Within Groups	63.771	200	.319		
		Total	70.877	203			
encouragement from family	number of teacher training received	Between Groups	6.803	2	3.401	4.117	.018
		Within Groups	166.075	201	.826		
		Total	172.877	203			
	access to computer and Internet	Between Groups	14.432	2	7.216	9.154	.000
		Within Groups	158.446	201	.788		
		Total	172.877	203			
perception regarding receiving training at distant centre	number of teacher training received	Between Groups	9.201	2	4.600	6.022	.003
		Within Groups	153.559	201	.764		
		Total	162.760	203			
	access to computer and Internet	Between Groups	14.558	2	7.279	9.872	.000
		Within Groups	148.202	201	.737		
		Total	162.760	203			
learning environment at home	English teaching experience	Between Groups	4.664	2	2.332	3.242	.041
		Within Groups	144.566	201	.719		
		Total	149.230	203			
	number of teacher training received	Between Groups	5.320	2	2.660	3.715	.026
		Within Groups	143.911	201	.716		
		Total	149.230	203			
learning environment at workplace	school types	Between Groups	16.720	2	8.360	5.851	.003
		Within Groups	287.216	201	1.429		
		Total	303.936	203			

access to computer and Internet	Between Groups	19.312	2	9.656	6.819	.001
	Within Groups	284.625	201	1.416		
	Total	303.936	203			

Based on ANOVA and Tukey's HSD test results I achieved the following findings.

- Regarding encouragement that the participants receive from their 'school authority' there are two areas of significant differences: age and level of computer usage.

In the case of age there are two significant differences. The first one is between the teachers who are 30 to 50 year old and the teachers who are below 30 years (the mean difference is .340, and p is .003). The test informs that the teachers who are 30 to 50 year old have the higher mean score. The second difference is between the teachers who are more than 50 year old and the teachers who are below 30 years (the mean difference is .392, and p is .003). According to the test result, the teachers who are more than 50 year old have the higher mean score.

On the other hand, in the case of the level of computer usage there are three significant differences. The first difference is between the teachers who do not know how to operate a computer and never started to learn it and the teachers who have recently started learning to operate a computer (the mean difference is .537, and p is .000). The test confirms that the teachers who do not know how to operate a computer and never started to learn it have the higher mean score. The second difference is between the teachers who started learning to operate a computer but stopped for some reasons and the teachers who have recently started learning to operate a computer (the mean difference is .416, and p is .004). The test confirms that the teachers who started learning to operate a computer but stopped for some reasons have the higher mean score. The third difference is between the teachers who can operate a computer well and the teachers who have recently started learning to operate a computer (the mean difference is .544, and p is .001). The test confirms that the teachers who can operate a computer well have the higher mean score.

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- Regarding the encouragement that the participants receive from their 'own family' there are two areas of significant differences: the number of teacher training they have received and their access to a computer and the Internet.

The first difference is between the teachers who have received 1 to 3 teacher-training and the teachers have not received any teacher training (the mean difference is .575, and p is .014). The test confirms that the teachers who have received 1 to 3 teacher-training have the higher mean score.

On the other hand, the teachers' access to a computer and the Internet has two significant differences. The first difference is between the teachers whose school has a computer without the Internet connection and the teachers whose school does not have any computer (the mean difference is .915, and p is .000). The test confirms that the teachers whose school has a computer without the Internet connection have the higher mean score. The second difference is between the teachers whose school has a computer with the Internet connection and the teachers whose school does not have any computer (the mean difference is .725, and p is .001). The test confirms that the teachers whose school has a computer with the Internet connection have the higher mean score.

- Regarding the perception about 'receiving training at distant centre' there are two areas of significant differences: number of teacher training they have received and their access to a computer and the Internet.

In the case of the teacher training exposure there are two significant differences. The first one is between the teachers who have received 1 to 3 teacher-training and the teachers who have not received any teacher training (the mean difference is .608, and p is .006). The test confirms that the teachers who have received 1 to 3 teacher-training have the higher mean score. The second difference is between the teachers who have received more than 3 teacher-training and the teachers have not received any teacher training (the mean difference is .681, and p is .002). According to the test result, the teachers who have received more than 3 teacher-training have the higher mean score.

On the other hand, there are two significant differences in the case of the teachers' access to a computer and the Internet. The first difference is between the teachers whose school has a computer without the Internet connection and the teachers whose school does not have any computer (the mean difference is .912, and p is .000). The test confirms that the teachers whose school has a computer without the Internet connection have the higher mean score. The second difference is between the teachers whose school has a computer with the Internet connection and the teachers whose school does not have any computer (the mean difference is .601, and p is .007). The test confirms that the teachers whose school has a computer with the Internet connection have the higher mean score.

- Regarding the learning environment at participants' 'home' there are two areas of significant differences: teachers' English teaching experience and the number of teacher training they have received.

The first difference is between the teachers who have more than 30 years' English teaching experience and the teachers who have 20 to 30 years' English teaching experience (the mean difference is .444, and p is .039). The test confirms that the teachers who have more than 30 years' English teaching experience have the higher mean score.

The second difference is between the teachers who have not received any teacher-training and the teachers who have received 1 to 3 teacher training (the mean difference is .451, and p is .047). The test confirms that the teachers who have not received any teacher-training have the higher mean score.

- Regarding the learning environment at the participants' 'workplace' there are two areas of significant differences: type of the school where the teachers work and the teachers' access to a computer and the Internet.

The first difference is between the teachers who work in non-government high schools and the teachers who work in the government

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affiliated Madrasa (the mean difference is 2.279, and p is .022). The test confirms that the teachers who work in non-government high schools have the higher mean score.

The second difference is between the teachers whose school does not have any computer and the teachers whose school has a computer with the Internet connection (the mean difference is .952, and p is .002). The test reveals that the teachers whose schools do not have any computer have the higher mean score.

Appendix 11 (d): Attitudes to technology enhanced learning

I tested my survey participants' 'attitudes to technology enhanced learning' through five indicators namely perception regarding 'the use of ICT for professional knowledge building', 'the use of ICT for teaching skills development', 'level of difficulty in computer learning', 'need of computer skills for teaching any subjects', 'eagerness to learn computer' (please refer to the questionnaire attached as Appendix 1).

Table 11.10: Mean scores of teachers' 'attitudes to technology based learning' of English teachers (in descending order)

	N	Minimum	Maximum	Mean	Std. Deviation	Interpretation of Mean score
perception about need of computer skills for teaching any subjects	204	1	5	4.44	.621	high
eagerness to learn computer	204	2	5	4.43	.763	high
perception about level of difficulty in computer learning	204	1	5	4.09	.861	high
perception regarding the use of ICT for teachers' teaching skills development	204	1	5	4.07	.851	high
perception regarding the use of ICT for teachers' professional knowledge building	204	1	5	3.98	.954	modest
Overall attitudes	204	1.80	5	4.2010	.53581	high

According to Table 11.10, ‘perception about need of computer skills for teaching any subjects’ and ‘eagerness to learn computer’ have the highest mean scores (4.44 and 4.43). On the other hand, ‘perception regarding the use of ICT for professional knowledge building’ and the ‘perception regarding the use of ICT for teaching skills development’ have the lowest mean scores (3.98 and 4.07).

To explore the association of ‘attitudes to technology enhanced learning’ of the survey participants with their demographic features and the state of technological orientation I conducted the Independent-Samples *t* Test (when there are two groups of responses), ANOVA (when there are three or more groups of responses), and post hoc comparisons named Tukey’s HSD (honestly significant difference) for identifying the exact area of difference. Here, in the Table 11.11 and Table 11.12, I report only the significant results (for the complete results of all the Independent-Samples *t* Test and ANOVA please refer to Table 12.vii and 12.viii respectively in Appendix 12).

Table 11.11: Association of ‘attitudes to technology based learning’ with gender, computer training, and number of English teachers at school (independent-Samples *t* Test results)

Indicator	Demographic features and state of technological orientation	N	Mean	SD	t-statistics	p-value
perception regarding the use of ICT for teachers' professional knowledge building	computer training received	Nil	144	3.88	.989	-2.356
		1-3	60	4.22	.825	.019

In Table 11.11, p-value of ‘perception regarding the use of ICT for professional knowledge building’ is less than 0.05 in the case of the number of computer training they have received. This means that,

- In terms of ‘perception regarding the use of ICT for professional knowledge building’ there is a significant difference between the teachers of English who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case the mean score of the teachers who have received 1 to 3 computer training is higher.

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Table 11.12: Association of teachers' 'attitudes to technology based learning' with total teaching experience, English teaching experience, number of teacher training received, age, and school types (ANOVA test results)

Aspect	Indicator		Sum of Squares	df	Mean Square	F	Sig.
perception regarding the use of ICT for teachers' professional knowledge building	age	Between Groups	6.075	2	3.037	3.414	.035
		Within Groups	178.803	201	.890		
		Total	184.877	203			
	number of teacher training received	Between Groups	9.493	2	4.747	5.440	.005
		Within Groups	175.384	201	.873		
		Total	184.877	203			
	level of computer usage	Between Groups	10.174	3	3.391	3.882	.010
		Within Groups	174.704	200	.874		
		Total	184.877	203			
perception regarding the use of ICT for teaching skills development	age	Between Groups	7.151	2	3.576	5.138	.007
		Within Groups	139.888	201	.696		
		Total	147.039	203			
perception about the need of computer skills for teaching any subjects	age	Between Groups	3.843	2	1.921	51.87	.006
		Within Groups	74.451	201	.370		
		Total	78.294	203			

Although Tukey's HSD showed a significant difference in teachers' perception regarding the use of ICT for teaching skills development between the teachers who have received 1 to 3 teacher training and the teachers who have not received any teacher training, the ANOVA result in this case did not show any significant difference. I therefore excluded this case from my list of significant differences.

From ANOVA and Tukey's HSD test results I achieved the following findings.

- Regarding the perception about the use of ICT for professional knowledge building there are two significant differences: one is age and the other one is the level of computer usage.

The first difference is between the teachers who are 30 to 50 year old and the teachers who are below 30 years (the mean difference is .527,

and p is .032). The test informs that the teachers who are 30 to 50 year old have the higher mean score.

The second difference, which is in the level of computer usage, has two areas. Firstly, there is a difference between the teachers who started learning to operate a computer but stopped for some reasons and the teachers who do not know how to operate a computer and never started to learn it (the mean difference is .430, and p is .036). The test informs that the teachers who started learning to operate a computer but stopped for some reasons have the higher mean score. Secondly, there is a difference between the teachers who can operate a computer well and the teachers who do not know how to operate a computer and never started to learn it (the mean difference is .587, and p is .017).

- Regarding the perception about the use of ICT for teaching skills development there is a significant difference between the teachers who are 30 to 50 year old and the teachers who are below 30 years (the mean difference is .581, and p is .005). The test informs that the teachers who are 30 to 50 year old have the higher mean score.
- Regarding the perception about the need of computer skills for teaching any subjects there is a significant difference between the teachers who are more than 50 year old and the teachers who are below 30 years (the mean difference is .522, and p is .004). The test informs that the teachers who are more than 50 year old have the higher mean score.

Appendix 11 (e): Professional needs

I tested the 'professional needs' of the survey participants through ten indicators namely 'readiness to teach English lessons', 'known English vocabulary for teaching English lessons', 'understanding of content of English lessons', 'level of using different learning activities', 'awareness about teaching and learning objectives', 'ability to plan English lessons', 'level of satisfaction about lesson activity management', 'ability to deliver English lessons interestingly', 'ability to use class instructions in English', 'involving learners in lesson through personalisation' (please refer to the questionnaire attached as Appendix 1).

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Table 11.13: Mean scores of the ‘professional needs’ of English teachers (in descending order)

	N	Minimum	Maximum	Mean	Std. Deviation	Interpretation of Mean scores
level of satisfaction about lesson activity management	204	2	5	4.17	.763	high
ability to deliver English lessons interestingly	204	2	5	4.11	.703	high
involving learners in lesson through personalisation	204	1	5	3.97	.818	modest
ability to plan English lessons	204	2	5	3.93	.756	modest
understanding of content of English lessons	204	1	5	3.92	.669	modest
readiness to teach English lessons	204	1	5	3.92	.829	modest
ability to use class instructions in English	204	1	5	3.89	.817	modest
level of using different learning activities	204	1	5	3.83	.900	modest
awareness about teaching and learning objectives	204	0	5	3.79	.931	modest
known English vocabulary for teaching English lessons	204	2	5	3.75	.631	modest
Overall needs	204	2.20	5	3.9275	.54964	high

According to Table 11.13, ‘level of satisfaction about lesson activity management’ and the ‘ability to deliver English lessons interestingly’ have ‘high’ mean scores (4.17 and 4.11). All the remaining indicators have ‘modest’ mean scores (between 3.75 and 3.97) whereas their ‘known English vocabulary for teaching English lessons’ and the ‘awareness about teaching and learning objectives’ have the lowest mean scores (3.75 and 3.79).

To explore the association of survey participants’ ‘professional needs’ with their demographic features and the state of technological orientation I conducted the Independent-Samples *t* Test (when there are two groups of responses), ANOVA (when there are three or more groups of responses), and

post hoc comparisons named Tukey's HSD (honestly significant difference) for identifying the exact area of difference. Here, in the Table 11.14 and Table 11.15, I report only the significant results (for the complete results of all the Independent-Samples *t* Test and ANOVA please refer to Table 12.ix and 12.x respectively in Appendix 12).

Table 11.14: Association of 'professional needs' with gender, computer training, and number of English teachers at school (independent-Samples *t* Test results)

Indicator	Demographic features and state of technological orientation		N	Mean	SD	t-statistics	p-value
understanding of content of English lessons	computer training received	Nil	144	3.85	.637	-2.253	.025
		1-3	60	4.08	.720		
ability to plan English lessons	computer training received	Nil	144	3.85	.760	-2.346	.020
		1-3	60	4.12	.715		
ability to use class instructions in English	gender	Male	135	3.98	.868	2.110	.036
		Female	69	3.72	.684		
awareness about teaching and learning objectives	computer training received	Nil	144	3.67	.931	-2.968	.003
		1-3	60	4.08	.869		

In Table 11.14, p-value of 'understanding of content of English lessons', 'ability to plan English lessons', 'ability to use class instructions in English', and 'awareness about teaching and learning objectives' are less than 0.05 in the cases of the number of computer training they have received and their gender. These mean that,

- In terms of 'understanding of content of English lessons' there is a significant difference between the teachers of English who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case the mean score of the teachers who have received 1 to 3 computer training is higher.

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- In terms of ‘ability to plan English lessons’ there is a significant difference between the teachers of English who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case the mean score of the teachers who have received 1 to 3 computer training is higher.
- In terms of ‘ability to use class instructions in English’ there is a significant difference between the male and the female teachers of English. In this case the mean score of the male teachers is higher.
- In terms of the ‘awareness about teaching and learning objectives’ there is a significant difference between the teachers who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case the mean score of the teachers who have received 1 to 3 computer training is higher.

Table 11.15: Association of teachers’ ‘professional needs’ with total teaching experience, English teaching experience, number of teacher training received, age, and school types (ANOVA test results)

Aspect	Indicator		Sum of Squares	df	Mean Square	F	Sig.
readiness to teach English lessons	level of computer usage	Between Groups	8.028	3	2.676	4.068	.008
		Within Groups	131.555	200	.658		
		Total	139.583	203			
awareness about teaching and learning objectives	access to computer and Internet	Between Groups	6.384	2	3.192	3.784	.024
		Within Groups	169.552	201	.844		
		Total	175.936	203			

From ANOVA and Tukey’s HSD test results I achieved the following findings.

- Regarding the ‘readiness to teach English lessons’ there are two significant differences in their ‘level of computer usage’. The first one is between the teachers who started learning to operate a computer but stopped it for some reasons and the teachers who have recently started learning to operate a computer (the mean difference is .454, and p is .000). The test informs that the teachers who started learning to operate a computer but stopped it for some reasons have the higher mean score. The second one is between the teachers who can operate a

computer well and the teachers who have recently started learning to operate a computer (the mean difference is .681, and p is .005). The test informs that the teachers who can operate a computer well have the higher mean score.

- Regarding the 'awareness about teaching and learning objectives' there is a significant difference between the teachers whose school has a computer with the Internet connection and the teachers whose school has a computer without any Internet connection (the mean difference is .366, and p is .028). The test informs that the teachers whose school has a computer with the Internet connection have the higher mean score.

Appendix 11 (f): Preferred teacher-learning procedures

I tested the survey participants' 'preferred teacher-learning procedures' through five indicators namely their 'confidence on professional knowledge of teachers of same school', 'confidence on professional knowledge of teachers of other schools of same district', 'view on teachers' involvement in designing teacher-learning programmes', 'view on learning with teachers having different backgrounds', and 'view on continuing teacher-learning' (please refer to the questionnaire attached as Appendix 1).

Table 11.16: Mean scores of the 'preferred teacher-learning procedures' of English teachers (in descending order)

	N	Minimum	Maximum	Mean	Std. Deviation	Interpretation of Mean scores
view on continuing teacher-learning	204	2	5	4.61	.518	high
view on learning with teachers having different backgrounds	204	3	5	4.34	.496	high
view on teachers' involvement in designing teacher-learning programmes	204	2	5	4.15	.741	high
confidence on professional knowledge of teachers of same school	204	2	5	4.14	.571	high

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confidence on professional knowledge of teachers of other schools of same district	204	2	5	3.95	.629	modest
Overall preferred procedures	204	3.60	5	4.2373	.38158	high

According to Table 11.16, except ‘confidence on professional knowledge of teachers of other schools of same district’ (the mean score of this item is 3.95); all the indicators have ‘high’ mean scores (from 4.14 to 4.61).

For exploring the survey participants’ ‘preferred teacher-learning procedures’ based on their demographic features and the state of technological orientation I conducted the Independent-Samples *t* Test (when there are two groups of responses), ANOVA (when there are three or more groups of responses), and post hoc comparisons named Tukey’s HSD (honestly significant difference) for identifying the exact area of difference. Here, in the Table 11.17 I report only the significant results (for the complete results of all the Independent-Samples *t* Test and ANOVA please refer to Table 12.xi and 12.xii respectively in Appendix 12).

Table 11.17: Association of ‘preferred teacher-learning procedures’ with gender, computer training, and number of English teachers at school (independent-Samples *t* Test results)

Indicator	Demographic features and state of technological orientation		N	Mean	SD	t-statistics	p-value
confidence on professional knowledge of teachers of same school	gender	Male	135	4.07	.594	-2.233	.027
		Female	69	4.26	.504		
confidence on professional knowledge of teachers of other schools of same district	gender	Male	135	3.88	.599	-2.067	.040
		Female	69	4.07	.671		

In Table 11.17, p-value of 'confidence on professional knowledge of teachers of same school' and 'confidence on professional knowledge of teachers of other schools of same district' are less than 0.05 in the case of gender. This means that,

- In terms of the 'confidence on professional knowledge of teachers of same school' there is a significant difference between the male and the female teachers of English. In this case the mean score of the female teachers is higher.
- In terms of the 'confidence on professional knowledge of teachers of other schools of same district' there is a significant difference between the male and the female teachers of English. In this case the mean score of the female teachers is higher.

According to ANOVA test results (please see Table 12.xii in Appendix 12), there is no significant difference of teachers' 'preferred teacher-learning procedures' in terms of age, total teaching experience, English teaching experience, number of teacher training received, and school types.

Appendix 11 (g): Preferred nature of teacher-learning activities

I tested the participants' 'preferred nature of teacher-learning activities' through ten indicators namely 'teacher-learning and teaching at school simultaneously', 'need for full-time teacher trainer', 'sharing teaching related issues with known teachers', 'learning through observing teaching of others', 'sharing experience with unknown teachers', 'using examples of teaching practices', 'using own teaching experiences', 'individual-focused learning activities', 'assessment of participants' performance', and 'provision of regular tasks and assignments' (please refer to the questionnaire attached as Appendix 1).

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Table 11.18: Mean scores of the ‘preferred teacher-learning activities’ of English teachers (in descending order)

	N	Minimum	Maximum	Mean	Std. Deviation	Interpretation of Mean score
need for full-time teacher trainer	204	4	5	4.58	.494	high
individual-focused learning activities	204	4	5	4.48	.501	high
provision of regular tasks and assignments	204	2	5	4.46	.564	high
using examples of teaching practices	204	3	5	4.44	.507	high
using own teaching experiences	204	3	5	4.43	.535	high
sharing teaching related issues with known teachers	204	2	5	4.42	.577	high
assessment of participants' performance	204	2	5	4.40	.529	high
learning through observing teaching of others	204	1	5	4.38	.613	high
sharing experience with unknown teachers	204	1	5	4.20	.854	high
teacher-learning and teaching at school simultaneously	204	1	5	4.01	1.189	high
Overall preferred activities	204	3.40	5	4.3794	.41090	high

According to Table 11.18, all the indicators of the ‘preferred teacher-learning activities’ have high mean scores (from 4.58 to 4.01).

For exploring the survey participants’ ‘preferred teacher-learning activities’ based on their demographic features and the state of technological orientation I conducted the Independent-Samples *t* Test (when there are two groups of responses), ANOVA (when there are three or more groups of responses), and post hoc comparisons named Tukey’s HSD (honestly significant difference) for identifying the exact area of difference. Here, in the Table 11.19 and Table 11.20, I report only the significant results (for the complete results of all the

Independent-Samples *t* Test and ANOVA please refer to Appendices 21 and 22 respectively).

Table 11.19: Association of ‘preferred nature of teacher-learning activities’ with gender, computer training, and number of English teachers at school (independent-Samples *t* Test results)

Indicator	Demographic features and state of technological orientation	N	Mean	SD	t-statistics	p-value
sharing teaching related issues with known teachers	computer training received	Nil	144	4.35	.597	-2.425
		1-3	60	4.57	.500	

In Table 11.19, p-value of preference on ‘sharing teaching related issues with known teachers’ is less than 0.05 in the case of the computer training they have received. This means that,

- In terms of ‘sharing teaching related issues with known teachers’ there is a significant difference between the teachers who have not received any computer training and the teachers who have received 1 to 3 computer training. In this case, the mean score of the teachers who have attended 1 to 3 computer training is higher.

Table 11.20: Association of teachers’ ‘preferred nature of teacher-learning activities’ with total teaching experience, English teaching experience, number of teacher training received, age, and school types (ANOVA test results).

Aspect	Indicator		Sum of Squares	df	Mean Square	F	Sig.
teacher-learning and teaching at school simultaneously	number of teacher-training received	Between Groups	8.775	2	4.388	3.170	.044
		Within Groups	278.180	201	1.384		
		Total	286.956	203			

Although the ANOVA result showed a significant difference among the mean scores of the preference of teacher-learning and teaching at school simultaneously (in terms of the number of teacher-training received by the teachers), Tukey’s HSD did not show any significant difference in this aspect.

Appendix 12: complete results of all Independent-Samples *t* Test and ANOVA of the survey data

(i) Independent-Samples *t* Test results on the association of 'professional learning preferences' with gender, computer training received, and the number of English teachers at school

a) 'Professional learning preferences' based on gender

Indicator	Gender	N	Mean	SD	t-statistics	p-value
preference to reading for professional learning	Male	135	4.49	.597	-1.665	.097
	Female	69	4.64	.618		
preference to training for professional learning	Male	135	4.75	.452	-.284	.777
	Female	69	4.77	.519		
preference to use reflections for professional learning	Male	135	4.24	.859	-2.090	.038
	Female	69	4.49	.678		
preference to use experience for professional learning	Male	135	4.24	.629	-.021	.983
	Female	69	4.25	.628		
readiness to interact with group members for professional learning	Male	135	4.48	.818	-.094	.925
	Female	69	4.49	.797		

b) 'Professional learning preferences' based on computer training received

Indicator	Computer training	N	Mean	SD	t-statistics	p-value
preference to reading for professional learning	Nil	144	4.48	.647	-2.517	.013
	1-3	60	4.68	.469		
preference to training for professional learning	Nil	144	4.74	.502	-.875	.382
	1-3	60	4.80	.403		
preference to use reflections for professional learning	Nil	144	4.18	.874	-5.307	.000
	1-3	60	4.68	.469		
preference to use experience for professional learning	Nil	144	4.20	.621	-1.548	.123
	1-3	60	4.35	.633		
readiness to interact with group members for professional learning	Nil	144	4.38	.892	- 3.896	.000
	1-3	60	4.75	.474		

c) 'Professional learning preferences' based on number of English teachers in school

Indicator	Number of English teachers	N	Mean	SD	t-statistics	p-value
preference to reading for professional learning	2-4	103	4.51	.684	-.587	.558
	More than 4	101	4.56	.518		
preference to training for professional learning	2-4	103	4.83	.445	2.460	.015
	More than 4	101	4.67	.492		
preference to use reflections for professional learning	2-4	103	4.17	.974	-2.797	.006
	More than 4	101	4.49	.559		
preference to use experience for professional learning	2-4	103	4.21	.621	-.724	.470
	More than 4	101	4.28	.634		
readiness to interact with group members for professional learning	2-4	103	4.50	.752	.175	.861
	More than 4	101	4.48	.867		

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(ii) ANOVA test results on association of 'professional learning preferences' with age, total teaching experience, English teaching experience, number of teacher training received, level of computer usage, school types, and access to computer and the Internet.

a) 'Professional learning preferences' based on age

		Sum of Squares	df	Mean Square	F	Sig.
preference to reading for professional learning	Between Groups	1.678	2	.839	2.309	.102
	Within Groups	73.009	201	.363		
	Total	74.686	203			
preference to training for professional learning	Between Groups	.876	2	.438	1.963	.143
	Within Groups	44.869	201	.223		
	Total	45.745	203			
preference to use reflections for professional learning	Between Groups	.465	2	.233	.353	.703
	Within Groups	132.530	201	.659		
	Total	132.995	203			
preference to use experience for professional learning	Between Groups	2.784	2	1.392	3.636	.028
	Within Groups	76.961	201	.383		
	Total	79.745	203			
readiness to interact with group members for professional learning	Between Groups	.794	2	.397	.604	.548
	Within Groups	132.161	201	.658		
	Total	132.956	203			

b) 'Professional learning preferences' based on total teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
preference to reading for professional learning	Between Groups	1.880	2	.940	2.595	.077
	Within Groups	72.806	201	.362		
	Total	74.686	203			
preference to training for professional learning	Between Groups	1.899	2	.950	4.354	.014
	Within Groups	43.846	201	.218		
	Total	45.745	203			
preference to use reflections for professional learning	Between Groups	.966	2	.483	.735	.481
	Within Groups	132.029	201	.657		
	Total	132.995	203			
preference to use experience for professional learning	Between Groups	4.237	2	2.119	5.639	.004
	Within Groups	75.508	201	.376		
	Total	79.745	203			
readiness to interact with group members for professional learning	Between Groups	.495	2	.248	.376	.687
	Within Groups	132.461	201	.659		
	Total	132.956	203			

c) 'Professional learning preferences' based on English teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
preference to reading for professional learning	Between Groups	1.540	2	.770	2.116	.123
	Within Groups	73.146	201	.364		
	Total	74.686	203			
preference to training for professional learning	Between Groups	1.800	2	.900	4.116	.018
	Within Groups	43.945	201	.219		
	Total	45.745	203			
preference to use reflections for professional learning	Between Groups	7.762	2	3.881	6.229	.002
	Within Groups	125.233	201	.623		
	Total	132.995	203			
preference to use experience for professional learning	Between Groups	2.358	2	1.179	3.062	.049
	Within Groups	77.387	201	.385		
	Total	79.745	203			
readiness to interact with group members for professional learning	Between Groups	1.715	2	.857	1.313	.271
	Within Groups	131.241	201	.653		
	Total	132.956	203			

d) 'Professional learning preferences' based on number of teacher training received

		Sum of Squares	df	Mean Square	F	Sig.
preference to reading for professional learning	Between Groups	2.016	2	1.008	2.788	.064
	Within Groups	72.670	201	.362		
	Total	74.686	203			
preference to training for professional learning	Between Groups	.280	2	.140	.619	.539
	Within Groups	45.465	201	.226		
	Total	45.745	203			
preference to use reflections for professional learning	Between Groups	3.925	2	1.962	3.056	.049
	Within Groups	129.070	201	.642		
	Total	132.995	203			
preference to use experience for professional learning	Between Groups	3.461	2	1.731	4.560	.012
	Within Groups	76.284	201	.380		
	Total	79.745	203			
readiness to interact with group members for professional learning	Between Groups	3.144	2	1.572	2.434	.090
	Within Groups	129.812	201	.646		
	Total	132.956	203			

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e) 'Professional learning preferences' based on level of computer usage

		Sum of Squares	df	Mean Square	F	Sig.
preference to reading for professional learning	Between Groups	.671	3	.224	.605	.613
	Within Groups	74.015	200	.370		
	Total	74.686	203			
preference to training for professional learning	Between Groups	.387	3	.129	.568	.636
	Within Groups	45.358	200	.227		
	Total	45.745	203			
preference to use reflections for professional learning	Between Groups	4.310	3	1.437	2.233	.086
	Within Groups	128.685	200	.643		
	Total	132.995	203			
preference to use experience for professional learning	Between Groups	.481	3	.160	.404	.750
	Within Groups	79.264	200	.396		
	Total	79.745	203			
readiness to interact with group members for professional learning	Between Groups	4.467	3	1.489	2.318	.077
	Within Groups	128.489	200	.642		
	Total	132.956	203			

f) 'Professional learning preferences' based on school types

		Sum of Squares	df	Mean Square	F	Sig.
preference to reading for professional learning	Between Groups	.568	2	.284	.770	.464
	Within Groups	74.118	201	.369		
	Total	74.686	203			
preference to training for professional learning	Between Groups	.215	2	.108	.475	.622
	Within Groups	45.530	201	.227		
	Total	45.745	203			
preference to use reflections for professional learning	Between Groups	.899	2	.450	.684	.506
	Within Groups	132.096	201	.657		
	Total	132.995	203			
preference to use experience for professional learning	Between Groups	2.676	2	1.338	3.489	.032
	Within Groups	77.069	201	.383		
	Total	79.745	203			
readiness to interact with group members for professional learning	Between Groups	.671	2	.335	.510	.601
	Within Groups	132.285	201	.658		
	Total	132.956	203			

g) 'Professional learning preferences' based on access to computer and the Internet

		Sum of Squares	df	Mean Square	F	Sig.
preference to reading for professional learning	Between Groups	1.757	2	.878	2.421	.091
	Within Groups	72.929	201	.363		
	Total	74.686	203			
preference to training for professional learning	Between Groups	.187	2	.094	.413	.662
	Within Groups	45.558	201	.227		
	Total	45.745	203			
preference to use reflections for professional learning	Between Groups	.388	2	.194	.294	.746
	Within Groups	132.607	201	.660		
	Total	132.995	203			
preference to use experience for professional learning	Between Groups	.669	2	.334	.850	.429
	Within Groups	79.076	201	.393		
	Total	79.745	203			
readiness to interact with group members for professional learning	Between Groups	5.085	2	2.542	3.997	.020
	Within Groups	127.871	201	.636		
	Total	132.956	203			

(iii) Independent-Samples *t* Test results on the association of 'professional learning network' with gender, computer training received, and the number of English teachers at school

a) 'Professional learning network' based on gender

Indicator	Gender	N	Mean	SD	t-statistics	p-value
with English teachers of the same school	Male	135	3.87	.832	-3.692	.000
	Female	69	4.32	.776		
with English teachers of other schools	Male	135	2.96	.957	-.941	.348
	Female	69	3.09	.742		
with teachers of other subjects of the same school	Male	135	3.61	.922	-2.578	.011
	Female	69	3.96	.848		
with teachers of other subjects of other schools	Male	135	2.67	.810	-.434	.665
	Female	69	2.71	.597		
with local government education officer	Male	135	2.81	1.087	-2.896	.004
	Female	69	3.20	.797		
with education experts	Male	135	2.82	.711	-1.010	.314
	Female	69	2.93	.693		
with non-government education officers	Male	135	2.77	.819	-1.930	.055
	Female	69	2.99	.717		
with government teacher trainers	Male	135	2.59	.767	-1.958	.052
	Female	69	2.81	.809		
with heads of school	Male	135	3.96	.762	-2.403	.017
	Female	69	4.22	.683		
with own family members	Male	135	3.51	1.239	-1.831	.069
	Female	69	3.80	.948		

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b) 'Professional learning network' based on computer training received

Indicator	Computer training	N	Mean	SD	t-statistics	p-value
with English teachers of the same school	Nil	144	3.98	.865	-2.896	.004
	1-3	60	4.28	.715		
with English teachers of other schools	Nil	144	2.88	.900	-3.306	.001
	1-3	60	3.32	.792		
with teachers of other subjects of the same school	Nil	144	3.65	.889	-2.072	.040
	1-3	60	3.93	.936		
with teachers of other subjects of other schools	Nil	144	2.56	.707	-3.782	.000
	1-3	60	2.98	.748		
with local government education officer	Nil	144	2.80	.943	-3.298	.001
	1-3	60	3.30	1.094		
with education experts	Nil	144	2.75	.695	-3.476	.001
	1-3	60	3.12	.666		
with non-government education officers	Nil	144	2.76	.813	-2.597	.011
	1-3	60	3.05	.699		
with government teacher trainers	Nil	144	2.57	.799	-2.757	.007
	1-3	60	2.88	.715		
with heads of school	Nil	144	3.94	.777	-3.241	.001
	1-3	60	4.30	.591		
with own family members	Nil	144	3.46	1.194	-3.171	.002
	1-3	60	3.97	.974		

c) 'Professional learning network' based on number of English teachers in school

Indicator	Number of teachers	N	Mean	SD	t-statistics	p-value
with English teachers of the same school	2-4	103	3.97	.834	-.922	.358
	More than 4	101	4.08	.845		
with English teachers of other schools	2-4	103	2.96	.827	-.708	.480
	More than 4	101	3.05	.953		
with teachers of other subjects of the same school	2-4	103	3.65	.936	-1.269	.206
	More than 4	101	3.81	.880		
with teachers of other subjects of other schools	2-4	103	2.64	.698	-.787	.432
	More than 4	101	2.72	.789		
with local government education officer	2-4	103	2.87	.987	-1.269	.206
	More than 4	101	3.02	1.039		
with education experts	2-4	103	2.87	.621	.325	.746
	More than 4	101	2.84	.784		
with non-government education officers	2-4	103	2.89	.873	.913	.362
	More than 4	101	2.79	.697		
with government teacher trainers	2-4	103	2.60	.796	-1.097	.274
	More than 4	101	2.72	.776		
with heads of school	2-4	103	4.05	.784	.086	.932

	More than 4	101	4.04	.706		
with own family members	2-4	103	3.31	1.253	-3.845	.000
	More than 4	101	3.91	.960		

(iv) ANOVA test results on association of 'professional learning network' with age, total teaching experience, English teaching experience, number of teacher training received, level of computer usage, school types, and access to computer and the Internet.

a) 'Professional learning network' based on age

		Sum of Squares	df	Mean Square	F	Sig.
with English teachers of the same school	Between Groups	7.754	2	3.877	5.767	.004
	Within Groups	135.123	201	.672		
	Total	142.877	203			
with English teachers of other schools	Between Groups	2.380	2	1.190	1.508	.224
	Within Groups	158.615	201	.789		
	Total	160.995	203			
with teachers of other subjects of the same school	Between Groups	2.715	2	1.357	1.649	.195
	Within Groups	165.457	201	.823		
	Total	168.172	203			
with teachers of other subjects of other schools	Between Groups	.356	2	.178	.320	.727
	Within Groups	111.933	201	.557		
	Total	112.289	203			
with local government education officer	Between Groups	7.635	2	3.818	3.822	.023
	Within Groups	200.772	201	.999		
	Total	208.407	203			
with education experts	Between Groups	2.755	2	1.378	2.822	.062
	Within Groups	98.122	201	.488		
	Total	100.877	203			
with non-government education officers	Between Groups	1.310	2	.655	1.048	.353
	Within Groups	125.671	201	.625		
	Total	126.980	203			
with government teacher trainers	Between Groups	6.687	2	3.344	5.649	.004
	Within Groups	118.974	201	.592		
	Total	125.662	203			
with heads of school	Between Groups	.916	2	.458	.824	.440
	Within Groups	111.687	201	.556		
	Total	112.603	203			
with own family members	Between Groups	.100	2	.050	.037	.964
	Within Groups	270.528	201	1.346		
	Total	270.627	203			

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b) 'Professional learning network' based on total teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
with English teachers of the same school	Between Groups	2.343	2	1.172	1.676	.190
	Within Groups	140.534	201	.699		
	Total	142.877	203			
with English teachers of other schools	Between Groups	4.739	2	2.370	3.048	.050
	Within Groups	156.256	201	.777		
	Total	160.995	203			
with teachers of other subjects of the same school	Between Groups	3.396	2	1.698	2.072	.129
	Within Groups	164.775	201	.820		
	Total	168.172	203			
with teachers of other subjects of other schools	Between Groups	4.481	2	2.241	4.178	.017
	Within Groups	107.808	201	.536		
	Total	112.289	203			
with local government education officer	Between Groups	4.364	2	2.182	2.150	.119
	Within Groups	204.043	201	1.015		
	Total	208.407	203			
with education experts	Between Groups	1.322	2	.661	1.334	.266
	Within Groups	99.556	201	.495		
	Total	100.877	203			
with non-government education officers	Between Groups	.899	2	.449	.716	.490
	Within Groups	126.082	201	.627		
	Total	126.980	203			
with government teacher trainers	Between Groups	.068	2	.034	.054	.947
	Within Groups	125.594	201	.625		
	Total	125.662	203			
with heads of school	Between Groups	.921	2	.461	.829	.438
	Within Groups	111.682	201	.556		
	Total	112.603	203			
with own family members	Between Groups	3.800	2	1.900	1.431	.241
	Within Groups	266.828	201	1.328		
	Total	270.627	203			

c) 'Professional learning network' based on English teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
with English teachers of the same school	Between Groups	6.653	2	3.327	4.908	.008
	Within Groups	136.224	201	.678		
	Total	142.877	203			
with English teachers of other schools	Between Groups	5.742	2	2.871	3.717	.026
	Within Groups	155.253	201	.772		
	Total	160.995	203			
with teachers of other subjects of the same school	Between Groups	7.661	2	3.831	4.797	.009
	Within Groups	160.511	201	.799		
	Total	168.172	203			
with teachers of other subjects of other schools	Between Groups	5.781	2	2.891	5.455	.005
	Within Groups	106.508	201	.530		
	Total	112.289	203			
with local government education officer	Between Groups	7.215	2	3.607	3.604	.029
	Within Groups	201.192	201	1.001		
	Total	208.407	203			
with education experts	Between Groups	2.481	2	1.240	2.534	.082
	Within Groups	98.397	201	.490		
	Total	100.877	203			
with non-government education officers	Between Groups	5.976	2	2.988	4.964	.008
	Within Groups	121.004	201	.602		
	Total	126.980	203			
with government teacher trainers	Between Groups	.780	2	.390	.628	.535
	Within Groups	124.882	201	.621		
	Total	125.662	203			
with heads of school	Between Groups	3.762	2	1.881	3.473	.033
	Within Groups	108.841	201	.541		
	Total	112.603	203			
with own family members	Between Groups	9.919	2	4.959	3.824	.023
	Within Groups	260.709	201	1.297		
	Total	270.627	203			

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d) 'Professional learning network' based on number of teacher training received

		Sum of Squares	df	Mean Square	F	Sig.
with English teachers of the same school	Between Groups	2.302	2	1.151	1.646	.195
	Within Groups	140.575	201	.699		
	Total	142.877	203			
with English teachers of other schools	Between Groups	.216	2	.108	.135	.874
	Within Groups	160.779	201	.800		
	Total	160.995	203			
with teachers of other subjects of the same school	Between Groups	7.551	2	3.775	4.724	.010
	Within Groups	160.621	201	.799		
	Total	168.172	203			
with teachers of other subjects of other schools	Between Groups	1.670	2	.835	1.518	.222
	Within Groups	110.619	201	.550		
	Total	112.289	203			
with local government education officer	Between Groups	5.195	2	2.598	2.569	.079
	Within Groups	203.212	201	1.011		
	Total	208.407	203			
with education experts	Between Groups	5.400	2	2.700	5.684	.004
	Within Groups	95.477	201	.475		
	Total	100.877	203			
with non-government education officers	Between Groups	3.651	2	1.826	2.975	.053
	Within Groups	123.329	201	.614		
	Total	126.980	203			
with government teacher trainers	Between Groups	1.557	2	.778	1.261	.286
	Within Groups	124.105	201	.617		
	Total	125.662	203			
with heads of school	Between Groups	4.280	2	2.140	3.971	.020
	Within Groups	108.323	201	.539		
	Total	112.603	203			
with own family members	Between Groups	9.479	2	4.739	3.648	.028
	Within Groups	261.148	201	1.299		
	Total	270.627	203			

e) 'Professional learning network' based on level of computer usage

		Sum of Squares	df	Mean Square	F	Sig.
with English teachers of the same school	Between Groups	1.408	3	.469	.663	.575
	Within Groups	141.470	200	.707		
	Total	142.877	203			
with English teachers of other schools	Between Groups	9.169	3	3.056	4.026	.008
	Within Groups	151.826	200	.759		
	Total	160.995	203			
with teachers of other subjects of the same school	Between Groups	2.007	3	.669	.805	.492
	Within Groups	166.165	200	.831		
	Total	168.172	203			
with teachers of other subjects of other schools	Between Groups	9.101	3	3.034	5.880	.001
	Within Groups	103.188	200	.516		
	Total	112.289	203			
with local government education officer	Between Groups	6.588	3	2.196	2.176	.092
	Within Groups	201.819	200	1.009		
	Total	208.407	203			
with education experts	Between Groups	2.328	3	.776	1.575	.197
	Within Groups	98.549	200	.493		
	Total	100.877	203			
with non-government education officers	Between Groups	7.818	3	2.606	4.374	.005
	Within Groups	119.162	200	.596		
	Total	126.980	203			
with government teacher trainers	Between Groups	11.806	3	3.935	6.913	.000
	Within Groups	113.856	200	.569		
	Total	125.662	203			
with heads of school	Between Groups	.093	3	.031	.055	.983
	Within Groups	112.509	200	.563		
	Total	112.603	203			
with own family members	Between Groups	5.646	3	1.882	1.421	.238
	Within Groups	264.981	200	1.325		
	Total	270.627	203			

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f) 'Professional learning network' based on school types

		Sum of Squares	df	Mean Square	F	Sig.
with English teachers of the same school	Between Groups	.567	2	.283	.400	.671
	Within Groups	142.311	201	.708		
	Total	142.877	203			
with English teachers of other schools	Between Groups	2.099	2	1.050	1.328	.267
	Within Groups	158.896	201	.791		
	Total	160.995	203			
with teachers of other subjects of the same school	Between Groups	.539	2	.270	.323	.724
	Within Groups	167.632	201	.834		
	Total	168.172	203			
with teachers of other subjects of other schools	Between Groups	1.526	2	.763	1.385	.253
	Within Groups	110.763	201	.551		
	Total	112.289	203			
with local government education officer	Between Groups	2.538	2	1.269	1.239	.292
	Within Groups	205.868	201	1.024		
	Total	208.407	203			
with education experts	Between Groups	.500	2	.250	.501	.607
	Within Groups	100.377	201	.499		
	Total	100.877	203			
with non-government education officers	Between Groups	.440	2	.220	.349	.705
	Within Groups	126.540	201	.630		
	Total	126.980	203			
with government teacher trainers	Between Groups	1.671	2	.836	1.355	.260
	Within Groups	123.990	201	.617		
	Total	125.662	203			
with heads of school	Between Groups	.985	2	.492	.886	.414
	Within Groups	111.618	201	.555		
	Total	112.603	203			
with own family members	Between Groups	8.348	2	4.174	3.199	.043
	Within Groups	262.280	201	1.305		
	Total	270.627	203			

g) 'Professional learning network' based on access to computer and the Internet

		Sum of Squares	df	Mean Square	F	Sig.
with English teachers of the same school	Between Groups	.292	2	.146	.206	.814
	Within Groups	142.585	201	.709		
	Total	142.877	203			
with English teachers of other schools	Between Groups	.338	2	.169	.212	.809
	Within Groups	160.657	201	.799		
	Total	160.995	203			
with teachers of other subjects of the same school	Between Groups	1.350	2	.675	.813	.445
	Within Groups	166.822	201	.830		
	Total	168.172	203			
with teachers of other subjects of other schools	Between Groups	.551	2	.275	.495	.610
	Within Groups	111.738	201	.556		
	Total	112.289	203			
with local government education officer	Between Groups	7.234	2	3.617	3.614	.029
	Within Groups	201.173	201	1.001		
	Total	208.407	203			
with education experts	Between Groups	1.293	2	.646	1.305	.274
	Within Groups	99.585	201	.495		
	Total	100.877	203			
with non-government education officers	Between Groups	3.354	2	1.677	2.727	.068
	Within Groups	123.626	201	.615		
	Total	126.980	203			
with government teacher trainers	Between Groups	1.166	2	.583	.941	.392
	Within Groups	124.496	201	.619		
	Total	125.662	203			
with heads of school	Between Groups	3.074	2	1.537	2.821	.062
	Within Groups	109.528	201	.545		
	Total	112.603	203			
with own family members	Between Groups	2.492	2	1.246	.934	.395
	Within Groups	268.136	201	1.334		
	Total	270.627	203			

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(v) Independent-Samples *t* Test results on the association of 'learning motivation and facilities' with gender, computer training received, and the number of English teachers at school

a) 'Learning motivation and facilities' based on gender

Indicator	Gender	N	Mean	SD	t-statistics	p-value
encouragement from school authority	Male	135	4.42	.629	-1.811	.072
	Female	69	4.58	.497		
encouragement from family	Male	135	4.24	1.018	-2.852	.005
	Female	69	4.58	.651		
perception regarding receiving training at distant centre	Male	135	4.12	.955	-1.851	.066
	Female	69	4.36	.747		
learning environment at home	Male	135	4.35	.776	2.075	.039
	Female	69	4.09	.981		
learning environment at workplace	Male	135	3.64	1.218	-1.084	.280
	Female	69	3.84	1.232		

b) 'Learning motivation and facilities' based on computer training received

Indicator	Computer training	N	Mean	SD	t-statistics	p-value
encouragement from school authority	Nil	144	4.44	.611	-1.426	.155
	1-3	60	4.57	.533		
encouragement from family	Nil	144	4.39	.845	.744	.458
	1-3	60	4.28	1.091		
perception regarding receiving training at distant centre	Nil	144	4.24	.853	.868	.387
	1-3	60	4.12	.993		
learning environment at home	Nil	144	4.24	.802	-.610	.542
	1-3	60	4.32	.983		
learning environment at workplace	Nil	144	3.69	1.190	-.295	.768
	1-3	60	3.75	1.310		

c) 'Learning motivation and facilities' based on number of English teachers in school

Indicator	Number of English teachers	N	Mean	SD	t-statistics	p-value
encouragement from school authority	2-4	103	4.46	.574	-.467	.641
	More than 4	101	4.50	.610		
encouragement from family	2-4	103	4.32	1.068	-.586	.558
	More than 4	101	4.40	.749		
perception regarding receiving training at distant centre	2-4	103	4.22	.969	.359	.720
	More than 4	101	4.18	.817		
learning environment at home	2-4	103	4.44	.605	3.024	.003
	More than 4	101	4.08	1.026		
learning environment at workplace	2-4	103	3.72	1.208	.090	.928
	More than 4	101	3.70	1.245		

(vi) ANOVA test results on association of 'learning motivation and facilities' with age, total teaching experience, English teaching experience, number of teacher training received, level of computer usage, school types, and access to computer and the Internet.

a) 'Learning motivation and facilities' based on age

		Sum of Squares	df	Mean Square	F	Sig.
encouragement from school authority	Between Groups	2.669	2	1.334	3.932	.021
	Within Groups	68.209	201	.339		
	Total	70.877	203			
encouragement from family	Between Groups	1.445	2	.723	.847	.430
	Within Groups	171.432	201	.853		
	Total	172.877	203			
perception regarding receiving training at distant centre	Between Groups	2.362	2	1.181	1.480	.230
	Within Groups	160.398	201	.798		
	Total	162.760	203			
learning environment at home	Between Groups	3.883	2	1.941	2.685	.071
	Within Groups	145.348	201	.723		
	Total	149.230	203			
learning environment at workplace	Between Groups	8.819	2	4.410	3.003	.052
	Within Groups	295.117	201	1.468		
	Total	303.936	203			

b) 'Learning motivation and facilities' based on total teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
encouragement from school authority	Between Groups	.150	2	.075	.214	.808
	Within Groups	70.727	201	.352		
	Total	70.877	203			
encouragement from family	Between Groups	2.273	2	1.137	1.339	.264
	Within Groups	170.604	201	.849		
	Total	172.877	203			
perception regarding receiving training at distant centre	Between Groups	.648	2	.324	.401	.670
	Within Groups	162.112	201	.807		
	Total	162.760	203			
learning environment at home	Between Groups	2.615	2	1.308	1.793	.169
	Within Groups	146.615	201	.729		
	Total	149.230	203			
learning environment at workplace	Between Groups	4.289	2	2.144	1.438	.240
	Within Groups	299.648	201	1.491		
	Total	303.936	203			

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c) 'Learning motivation and facilities' based on English teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
encouragement from school authority	Between Groups	.060	2	.030	.086	.918
	Within Groups	70.817	201	.352		
	Total	70.877	203			
encouragement from family	Between Groups	1.450	2	.725	.850	.429
	Within Groups	171.428	201	.853		
	Total	172.877	203			
perception regarding receiving training at distant centre	Between Groups	.006	2	.003	.004	.996
	Within Groups	162.754	201	.810		
	Total	162.760	203			
learning environment at home	Between Groups	4.664	2	2.332	3.242	.041
	Within Groups	144.566	201	.719		
	Total	149.230	203			
learning environment at workplace	Between Groups	5.732	2	2.866	1.932	.148
	Within Groups	298.204	201	1.484		
	Total	303.936	203			

d) 'Learning motivation and facilities' based on number of teacher training received

		Sum of Squares	df	Mean Square	F	Sig.
encouragement from school authority	Between Groups	.501	2	.251	.716	.490
	Within Groups	70.376	201	.350		
	Total	70.877	203			
encouragement from family	Between Groups	6.803	2	3.401	4.117	.018
	Within Groups	166.075	201	.826		
	Total	172.877	203			
perception regarding receiving training at distant centre	Between Groups	9.201	2	4.600	6.022	.003
	Within Groups	153.559	201	.764		
	Total	162.760	203			
learning environment at home	Between Groups	5.320	2	2.660	3.715	.026
	Within Groups	143.911	201	.716		
	Total	149.230	203			
learning environment at workplace	Between Groups	7.044	2	3.522	2.384	.095
	Within Groups	296.892	201	1.477		
	Total	303.936	203			

e) 'Learning motivation and facilities' based on level of computer usage

		Sum of Squares	df	Mean Square	F	Sig.
encouragement from school authority	Between Groups	7.106	3	2.369	7.429	.000
	Within Groups	63.771	200	.319		
	Total	70.877	203			
encouragement from family	Between Groups	3.517	3	1.172	1.384	.249
	Within Groups	169.361	200	.847		
	Total	172.877	203			
perception regarding receiving training at distant centre	Between Groups	.535	3	.178	.220	.883
	Within Groups	162.225	200	.811		
	Total	162.760	203			
learning environment at home	Between Groups	5.050	3	1.683	2.335	.075
	Within Groups	144.181	200	.721		
	Total	149.230	203			
learning environment at workplace	Between Groups	3.617	3	1.206	.803	.494
	Within Groups	300.319	200	1.502		
	Total	303.936	203			

f) 'Learning motivation and facilities' based on school types

		Sum of Squares	df	Mean Square	F	Sig.
encouragement from school authority	Between Groups	.462	2	.231	.659	.519
	Within Groups	70.416	201	.350		
	Total	70.877	203			
encouragement from family	Between Groups	.304	2	.152	.177	.838
	Within Groups	172.574	201	.859		
	Total	172.877	203			
perception regarding receiving training at distant centre	Between Groups	1.544	2	.772	.963	.384
	Within Groups	161.216	201	.802		
	Total	162.760	203			
learning environment at home	Between Groups	1.451	2	.725	.986	.375
	Within Groups	147.780	201	.735		
	Total	149.230	203			
learning environment at workplace	Between Groups	16.720	2	8.360	5.851	.003
	Within Groups	287.216	201	1.429		
	Total	303.936	203			

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g) 'Learning motivation and facilities' based on access to computer and the Internet

		Sum of Squares	df	Mean Square	F	Sig.
encouragement from school authority	Between Groups	1.918	2	.959	2.796	.063
	Within Groups	68.959	201	.343		
	Total	70.877	203			
encouragement from family	Between Groups	14.432	2	7.216	9.154	.000
	Within Groups	158.446	201	.788		
	Total	172.877	203			
perception regarding receiving training at distant centre	Between Groups	14.558	2	7.279	9.872	.000
	Within Groups	148.202	201	.737		
	Total	162.760	203			
learning environment at home	Between Groups	1.959	2	.980	1.337	.265
	Within Groups	147.271	201	.733		
	Total	149.230	203			
learning environment at workplace	Between Groups	19.312	2	9.656	6.819	.001
	Within Groups	284.625	201	1.416		
	Total	303.936	203			

(vii) Independent-Samples *t* Test results on the association of teachers' 'attitudes to technology based learning' with gender, computer training received, and the number of English teachers at school

a) 'Attitudes to technology based learning' based on gender

Indicator	Number of English teachers	N	Mean	SD	t-statistics	p-value
perception regarding the use of ICT for teachers' professional knowledge building	Male	135	3.93	1.005	-1.038	.301
	Female	69	4.07	.846		
perception regarding the use of ICT for teachers' teaching skills development	Male	135	4.01	.926	-1.441	.151
	Female	69	4.19	.670		
perception about level of difficulty in computer learning	Male	135	4.08	.838	-1.56	.876
	Female	69	4.10	.910		
perception about need of computer skills for teaching any subjects	Male	135	4.42	.604	-.609	.543
	Female	69	4.48	.655		
eagerness about learning computer	Male	135	4.41	.785	-.627	.531
	Female	69	4.48	.720		

b) 'Attitudes to technology based learning' based on computer training received

Indicator	Computer training	N	Mean	SD	t-statistics	p-value
perception regarding the use of ICT for teachers' professional knowledge building	Nil	144	3.88	.989	-2.356	.019
	1-3	60	4.22	.825		
perception regarding the use of ICT for teachers' teaching skills development	Nil	144	4.01	.828	-1.379	.171
	1-3	60	4.20	.898		
perception about level of difficulty in computer learning	Nil	144	4.05	.805	-1.019	.310
	1-3	60	4.18	.983		
perception about need of computer skills for teaching any subjects	Nil	144	4.40	.661	-1.622	.106
	1-3	60	4.55	.502		
eagerness about learning computer	Nil	144	4.38	.793	-1.438	.152
	1-3	60	4.55	.675		

c) 'Attitudes to technology based learning' based on number of English teachers in school

Indicator	Computer training	N	Mean	SD	t-statistics	p-value
perception regarding the use of ICT for teachers' professional knowledge building	2-4	103	3.86	1.020	-1.692	.092
	More than 4	101	4.09	.873		
perception regarding the use of ICT for teachers' teaching skills development	2-4	103	3.96	.885	-1.832	.068
	More than 4	101	4.18	.805		
perception about level of difficulty in computer learning	2-4	103	4.08	.882	-.177	.860
	More than 4	101	4.10	.843		
perception about need of computer skills for teaching any subjects	2-4	103	4.45	.622	.126	.900
	More than 4	101	4.44	.623		
eagerness about learning computer	2-4	103	4.36	.803	-1.368	.173
	More than 4	101	4.50	.716		

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(viii) ANOVA test results on association of 'attitudes to technology based learning' with age, total teaching experience, English teaching experience, number of teacher training received, level of computer usage, school types, and access to computer and the Internet.

a) 'Attitudes to technology based learning' based on age

		Sum of Squares	df	Mean Square	F	Sig.
perception regarding the use of ICT for teachers' professional knowledge building	Between Groups	6.075	2	3.037	3.414	.035
	Within Groups	178.803	201	.890		
	Total	184.877	203			
perception regarding the use of ICT for teachers' teaching skills development	Between Groups	7.151	2	3.576	5.138	.007
	Within Groups	139.888	201	.696		
	Total	147.039	203			
perception about level of difficulty in computer learning	Between Groups	.038	2	.019	.025	.975
	Within Groups	150.374	201	.748		
	Total	150.412	203			
perception about need of computer skills for teaching any subjects	Between Groups	3.843	2	1.921	5.187	.006
	Within Groups	74.451	201	.370		
	Total	78.294	203			
eagerness about learning computer	Between Groups	.356	2	.178	.304	.738
	Within Groups	117.683	201	.585		
	Total	118.039	203			

b) 'Attitudes to technology based learning' based on total teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
perception regarding the use of ICT for teachers' professional knowledge building	Between Groups	.225	2	.112	.122	.885
	Within Groups	184.653	201	.919		
	Total	184.877	203			
perception regarding the use of ICT for teachers' teaching skills development	Between Groups	.025	2	.013	.017	.983
	Within Groups	147.014	201	.731		
	Total	147.039	203			
perception about level of difficulty in computer learning	Between Groups	3.486	2	1.743	2.384	.095
	Within Groups	146.926	201	.731		
	Total	150.412	203			
perception about need of computer skills for teaching any subjects	Between Groups	2.123	2	1.062	2.801	.063
	Within Groups	76.171	201	.379		
	Total	78.294	203			
eagerness about learning computer	Between Groups	2.797	2	1.398	2.439	.090
	Within Groups	115.243	201	.573		
	Total	118.039	203			

c) 'Attitudes to technology based learning' based on English teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
perception regarding the use of ICT for teachers' professional knowledge building	Between Groups	.319	2	.159	.174	.841
	Within Groups	184.559	201	.918		
	Total	184.877	203			
perception regarding the use of ICT for teachers' teaching skills development	Between Groups	.352	2	.176	.241	.786
	Within Groups	146.688	201	.730		
	Total	147.039	203			
perception about level of difficulty in computer learning	Between Groups	1.124	2	.562	.756	.471
	Within Groups	149.288	201	.743		
	Total	150.412	203			
perception about need of computer skills for teaching any subjects	Between Groups	.928	2	.464	1.206	.302
	Within Groups	77.366	201	.385		
	Total	78.294	203			
eagerness about learning computer	Between Groups	2.683	2	1.342	2.338	.099
	Within Groups	115.356	201	.574		
	Total	118.039	203			

d) 'Attitudes to technology based learning' based on number of teacher training received

		Sum of Squares	df	Mean Square	F	Sig.
perception regarding the use of ICT for teachers' professional knowledge building	Between Groups	9.493	2	4.747	5.440	.005
	Within Groups	175.384	201	.873		
	Total	184.877	203			
perception regarding the use of ICT for teachers' teaching skills development	Between Groups	4.066	2	2.033	2.858	.060
	Within Groups	142.973	201	.711		
	Total	147.039	203			
perception about level of difficulty in computer learning	Between Groups	.222	2	.111	.149	.862
	Within Groups	150.189	201	.747		
	Total	150.412	203			
perception about need of computer skills for teaching any subjects	Between Groups	.756	2	.378	.980	.377
	Within Groups	77.538	201	.386		
	Total	78.294	203			
eagerness about learning computer	Between Groups	.057	2	.028	.048	.953
	Within Groups	117.982	201	.587		
	Total	118.039	203			

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e) 'Attitudes to technology based learning' based on level of computer usage

		Sum of Squares	df	Mean Square	F	Sig.
perception regarding the use of ICT for teachers' professional knowledge building	Between Groups	10.174	3	3.391	3.882	.010
	Within Groups	174.704	200	.874		
	Total	184.877	203			
perception regarding the use of ICT for teachers' teaching skills development	Between Groups	1.714	3	.571	.786	.503
	Within Groups	145.325	200	.727		
	Total	147.039	203			
perception about level of difficulty in computer learning	Between Groups	1.236	3	.412	.552	.647
	Within Groups	149.176	200	.746		
	Total	150.412	203			
perception about need of computer skills for teaching any subjects	Between Groups	.857	3	.286	.738	.531
	Within Groups	77.437	200	.387		
	Total	78.294	203			
eagerness about learning computer	Between Groups	3.589	3	1.196	2.090	.103
	Within Groups	114.451	200	.572		
	Total	118.039	203			

f) 'Attitudes to technology based learning' based on school types

		Sum of Squares	df	Mean Square	F	Sig.
perception regarding the use of ICT for teachers' professional knowledge building	Between Groups	2.237	2	1.119	1.231	.294
	Within Groups	182.640	201	.909		
	Total	184.877	203			
perception regarding the use of ICT for teachers' teaching skills development	Between Groups	1.549	2	.774	1.070	.345
	Within Groups	145.490	201	.724		
	Total	147.039	203			
perception about level of difficulty in computer learning	Between Groups	.346	2	.173	.232	.793
	Within Groups	150.066	201	.747		
	Total	150.412	203			
perception about need of computer skills for teaching any subjects	Between Groups	.881	2	.440	1.144	.321
	Within Groups	77.413	201	.385		
	Total	78.294	203			
eagerness about learning computer	Between Groups	.012	2	.006	.010	.990
	Within Groups	118.027	201	.587		
	Total	118.039	203			

g) 'Attitudes to technology based learning' based on access to computer and the Internet

		Sum of Squares	df	Mean Square	F	Sig.
perception regarding the use of ICT for teachers' professional knowledge building	Between Groups	3.107	2	1.553	1.718	.182
	Within Groups	181.771	201	.904		
	Total	184.877	203			
perception regarding the use of ICT for teachers' teaching skills development	Between Groups	.013	2	.007	.009	.991
	Within Groups	147.026	201	.731		
	Total	147.039	203			
perception about level of difficulty in computer learning	Between Groups	1.812	2	.906	1.226	.296
	Within Groups	148.599	201	.739		
	Total	150.412	203			
perception about need of computer skills for teaching any subjects	Between Groups	1.082	2	.541	1.408	.247
	Within Groups	77.212	201	.384		
	Total	78.294	203			
eagerness about learning computer	Between Groups	.376	2	.188	.321	.726
	Within Groups	117.663	201	.585		
	Total	118.039	203			

(ix) Independent-Samples *t* Test results on the association of 'professional needs' with gender, computer training received, and the number of English teachers at school

a) 'Professional needs' based on gender

Indicator	Gender	N	Mean	SD	t-statistics	p-value
readiness to teach English lessons	Male	135	3.90	.916	-.551	.582
	Female	69	3.96	.629		
known English vocabulary for teaching English lessons	Male	135	3.79	.616	1.272	.205
	Female	69	3.67	.657		
understanding of content of English lessons	Male	135	3.96	.706	1.239	.217
	Female	69	3.84	.585		
level of using different learning activities	Male	135	3.80	.999	-.838	.403
	Female	69	3.90	.667		
awareness about teaching and learning objectives	Male	135	3.79	1.030	.072	.942
	Female	69	3.78	.704		
ability to plan English lessons	Male	135	3.94	.808	.377	.707
	Female	69	3.90	.645		

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level of satisfaction about lesson activity management	Male	135	4.19	.793	.484	.629
	Female	69	4.13	.705		
ability to deliver English lessons interestingly	Male	135	4.17	.739	1.741	.084
	Female	69	4.00	.618		
ability to use class instructions in English	Male	135	3.98	.868	2.110	.036
	Female	69	3.72	.684		
Involving learners in lesson through personalisation	Male	135	3.97	.872	-.005	.996
	Female	69	3.97	.707		

b) 'Professional needs' based on computer training received

Indicator	Computer training	N	Mean	SD	t-statistics	p-value
readiness to teach English lessons	Nil	144	3.88	.806	-.926	.355
	1-3	60	4.00	.883		
known English vocabulary for teaching English lessons	Nil	144	3.71	.613	-1.292	.198
	1-3	60	3.83	.668		
understanding of content of English lessons	Nil	144	3.85	.637	-2.253	.025
	1-3	60	4.08	.720		
level of using different learning activities	Nil	144	3.78	.904	-1.369	.172
	1-3	60	3.97	.882		
awareness about teaching and learning objectives	Nil	144	3.67	.931	-2.968	.003
	1-3	60	4.08	.869		
ability to plan English lessons	Nil	144	3.85	.760	-2.346	.020
	1-3	60	4.12	.715		
level of satisfaction about lesson activity management	Nil	144	4.12	.789	-1.412	.159
	1-3	60	4.28	.691		
ability to deliver English lessons interestingly	Nil	144	4.10	.662	-.487	.626
	1-3	60	4.15	.799		
ability to use class instructions in English	Nil	144	3.88	.774	-.464	.643
	1-3	60	3.93	.918		
Involving learners in lesson through personalisation	Nil	144	3.95	.796	-.518	.605
	1-3	60	4.02	.873		

c) 'Professional needs' based on number of English teachers in school

Indicator	Number of teachers	N	Mean	SD	t-statistics	p-value
readiness to teach English lessons	2-4	103	3.91	.853	-.070	.944
	More than 4	101	3.92	.808		
known English vocabulary for teaching English lessons	2-4	103	3.79	.621	.944	.346
	More than 4	101	3.70	.641		
understanding of content of English lessons	2-4	103	3.87	.667	-1.031	.304
	More than 4	101	3.97	.670		
level of using different learning activities	2-4	103	3.92	.957	1.430	.154
	More than 4	101	3.74	.833		
awareness about teaching and learning objectives	2-4	103	3.82	.872	.407	.684
	More than 4	101	3.76	.991		
ability to plan English lessons	2-4	103	3.96	.753	.661	.509
	More than 4	101	3.89	.760		
level of satisfaction about lesson activity management	2-4	103	4.26	.727	1.814	.071
	More than 4	101	4.07	.791		
ability to deliver English lessons interestingly	2-4	103	4.17	.658	1.073	.285
	More than 4	101	4.06	.746		
ability to use class instructions in English	2-4	103	3.94	.790	.875	.383
	More than 4	101	3.84	.845		
Involving learners in lesson through personalisation	2-4	103	4.06	.765	1.551	.122
	More than 4	101	3.88	.864		

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(x) ANOVA test results on association of 'professional needs' with age, total teaching experience, English teaching experience, number of teacher training received, level of computer usage, school types, and access to computer and the Internet.

a) 'Professional needs' based on age

		Sum of Squares	df	Mean Square	F	Sig.
readiness to teach English lessons	Between Groups	1.099	2	.550	.798	.452
	Within Groups	138.484	201	.689		
	Total	139.583	203			
known English vocabulary for teaching English lessons	Between Groups	.018	2	.009	.022	.978
	Within Groups	80.727	201	.402		
	Total	80.745	203			
understanding of content of English lessons	Between Groups	.490	2	.245	.545	.580
	Within Groups	90.255	201	.449		
	Total	90.745	203			
level of using different learning activities	Between Groups	.197	2	.099	.121	.886
	Within Groups	164.136	201	.817		
	Total	164.333	203			
awareness about teaching and learning objectives	Between Groups	.201	2	.101	.115	.891
	Within Groups	175.735	201	.874		
	Total	175.936	203			
ability to plan English lessons	Between Groups	.436	2	.218	.379	.685
	Within Groups	115.461	201	.574		
	Total	115.897	203			
level of satisfaction about lesson activity management	Between Groups	.403	2	.201	.343	.710
	Within Groups	117.930	201	.587		
	Total	118.333	203			
ability to deliver English lessons interestingly	Between Groups	.024	2	.012	.024	.977
	Within Groups	100.383	201	.499		
	Total	100.407	203			
ability to use class instructions in English	Between Groups	1.014	2	.507	.757	.471
	Within Groups	134.614	201	.670		
	Total	135.627	203			
involving learners in lesson through personalisation	Between Groups	1.733	2	.867	1.299	.275
	Within Groups	134.090	201	.667		
	Total	135.824	203			

b) 'Professional needs' based on total teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
readiness to teach English lessons	Between Groups	1.043	2	.522	.757	.471
	Within Groups	138.540	201	.689		
	Total	139.583	203			
known English vocabulary for teaching English lessons	Between Groups	1.085	2	.542	1.369	.257
	Within Groups	79.660	201	.396		
	Total	80.745	203			
understanding of content of English lessons	Between Groups	.585	2	.293	.653	.522
	Within Groups	90.160	201	.449		
	Total	90.745	203			
level of using different learning activities	Between Groups	.180	2	.090	.110	.896
	Within Groups	164.153	201	.817		
	Total	164.333	203			
awareness about teaching and learning objectives	Between Groups	.101	2	.050	.057	.944
	Within Groups	175.836	201	.875		
	Total	175.936	203			
ability to plan English lessons	Between Groups	.526	2	.263	.458	.633
	Within Groups	115.371	201	.574		
	Total	115.897	203			
level of satisfaction about lesson activity management	Between Groups	2.860	2	1.430	2.490	.086
	Within Groups	115.473	201	.574		
	Total	118.333	203			
ability to deliver English lessons interestingly	Between Groups	.905	2	.452	.914	.403
	Within Groups	99.502	201	.495		
	Total	100.407	203			
ability to use class instructions in English	Between Groups	1.807	2	.904	1.357	.260
	Within Groups	133.820	201	.666		
	Total	135.627	203			
involving learners in lesson through personalisation	Between Groups	.612	2	.306	.455	.635
	Within Groups	135.212	201	.673		
	Total	135.824	203			

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c) 'Professional needs' based on English teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
readiness to teach English lessons	Between Groups	.125	2	.062	.090	.914
	Within Groups	139.459	201	.694		
	Total	139.583	203			
known English vocabulary for teaching English lessons	Between Groups	1.553	2	.776	1.971	.142
	Within Groups	79.192	201	.394		
	Total	80.745	203			
understanding of content of English lessons	Between Groups	1.710	2	.855	1.930	.148
	Within Groups	89.035	201	.443		
	Total	90.745	203			
level of using different learning activities	Between Groups	1.707	2	.854	1.055	.350
	Within Groups	162.626	201	.809		
	Total	164.333	203			
awareness about teaching and learning objectives	Between Groups	3.130	2	1.565	1.821	.165
	Within Groups	172.806	201	.860		
	Total	175.936	203			
ability to plan English lessons	Between Groups	.971	2	.485	.849	.429
	Within Groups	114.926	201	.572		
	Total	115.897	203			
level of satisfaction about lesson activity management	Between Groups	1.014	2	.507	.869	.421
	Within Groups	117.319	201	.584		
	Total	118.333	203			
ability to deliver English lessons interestingly	Between Groups	2.308	2	1.154	2.364	.097
	Within Groups	98.099	201	.488		
	Total	100.407	203			
ability to use class instructions in English	Between Groups	3.170	2	1.585	2.405	.093
	Within Groups	132.457	201	.659		
	Total	135.627	203			
involving learners in lesson through personalisation	Between Groups	.426	2	.213	.316	.729
	Within Groups	135.397	201	.674		
	Total	135.824	203			

d) 'Professional needs' based on number of teacher training received

		Sum of Squares	df	Mean Square	F	Sig.
readiness to teach English lessons	Between Groups	.054	2	.027	.039	.962
	Within Groups	139.529	201	.694		
	Total	139.583	203			
known English vocabulary for teaching English lessons	Between Groups	.136	2	.068	.170	.844
	Within Groups	80.609	201	.401		
	Total	80.745	203			
understanding of content of English lessons	Between Groups	.811	2	.405	.906	.406
	Within Groups	89.934	201	.447		
	Total	90.745	203			
level of using different learning activities	Between Groups	2.077	2	1.038	1.286	.279
	Within Groups	162.256	201	.807		
	Total	164.333	203			
awareness about teaching and learning objectives	Between Groups	3.587	2	1.793	2.092	.126
	Within Groups	172.349	201	.857		
	Total	175.936	203			
ability to plan English lessons	Between Groups	1.178	2	.589	1.032	.358
	Within Groups	114.719	201	.571		
	Total	115.897	203			
level of satisfaction about lesson activity management	Between Groups	1.453	2	.726	1.249	.289
	Within Groups	116.880	201	.581		
	Total	118.333	203			
ability to deliver English lessons interestingly	Between Groups	.031	2	.016	.031	.969
	Within Groups	100.376	201	.499		
	Total	100.407	203			
ability to use class instructions in English	Between Groups	1.293	2	.646	.967	.382
	Within Groups	134.334	201	.668		
	Total	135.627	203			
involving learners in lesson through personalisation	Between Groups	1.097	2	.549	.819	.443
	Within Groups	134.726	201	.670		
	Total	135.824	203			

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e) 'Professional needs' based on level of computer usage

		Sum of Squares	df	Mean Square	F	Sig.
readiness to teach English lessons	Between Groups	8.028	3	2.676	4.068	.008
	Within Groups	131.555	200	.658		
	Total	139.583	203			
known English vocabulary for teaching English lessons	Between Groups	1.306	3	.435	1.096	.352
	Within Groups	79.440	200	.397		
	Total	80.745	203			
understanding of content of English lessons	Between Groups	1.410	3	.470	1.052	.371
	Within Groups	89.335	200	.447		
	Total	90.745	203			
level of using different learning activities	Between Groups	.943	3	.314	.385	.764
	Within Groups	163.391	200	.817		
	Total	164.333	203			
awareness about teaching and learning objectives	Between Groups	5.800	3	1.933	2.273	.081
	Within Groups	170.136	200	.851		
	Total	175.936	203			
ability to plan English lessons	Between Groups	1.103	3	.368	.641	.590
	Within Groups	114.794	200	.574		
	Total	115.897	203			
level of satisfaction about lesson activity management	Between Groups	2.029	3	.676	1.163	.325
	Within Groups	116.304	200	.582		
	Total	118.333	203			
ability to deliver English lessons interestingly	Between Groups	.459	3	.153	.306	.821
	Within Groups	99.948	200	.500		
	Total	100.407	203			
ability to use class instructions in English	Between Groups	2.771	3	.924	1.391	.247
	Within Groups	132.856	200	.664		
	Total	135.627	203			
involving learners in lesson through personalisation	Between Groups	2.922	3	.974	1.466	.225
	Within Groups	132.902	200	.665		
	Total	135.824	203			

f) 'Professional needs' facilities' based on school types

		Sum of Squares	df	Mean Square	F	Sig.
readiness to teach English lessons	Between Groups	.104	2	.052	.075	.928
	Within Groups	139.479	201	.694		
	Total	139.583	203			
known English vocabulary for teaching English lessons	Between Groups	.518	2	.259	.649	.524
	Within Groups	80.227	201	.399		
	Total	80.745	203			
understanding of content of English lessons	Between Groups	1.034	2	.517	1.158	.316
	Within Groups	89.711	201	.446		
	Total	90.745	203			
level of using different learning activities	Between Groups	.973	2	.486	.598	.551
	Within Groups	163.361	201	.813		
	Total	164.333	203			
awareness about teaching and learning objectives	Between Groups	.275	2	.137	.157	.855
	Within Groups	175.661	201	.874		
	Total	175.936	203			
ability to plan English lessons	Between Groups	.751	2	.376	.656	.520
	Within Groups	115.146	201	.573		
	Total	115.897	203			
level of satisfaction about lesson activity management	Between Groups	.141	2	.071	.120	.887
	Within Groups	118.192	201	.588		
	Total	118.333	203			
ability to deliver English lessons interestingly	Between Groups	1.195	2	.598	1.211	.300
	Within Groups	99.211	201	.494		
	Total	100.407	203			
ability to use class instructions in English	Between Groups	2.435	2	1.218	1.838	.162
	Within Groups	133.192	201	.663		
	Total	135.627	203			
involving learners in lesson through personalisation	Between Groups	3.165	2	1.582	2.398	.094
	Within Groups	132.659	201	.660		
	Total	135.824	203			

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g) 'Professional needs' based on access to computer and the Internet

		Sum of Squares	df	Mean Square	F	Sig.
readiness to teach English lessons	Between Groups	2.898	2	1.449	2.131	.121
	Within Groups	136.685	201	.680		
	Total	139.583	203			
known English vocabulary for teaching English lessons	Between Groups	.550	2	.275	.690	.503
	Within Groups	80.195	201	.399		
	Total	80.745	203			
understanding of content of English lessons	Between Groups	.384	2	.192	.427	.653
	Within Groups	90.361	201	.450		
	Total	90.745	203			
level of using different learning activities	Between Groups	.733	2	.366	.450	.638
	Within Groups	163.601	201	.814		
	Total	164.333	203			
awareness about teaching and learning objectives	Between Groups	6.384	2	3.192	3.784	.024
	Within Groups	169.552	201	.844		
	Total	175.936	203			
ability to plan English lessons	Between Groups	.197	2	.099	.171	.843
	Within Groups	115.700	201	.576		
	Total	115.897	203			
level of satisfaction about lesson activity management	Between Groups	.510	2	.255	.435	.648
	Within Groups	117.824	201	.586		
	Total	118.333	203			
ability to deliver English lessons interestingly	Between Groups	.233	2	.117	.234	.792
	Within Groups	100.174	201	.498		
	Total	100.407	203			
ability to use class instructions in English	Between Groups	.860	2	.430	.642	.528
	Within Groups	134.767	201	.670		
	Total	135.627	203			
involving learners in lesson through personalisation	Between Groups	.443	2	.222	.329	.720
	Within Groups	135.380	201	.674		
	Total	135.824	203			

(xi) Independent-Samples *t* Test results on the association of 'preferred teacher-learning procedures' with gender, computer training received, and the number of English teachers at school

a) 'Preferred teacher-learning procedures' based on gender

Indicator	Gender	N	Mean	SD	t-statistics	p-value
confidence on professional knowledge of teachers of same school	Male	135	4.07	.594	-2.233	.027
	Female	69	4.26	.504		
confidence on professional knowledge of teachers of other schools of same district	Male	135	3.88	.599	-2.067	.040
	Female	69	4.07	.671		
view on teachers' involvement in designing teacher-learning programmes	Male	135	4.14	.724	-.170	.865
	Female	69	4.16	.779		
view on learning with teachers having different backgrounds	Male	135	4.36	.498	.798	.426
	Female	69	4.30	.494		
view on continuing teacher-learning	Male	135	4.61	.532	.080	.937
	Female	69	4.61	.492		

b) 'Preferred teacher-learning procedures' based on computer training received

Indicator	Computer training	N	Mean	SD	t-statistics	p-value
confidence on professional knowledge of teachers of same school	Nil	144	4.10	.571	-1.557	.121
	1-3	60	4.23	.563		
confidence on professional knowledge of teachers of other schools of same district	Nil	144	3.92	.653	-1.034	.302
	1-3	60	4.02	.567		
view on teachers' involvement in designing teacher-learning programmes	Nil	144	4.11	.711	-1.073	.284
	1-3	60	4.23	.810		
view on learning with teachers having different backgrounds	Nil	144	4.30	.489	-1.979	.050
	1-3	60	4.45	.502		
view on continuing teacher-learning	Nil	144	4.60	.491	-.366	.715
	1-3	60	4.63	.581		

c) 'Preferred teacher-learning procedures' based on number of English teachers in school

Indicator	Number of English teachers	N	Mean	SD	t-statistics	p-value
confidence on professional knowledge of teachers of same school	2-4	103	4.11	.559	-.769	.443
	More than 4	101	4.17	.584		
confidence on professional knowledge of teachers of other schools of same district	2-4	103	3.99	.569	1.011	.313
	More than 4	101	3.90	.686		

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view on teachers' involvement in designing teacher-learning programmes	2-4	103	4.16	.724	.161	.872
	More than 4	101	4.14	.762		
view on learning with teachers having different backgrounds	2-4	103	4.35	.499	.185	.853
	More than 4	101	4.34	.496		
view on continuing teacher-learning	2-4	103	4.62	.487	.239	.811
	More than 4	101	4.60	.549		

(xii) ANOVA test results on association of 'preferred teacher-learning procedures' with age, total teaching experience, English teaching experience, number of teacher training received, level of computer usage, school types, and access to computer and the Internet.

a) 'Preferred teacher-learning procedures' based on age

		Sum of Squares	df	Mean Square	F	Sig.
confidence on professional knowledge of teachers of same school	Between Groups	.122	2	.061	.186	.831
	Within Groups	66.035	201	.329		
	Total	66.157	203			
confidence on professional knowledge of teachers of other schools of same district	Between Groups	.146	2	.073	.183	.833
	Within Groups	80.261	201	.399		
	Total	80.407	203			
view on teachers' involvement in designing teacher-learning programmes	Between Groups	.884	2	.442	.802	.450
	Within Groups	110.704	201	.551		
	Total	111.588	203			
view on learning with teachers having different backgrounds	Between Groups	.036	2	.018	.072	.930
	Within Groups	49.945	201	.248		
	Total	49.980	203			
view on continuing teacher-learning	Between Groups	.601	2	.301	1.123	.327
	Within Groups	53.805	201	.268		
	Total	54.407	203			

b) 'Preferred teacher-learning procedures' based on total teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
confidence on professional knowledge of teachers of same school	Between Groups	.300	2	.150	.457	.634
	Within Groups	65.857	201	.328		
	Total	66.157	203			
confidence on professional knowledge of teachers of other schools of same district	Between Groups	.756	2	.378	.954	.387
	Within Groups	79.651	201	.396		
	Total	80.407	203			

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view on teachers' involvement in designing teacher-learning programmes	Between Groups	2.770	2	1.385	2.558	.080
	Within Groups	108.818	201	.541		
	Total	111.588	203			
view on learning with teachers having different backgrounds	Between Groups	.115	2	.058	.232	.793
	Within Groups	49.865	201	.248		
	Total	49.980	203			
view on continuing teacher-learning	Between Groups	.048	2	.024	.089	.915
	Within Groups	54.359	201	.270		
	Total	54.407	203			

c) Preferred teacher-learning procedures' based on English teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
confidence on professional knowledge of teachers of same school	Between Groups	.266	2	.133	.406	.667
	Within Groups	65.891	201	.328		
	Total	66.157	203			
confidence on professional knowledge of teachers of other schools of same district	Between Groups	2.152	2	1.076	2.764	.065
	Within Groups	78.254	201	.389		
	Total	80.407	203			
view on teachers' involvement in designing teacher-learning programmes	Between Groups	1.452	2	.726	1.325	.268
	Within Groups	110.136	201	.548		
	Total	111.588	203			
view on learning with teachers having different backgrounds	Between Groups	.478	2	.239	.971	.381
	Within Groups	49.502	201	.246		
	Total	49.980	203			
view on continuing teacher-learning	Between Groups	.199	2	.099	.369	.692
	Within Groups	54.208	201	.270		
	Total	54.407	203			

d) 'Preferred teacher-learning procedures' based on number of teacher training received

		Sum of Squares	df	Mean Square	F	Sig.
confidence on professional knowledge of teachers of same school	Between Groups	.027	2	.013	.040	.960
	Within Groups	66.130	201	.329		
	Total	66.157	203			
confidence on professional knowledge of teachers of other schools of same district	Between Groups	.156	2	.078	.195	.823
	Within Groups	80.251	201	.399		
	Total	80.407	203			
	Between Groups	.387	2	.194	.350	.705

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view on teachers' involvement in designing teacher-learning programmes	Within Groups	111.201	201	.553		
	Total	111.588	203			
view on learning with teachers having different backgrounds	Between Groups	.647	2	.323	1.317	.270
	Within Groups	49.334	201	.245		
	Total	49.980	203			
view on continuing teacher-learning	Between Groups	.355	2	.177	.659	.518
	Within Groups	54.052	201	.269		
	Total	54.407	203			

e) 'Preferred teacher-learning procedures' based on level of computer usage

		Sum of Squares	df	Mean Square	F	Sig.
confidence on professional knowledge of teachers of same school	Between Groups	.854	3	.285	.872	.457
	Within Groups	65.303	200	.327		
	Total	66.157	203			
confidence on professional knowledge of teachers of other schools of same district	Between Groups	.849	3	.283	.711	.546
	Within Groups	79.558	200	.398		
	Total	80.407	203			
view on teachers' involvement in designing teacher-learning programmes	Between Groups	2.253	3	.751	1.374	.252
	Within Groups	109.335	200	.547		
	Total	111.588	203			
view on learning with teachers having different backgrounds	Between Groups	.830	3	.277	1.125	.340
	Within Groups	49.151	200	.246		
	Total	49.980	203			
view on continuing teacher-learning	Between Groups	.228	3	.076	.280	.840
	Within Groups	54.179	200	.271		
	Total	54.407	203			

f) 'Preferred teacher-learning procedures' based on school types

		Sum of Squares	df	Mean Square	F	Sig.
confidence on professional knowledge of teachers of same school	Between Groups	.048	2	.024	.073	.930
	Within Groups	66.109	201	.329		
	Total	66.157	203			
confidence on professional knowledge of teachers of other schools of same district	Between Groups	.494	2	.247	.621	.538
	Within Groups	79.913	201	.398		
	Total	80.407	203			
	Between Groups	.258	2	.129	.233	.792

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view on teachers' involvement in designing teacher-learning programmes	Within Groups	111.330	201	.554		
		111.588	203			
	Total					
view on learning with teachers having different backgrounds	Between Groups	.122	2	.061	.245	.783
	Within Groups	49.859	201	.248		
	Total	49.980	203			
view on continuing teacher-learning	Between Groups	.038	2	.019	.069	.933
	Within Groups	54.369	201	.270		
	Total	54.407	203			

g) 'Learning motivation and facilities' based on access to computer and the Internet

		Sum of Squares	df	Mean Square	F	Sig.
confidence on professional knowledge of teachers of same school	Between Groups	.572	2	.286	.877	.418
	Within Groups	65.585	201	.326		
	Total	66.157	203			
confidence on professional knowledge of teachers of other schools of same district	Between Groups	.548	2	.274	.690	.503
	Within Groups	79.859	201	.397		
	Total	80.407	203			
view on teachers' involvement in designing teacher-learning programmes	Between Groups	.316	2	.158	.285	.752
	Within Groups	111.272	201	.554		
	Total	111.588	203			
view on learning with teachers having different backgrounds	Between Groups	.187	2	.093	.377	.686
	Within Groups	49.794	201	.248		
	Total	49.980	203			
view on continuing teacher-learning	Between Groups	.547	2	.274	1.021	.362
	Within Groups	53.860	201	.268		
	Total	54.407	203			

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(xiii) Independent-Samples *t* Test results on the association of 'preferred nature of teacher-learning activities' with gender, computer training received, and the number of English teachers at school

a) 'Preferred nature of teacher-learning activities' based on gender

Indicator	Gender	N	Mean	SD	t-statistics	p-value
teacher-learning and teaching at school simultaneously	Male	135	3.96	1.200	-.869	.386
	Female	69	4.12	1.170		
need for full-time teacher trainer	Male	135	4.58	.496	-.224	.823
	Female	69	4.59	.495		
sharing teaching related issues with known teachers	Male	135	4.44	.542	.962	.337
	Female	69	4.36	.641		
learning through observing teaching of others	Male	135	4.39	.586	.092	.927
	Female	69	4.38	.666		
sharing experience with unknown teachers	Male	135	4.17	.902	-.600	.549
	Female	69	4.25	.755		
using examples of teaching practices	Male	135	4.43	.512	-.261	.794
	Female	69	4.45	.501		
using teachers' own teaching experiences	Male	135	4.41	.550	-.895	.372
	Female	69	4.48	.503		
individual-focused learning activities	Male	135	4.46	.500	-.842	.401
	Female	69	4.52	.503		
assessment participants' performance	Male	135	4.38	.545	-.727	.468
	Female	69	4.43	.499		
provision of regular tasks and assignments	Male	135	4.46	.583	.119	.905
	Female	69	4.45	.530		

b) 'Preferred nature of teacher-learning activities' based on computer training received

Indicator	Computer training	N	Mean	SD	t-statistics	p-value
teacher-learning and teaching at school simultaneously	Nil	144	3.95	1.196	-1.180	.240
	1-3	60	4.17	1.167		
need for full-time teacher trainer	Nil	144	4.56	.498	-.942	.348
	1-3	60	4.63	.486		
sharing teaching related issues with known teachers	Nil	144	4.35	.597	-2.425	.016
	1-3	60	4.57	.500		
learning through observing teaching of others	Nil	144	4.33	.626	-1.780	.077
	1-3	60	4.50	.567		

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sharing experience with unknown teachers	Nil	144	4.24	.748	1.037	.301
	1-3	60	4.10	1.069		
using examples of teaching practices	Nil	144	4.40	.505	-1.774	.077
	1-3	60	4.53	.503		
using teachers' own teaching experiences	Nil	144	4.41	.534	-.895	.372
	1-3	60	4.48	.537		
individual-focused learning activities	Nil	144	4.44	.499	-1.594	.112
	1-3	60	4.57	.500		
assessment participants' performance	Nil	144	4.37	.498	-1.128	.262
	1-3	60	4.47	.596		
provision of regular tasks and assignments	Nil	144	4.42	.535	-1.543	.124
	1-3	60	4.55	.622		

c) 'Preferred nature of teacher-learning activities' based on number of English teachers in school

Indicator	Number of teachers	N	Mean	SD	t-statistics	p-value
teacher-learning and teaching at school simultaneously	2-4	103	3.93	1.231	-1.003	.317
	More than 4	101	4.10	1.145		
need for full-time teacher trainer	2-4	103	4.62	.487	1.110	.268
	More than 4	101	4.54	.500		
sharing teaching related issues with known teachers	2-4	103	4.41	.532	-.222	.825
	More than 4	101	4.43	.622		
learning through observing teaching of others	2-4	103	4.39	.598	.141	.888
	More than 4	101	4.38	.630		
sharing experience with unknown teachers	2-4	103	4.19	.852	-.032	.974
	More than 4	101	4.20	.860		
using examples of teaching practices	2-4	103	4.40	.492	-1.087	.278
	More than 4	101	4.48	.521		
using teachers' own teaching experiences	2-4	103	4.42	.534	-.374	.709
	More than 4	101	4.45	.538		
individual-focused learning activities	2-4	103	4.44	.498	-1.254	.211
	More than 4	101	4.52	.502		
assessment participants' performance	2-4	103	4.40	.492	.027	.978
	More than 4	101	4.40	.567		

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provision of regular tasks and assignments	2-4	103	4.43	.516	-.733	.464
	More than 4	101	4.49	.610		

(xiv) ANOVA test results on association of 'preferred teacher-learning activities' with age, total teaching experience, English teaching experience, number of teacher training received, level of computer usage, school types, and access to computer and the Internet.

a) 'Preferred teacher-learning activities' based on age

		Sum of Squares	df	Mean Square	F	Sig.
teacher-learning and teaching at school simultaneously	Between Groups	4.866	2	2.433	1.734	.179
	Within Groups	282.090	201	1.403		
	Total	286.956	203			
need for full-time teacher trainer	Between Groups	.242	2	.121	.493	.611
	Within Groups	49.341	201	.245		
	Total	49.583	203			
sharing teaching related issues with known teachers	Between Groups	.622	2	.311	.933	.395
	Within Groups	66.961	201	.333		
	Total	67.583	203			
learning through observing teaching of others	Between Groups	.033	2	.016	.043	.958
	Within Groups	76.144	201	.379		
	Total	76.176	203			
sharing experience with unknown teachers	Between Groups	2.552	2	1.276	1.761	.174
	Within Groups	145.605	201	.724		
	Total	148.157	203			
using examples of teaching practices	Between Groups	.393	2	.197	.763	.468
	Within Groups	51.779	201	.258		
	Total	52.172	203			
using teachers' own teaching experiences	Between Groups	.097	2	.048	.168	.846
	Within Groups	57.943	201	.288		
	Total	58.039	203			
individual-focused learning activities	Between Groups	.524	2	.262	1.045	.353
	Within Groups	50.397	201	.251		
	Total	50.922	203			
assessment participants' performance	Between Groups	.444	2	.222	.791	.455
	Within Groups	56.394	201	.281		
	Total	56.838	203			
provision of regular tasks and assignments	Between Groups	.442	2	.221	.692	.502
	Within Groups	64.161	201	.319		
	Total	64.603	203			

b) 'Preferred teacher-learning activities' based on total teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
teacher-learning and teaching at school simultaneously	Between Groups	1.063	2	.532	.374	.689
	Within Groups	285.893	201	1.422		
	Total	286.956	203			
need for full-time teacher trainer	Between Groups	.236	2	.118	.480	.620
	Within Groups	49.348	201	.246		
	Total	49.583	203			
sharing teaching related issues with known teachers	Between Groups	.817	2	.409	1.230	.294
	Within Groups	66.766	201	.332		
	Total	67.583	203			
learning through observing teaching of others	Between Groups	.521	2	.261	.693	.501
	Within Groups	75.655	201	.376		
	Total	76.176	203			
sharing experience with unknown teachers	Between Groups	2.526	2	1.263	1.743	.178
	Within Groups	145.631	201	.725		
	Total	148.157	203			
using examples of teaching practices	Between Groups	.422	2	.211	.819	.442
	Within Groups	51.750	201	.257		
	Total	52.172	203			
using teachers' own teaching experiences	Between Groups	.028	2	.014	.049	.953
	Within Groups	58.011	201	.289		
	Total	58.039	203			
individual-focused learning activities	Between Groups	.168	2	.084	.333	.717
	Within Groups	50.754	201	.253		
	Total	50.922	203			
assessment participants' performance	Between Groups	.811	2	.405	1.454	.236
	Within Groups	56.028	201	.279		
	Total	56.838	203			
provision of regular tasks and assignments	Between Groups	.370	2	.185	.579	.561
	Within Groups	64.233	201	.320		
	Total	64.603	203			

Appendix 12

c) 'Preferred teacher-learning activities' based on English teaching experience

		Sum of Squares	df	Mean Square	F	Sig.
teacher-learning and teaching at school simultaneously	Between Groups	1.010	2	.505	.355	.702
	Within Groups	285.946	201	1.423		
	Total	286.956	203			
need for full-time teacher trainer	Between Groups	.227	2	.114	.463	.630
	Within Groups	49.356	201	.246		
	Total	49.583	203			
sharing teaching related issues with known teachers	Between Groups	.401	2	.200	.599	.550
	Within Groups	67.183	201	.334		
	Total	67.583	203			
learning through observing teaching of others	Between Groups	.759	2	.379	1.011	.366
	Within Groups	75.418	201	.375		
	Total	76.176	203			
sharing experience with unknown teachers	Between Groups	.099	2	.049	.067	.935
	Within Groups	148.058	201	.737		
	Total	148.157	203			
using examples of teaching practices	Between Groups	.481	2	.240	.935	.394
	Within Groups	51.691	201	.257		
	Total	52.172	203			
using teachers' own teaching experiences	Between Groups	.217	2	.108	.377	.687
	Within Groups	57.822	201	.288		
	Total	58.039	203			
individual-focused learning activities	Between Groups	.766	2	.383	1.536	.218
	Within Groups	50.155	201	.250		
	Total	50.922	203			
assessment participants' performance	Between Groups	.257	2	.128	.456	.634
	Within Groups	56.581	201	.281		
	Total	56.838	203			
provision of regular tasks and assignments	Between Groups	.151	2	.075	.235	.791
	Within Groups	64.452	201	.321		
	Total	64.603	203			

d) 'Preferred teacher-learning activities' based on number of teacher training received

		Sum of Squares	df	Mean Square	F	Sig.
teacher-learning and teaching at school simultaneously	Between Groups	8.775	2	4.388	3.170	.044
	Within Groups	278.180	201	1.384		
	Total	286.956	203			
need for full-time teacher trainer	Between Groups	.146	2	.073	.298	.743
	Within Groups	49.437	201	.246		
	Total	49.583	203			
sharing teaching related issues with known teachers	Between Groups	.271	2	.135	.404	.668
	Within Groups	67.313	201	.335		
	Total	67.583	203			
learning through observing teaching of others	Between Groups	.366	2	.183	.485	.617
	Within Groups	75.811	201	.377		
	Total	76.176	203			
sharing experience with unknown teachers	Between Groups	3.269	2	1.634	2.267	.106
	Within Groups	144.888	201	.721		
	Total	148.157	203			
using examples of teaching practices	Between Groups	.551	2	.276	1.073	.344
	Within Groups	51.620	201	.257		
	Total	52.172	203			
using teachers' own teaching experiences	Between Groups	.028	2	.014	.049	.953
	Within Groups	58.011	201	.289		
	Total	58.039	203			
individual-focused learning activities	Between Groups	1.154	2	.577	2.330	.100
	Within Groups	49.768	201	.248		
	Total	50.922	203			
assessment participants' performance	Between Groups	.403	2	.202	.718	.489
	Within Groups	56.435	201	.281		
	Total	56.838	203			
provision of regular tasks and assignments	Between Groups	.328	2	.164	.513	.599
	Within Groups	64.275	201	.320		
	Total	64.603	203			

Appendix 12

e) 'Preferred teacher-learning activities' based on level of computer usage

		Sum of Squares	df	Mean Square	F	Sig.
teacher-learning and teaching at school simultaneously	Between Groups	4.023	3	1.341	.948	.418
	Within Groups	282.933	200	1.415		
	Total	286.956	203			
need for full-time teacher trainer	Between Groups	.146	3	.049	.197	.898
	Within Groups	49.437	200	.247		
	Total	49.583	203			
sharing teaching related issues with known teachers	Between Groups	.478	3	.159	.475	.700
	Within Groups	67.105	200	.336		
	Total	67.583	203			
learning through observing teaching of others	Between Groups	.488	3	.163	.429	.732
	Within Groups	75.689	200	.378		
	Total	76.176	203			
sharing experience with unknown teachers	Between Groups	2.603	3	.868	1.192	.314
	Within Groups	145.553	200	.728		
	Total	148.157	203			
using examples of teaching practices	Between Groups	.379	3	.126	.488	.691
	Within Groups	51.793	200	.259		
	Total	52.172	203			
using teachers' own teaching experiences	Between Groups	.102	3	.034	.118	.950
	Within Groups	57.937	200	.290		
	Total	58.039	203			
individual-focused learning activities	Between Groups	.361	3	.120	.476	.699
	Within Groups	50.560	200	.253		
	Total	50.922	203			
assessment participants' performance	Between Groups	.038	3	.013	.045	.987
	Within Groups	56.800	200	.284		
	Total	56.838	203			
provision of regular tasks and assignments	Between Groups	.512	3	.171	.533	.660
	Within Groups	64.091	200	.320		
	Total	64.603	203			

f) 'Preferred teacher-learning activities' based on school types

		Sum of Squares	df	Mean Square	F	Sig.
teacher-learning and teaching at school simultaneously	Between Groups	6.544	2	3.272	2.346	.098
	Within Groups	280.411	201	1.395		
	Total	286.956	203			
need for full-time teacher trainer	Between Groups	.101	2	.050	.205	.815
	Within Groups	49.482	201	.246		
	Total	49.583	203			
sharing teaching related issues with known teachers	Between Groups	.104	2	.052	.155	.856
	Within Groups	67.479	201	.336		
	Total	67.583	203			
learning through observing teaching of others	Between Groups	.044	2	.022	.058	.944
	Within Groups	76.132	201	.379		
	Total	76.176	203			
sharing experience with unknown teachers	Between Groups	.340	2	.170	.231	.794
	Within Groups	147.817	201	.735		
	Total	148.157	203			
using examples of teaching practices	Between Groups	.689	2	.345	1.345	.263
	Within Groups	51.482	201	.256		
	Total	52.172	203			
using teachers' own teaching experiences	Between Groups	.012	2	.006	.021	.979
	Within Groups	58.027	201	.289		
	Total	58.039	203			
individual-focused learning activities	Between Groups	.136	2	.068	.270	.764
	Within Groups	50.785	201	.253		
	Total	50.922	203			
assessment participants' performance	Between Groups	.159	2	.080	.282	.754
	Within Groups	56.679	201	.282		
	Total	56.838	203			
provision of regular tasks and assignments	Between Groups	.629	2	.315	.989	.374
	Within Groups	63.974	201	.318		
	Total	64.603	203			

Appendix 12

g) 'Preferred teacher-learning activities' based on access to computer and the Internet

		Sum of Squares	df	Mean Square	F	Sig.
teacher-learning and teaching at school simultaneously	Between Groups	.677	2	.339	.238	.789
	Within Groups	286.279	201	1.424		
	Total	286.956	203			
need for full-time teacher trainer	Between Groups	1.085	2	.542	2.248	.108
	Within Groups	48.498	201	.241		
	Total	49.583	203			
sharing teaching related issues with known teachers	Between Groups	.176	2	.088	.263	.769
	Within Groups	67.407	201	.335		
	Total	67.583	203			
learning through observing teaching of others	Between Groups	.393	2	.197	.522	.594
	Within Groups	75.783	201	.377		
	Total	76.176	203			
sharing experience with unknown teachers	Between Groups	.336	2	.168	.228	.796
	Within Groups	147.821	201	.735		
	Total	148.157	203			
using examples of teaching practices	Between Groups	.214	2	.107	.414	.661
	Within Groups	51.957	201	.258		
	Total	52.172	203			
using teachers' own teaching experiences	Between Groups	.063	2	.031	.109	.897
	Within Groups	57.976	201	.288		
	Total	58.039	203			
individual-focused learning activities	Between Groups	.058	2	.029	.115	.891
	Within Groups	50.863	201	.253		
	Total	50.922	203			
assessment participants' performance	Between Groups	.011	2	.005	.019	.981
	Within Groups	56.827	201	.283		
	Total	56.838	203			
provision of regular tasks and assignments	Between Groups	.488	2	.244	.766	.466
	Within Groups	64.114	201	.319		
	Total	64.603	203			

List of References

- Abell, S. K., Bryan, L. A., & Anderson, M. A. (1998). Investigating Preservice Elementary Science Teacher Reflective Thinking Using Integrated Media Case-Based Instruction in Elementary Science Teacher Preparation. *Science Teacher Education*, 82(4), 491-510.
- Adler, R. B., & Proctor, R. F. (2007). *Looking out looking in* (Vol. 12). Belmont, CA: Thomas Learning, Inc.
- Aghion, P., Caroli, E., & Garci a-Peñalosa, C. (1999). Inequality and economic growth: The perspective of the new growth theories. *Journal of Economic Literature*, 37, 1615-1660.
- Ahmed, M., Nath, S. R., Hossain, A., & Kalam, M. A. (2006). Education Watch 2005: the state of secondary education: progress and challenges. Dhaka: Campaign for Popular Education (CAMPE).
- Ainsworth, S., Bibby, P. A., & Wood, D. J. (1997). Information technology and multiple representations: New opportunities - new problems. *Journal of Information Technology for Teacher Education*, 6, 93-104.
- Akbar, M. S. U. (2005, 4-7 August). *eLearning in Developing Countries: Challenges and Opportunities Bangladesh Perspective*. Paper presented at the Second International Conference on eLearning for Knowledge-Based Society, Bangkok, Thailand.
- Albertin, A., & Nair, P. K. R. (2004). Farmers' perspectives on the role of shade trees in coffee production systems: an assessment from the Nicoya Peninsula, Costa Rica. *Human Ecology*, 32, 443-463.
- Aldrich, C. (2004). *Simulations and the Future of Learning: An Innovative (and Perhaps Revolutionary) Approach to e-Learning*. San Francisco, CA: Pfeiffer.
- Alexander, R. (2010). Still no pedagogy? principle, pragmatism and compliance in primary education. *Cambridge Journal of Education*, 34(1), 7-33. doi: 10.1080/0305764042000183106
- Alger, C., & Kopcha, T. (2009). eSupervision: A Technology Framework for the 21st Century Field Experience in Teacher Education. 18(2), 31-46.
- Allinson, C. W., & Hayes, J. (2000). Cross-national Differences in Cognitive Style: Implications for Management. *International Journal of Human Resource Management*, 11(1), 161-170.
- Ally, M. (2004). Role and function of theory in online education development and delivery. In T. Anderson & F. Elloumi (Eds.), *Foundations of educational theory for online learning*. Athabasca, AB: Athabasca University.
- Alvarez, I., Guasch, T., & Espasa, A. (2009). University teacher roles and competencies in online learning environments: a theoretical analysis of teaching and learning practices. *European Journal of Teacher Education*, 32(3), 321-336.
- Amabile, T. (1983). *The Social Psychology of Creativity*. New York: Springer-Verlag.
- Aminuzzaman, S., Baldersheim, H., & Jamil, I. (2002). *Talking Back! Empowerment and mobile phones in rural Bangladesh: A Study of the Village Pay Phone of Grameen Bank*. Paper presented at the Transforming Civil Society, Citizenship and Governance: The Third Sector in an Era of Global (Dis)Order, Graduate School in Humanities, University of Cape Town, South Africa.

- Anderson, J. R., Corbett, A. T., Koedinger, K. R., & Pelletier, R. (2005). Cognitive Tutors: Lessons Learned. *Journal of the Learning Sciences*, 4(2), 167-208.
- Anderson, T., Annand, D., & Wark, N. (2005). The Search for Learning Community in Learner-Paced Distance Education Programming Or "Having Your Cake and Eating It, Too!". *Australian Journal of Educational Technology*, 21(2), 222-241.
- Angeli, C., & Valanides, N. (2009). Epistemological and methodological issues for the conceptualization, development, and assessment of ICT-TPCK: advances in technological pedagogical content knowledge (TPCK). *Computers & Education*, 52(1), 154-168.
- Archambault, L. M., & Barnett, J. H. (2010). Revisiting Technological Pedagogical Content Knowledge: exploring the TPACK framework. *Computers & Education*, 55, 1656-1662. doi: 10.1016/j.compedu.2010.07.009
- Archer, M. (1995). *Realist Social Theory: The Morphogenetic Approach*. Cambridge: Cambridge University Press.
- Archer, M. (2003). *Structure, Agency and the Internal Conversation*. Cambridge: Cambridge University Press.
- Argyle, M. (1991). *Cooperation: the basis of sociability*. London: Routledge.
- Arnd-Caddigan, M., & Pozzuto, R. (2006). Truth in our time. *Qualitative Social Work*, 5(4), 423-440.
- Arnett, R. (1992). *Dialogic education: Conversations about ideas and between persons*. Carbondale, IL: Southern Illinois University Press.
- Arvaja, M. (2007). Contextual perspective in analysing collaborative knowledge construction of two small groups in Web-based discussion. *International Journal of Computer-Supported Collaborative Learning*, 2(2/3), 133-158.
- Asadullah, M. N. (2006). Pay differences between teachers and other occupations: some empirical evidence from Bangladesh. *Journal of Asian Economics*, 17(6), 1044-1065. doi: ISSN 1049-0078 doi: 10.1016/j.asieco.2006.09.007
- Austin, U. o. T. a. (2004). Report of the Technology Enhanced Learning Committee: The University of Texas at Austin
- Avalos, B. (2011). Teacher professional development in Teaching and Teacher Education over ten years. *Teaching and Teacher Education*, 27, 10-20.
- Bahtkin, M. (1986). *Speech Genres and other Late Essays (C. Emerson and M. Holquist Translation)*. Austin: University of Texas press.
- Bailey, M. K., Curtis, A., & Nunan, D. (2001). *Pursuing professional development: the self as source*. Boston: Heinle & Heinle.
- Baird, J. E., & Zelin, R. C. (2000). The effects of information ordering on investor perceptions: An experiment utilizing presidents' letters. *Journal of Financial and Strategic Decisions*, 13(3), 71-80.
- Baker, A. C., Jensen, P. J., & Kolb, D. A. (2002). Learning and conversation. Conversational learning: An experiential approach to knowledge creation. In A. C. Baker, P. J. Jensen & D. A. Kolb (Eds.), *Conversational learning: An experiential approach to knowledge creation* (pp. 2-11). Westport: Quorum.
- Ball, T., & Wells, G. (2009). Running cars down ramps: learning about learning over time. *Language and Education*, 23(4), 1-20.
- BANBEIS. (2010). Bangladesh Bureau of Educational Information and Statistics. Retrieved 16 May, 2012, from <http://www.banbeis.gov.bd/webnew/>
- BANBEIS. (2011). Retrieved 6 May, 2012, from <http://www.bbs.gov.bd/Home.aspx>

- Bandura, A. (1971). *Social learning theory*. New York: General Learning Press.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Bandura, A. (1986). The social learning perspective: Mechanisms of aggression. In H. Toch (Ed.), *Psychology of crime and criminal justice* (pp. 198-236). Prospect Heights, IL: Waveland Press.
- Bandura, A. (1995). *Self-Efficacy in Changing Societies*. London: Cambridge University Press.
- Bangladesh and Netrakona district. (2006). Retrieved from http://www.banglapedia.org/HT/N_0162.HTM
- Bangladesh Country Paper: Supply, Retention, Preparation and Career-long Development of Teachers in E-9 Countries*. (2008). Paper presented at the 7th E-9 Ministerial Review Meeting, Bali.
- Bangladesh: ONI Country Profile. (2012, 6th August). Retrieved 13 December, 2014, from <https://opennet.net/research/profiles/bangladesh>
- Banglalink. (2015). About Banglalink. Retrieved 1 April, 2015, from http://www.banglalink.com.bd/en/about_banglalink
- Bank, W. (2002). *Economic growth and public policy: The East Asian miracle*. Washington, DC: World Bank.
- Bank, W. (2011). World Bank Data Indicators: Population Density. Retrieved 20 May, 2012, from <http://data.worldbank.org/indicator/EN.POP.DNST>
- Bank, W. (2012). Rural population. from <http://data.worldbank.org/indicator/SP.RUR.TOTL.ZS>
- Banks, F., Moon, B., & Wolfenden, F. (2009). *New modes of communication technologies and the reform of open and distance learning programmes: A response to the global crisis in teacher education and training*. Paper presented at the 23rd ICDE World Conference on Open and Distance Learning, Maastricht, The Netherlands.
- Barro, R. J. (1997). *The Determinants of Economic Growth*. Cambridge, MA: MIT Press.
- Barron, B. J. S., Schwartz, D. L., Vye, N. J., Moore, A., Petrosino, A., & Zech, L. (1998). Doing with understanding: Lessons from research on problem- and project-based learning. *Journal of the Learning Sciences*, 7(3/4), 271-311.
- Barrows, H. S., & Tamblyn, R. M. (1980). *Problem-based learning: An approach to medical education*. New York: Springer Publishing Company.
- Barry, B., & Fulmer, I. S. (2004). The medium and the message: The adaptive use of communication media in dyadic influence. *Academy of Management Review*, 29, 272-292.
- Bartlett, F. C. (1958). *Thinking*. New York: Basic Books.
- Bassey, M. (1981). Pedagogic research: on the relative merits of search for generalisation and study of single events. *Oxford Review of Education*, 7, 73-93.
- Bates, A. W., & Poole, G. (2003). *Effective Teaching with Technology in Higher Education: Foundations for Success San Francisco*. San. Francisco: Jossey-Bass.
- Baylor, A. L., & Ritchie, D. (2002). What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms? *Computers and Education*, 39, 395-414.
- BBS. (2011a). Household Income and Expenditure Survey conducted by Bangladesh Bureau of Statistics, 2010. Retrieved 2 February, 2013, from <http://www.bbs.gov.bd/PageReportLists.aspx?PARENTKEY=66>

- BBS. (2011b). Report on the Bangladesh Literacy Survey 2010.
- BBS, & SID. (2013). Global e-Indices' Rankings and Bangladesh: Indicators for Measuring Digital Bangladesh: Bangladesh Bureau of Statistics (BBS) and Statistics and Informatics Division (SID).
- Beetham, H., & Sharpe, R. (Eds.). (2013). *Rethinking Pedagogy for a Digital Age: Designing for 21st century learning* (2 ed.). NY and Oxon: Routledge.
- Bell, F. (2011). Connectivism: Its Place in Theory-Informed Research and Innovation in TechnologyEnabled Learning. *International Review of Research in Open and Distance Learning and Individual Differences*, 12(3), 98-118.
- Benson, B. K. (1997). Scaffolding: Coming to terms. *The English Journal*, 86(7), 126-127.
- Benson, R., Hardy, L., & Maxfield, J. (2001). *The international classroom: using reflective practice to improve teaching and learning*. Paper presented at the Meeting at the crossroads. 18th annual conference of the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE), Melbourne.
- Berger, P., & Luckmann, T. (1991). *The social construction of reality*. London: Penguin Books.
- Bergold, J. (2007). *Participatory strategies in community psychology research—a short survey*. Paper presented at the 6th European Conference on Community Psychology, Opole.
- Bergold, J., & Thomas, S. (2012). Participatory Research Methods: A Methodological Approach in Motion. *Forum: Qualitative Social Research* 13(1), Art. 30.
- Bhaskar, R. A. (1989). *Reclaiming Reality: A Critical Introduction to Contemporary Philosophy*. London: Verso.
- Biesta, G. J. J. (2004). Education, accountability and the ethical demand. Can the democratic potential of accountability be regained? *Educational Theory*, 54(3), 233-250.
- Biggs, J. (1999). *Teaching for Quality Learning at University*. SRHE: Open University.
- Billah, M. M. (2013). Computer Aided Learning can develop teaching learning environment. Retrieved 1 January, 2013, from <http://www.bdeduarticle.com/index.php/about-the-site/learning/45-uncatagorized/62-computer-aided-learning-can-develop-teaching-learning-environment>
- Birman, B. F., Desimone, L., Porter, A. C., & Garet, M. S. (2000). Designing Professional Development that works. *Educational Leadership*, 57, 28-33.
- Black, P., & William, D. (1998). Inside the Black Box. *Phi Delta Kappan*, 80(2), 139-148.
- Bloom, B. S. (1965). *Taxonomy of Educational Objectives: The Classification of Educational Goals*. New York: David McKay Company, Inc. .
- Bloor, M., Frankland, J., Thomas, M., & Robson, K. (2001). *Focus groups in social research*. London: Sage.
- Blumenfeld, P. C., Soloway, E., Marx, R. W., Drajcik, J. S., Guzdial, M., & Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist*, 26, 369-398.
- Board, N. C. a. T. (2013). *English for Today (for classes 9–10)*. Dhaka: NCTB.
- Bodzin, A. C., & Park, J. P. (2002). Using a nonrestrictive web-based forum to promote reflective discourse with preservice science teachers.

- Contemporary Issues in Technology and Teacher Education*, 2(3), 267-289.
- Bogdan, R. C., & Biklen, S. K. (1982). *Qualitative Research for Education: An Introduction to Theory and Methods*. Boston: Allyn and Bacon.
- Bondarouk, T. (2006). The call for greater user participation. *International Journal of Technology and Human Interaction*, 2(3), 82-93.
- Bose, K. (2003). An e-learning experience – a written analysis based on my experience in an e-learning pilot project. *Campus-Wide Information Systems*, 20(5), 193-199.
- BOU. (2013). Profile. Retrieved 5 August, 2013, from <http://www.bou.edu.bd/home.php>
- Boud, D., & Feletti, G. (1991). *The challenge of problem-based learning*. London: Kogan Page.
- Bourdieu, P. (1977). *Outline of a theory of practice*. Cambridge: Cambridge University Press.
- Bourdieu, P. (1990). *The Logic of Practice*, (trans. Richard Nice). Cambridge, U.K: Polity Press.
- Bourner, T., & Flowers, S. (1997). Teaching and learning methods in higher education: A glimpse of the future. *Reflections on Higher Education*, 9, 77-102.
- Bowers, C. A. (2005). *The False Promises of Constructivist Theories of Learning*. New York: Peter Lang Publishing.
- Bowles, S., & Gintis, H. (1976). *Schooling in capitalist America: Educational reform and the contradictions of economic life*. New York: Basic Books.
- BRAC. (2007). BRAC Annual Report 2007. Dhaka: BRAC.
- BRAC. (2013). Computer Aided Learning (CAL) Programme. Retrieved 21st January, 2012, from <http://education.brac.net/computer-aided-learning-cal-programme>
- Brooke, S. (2006). Using the case method to teach online classes: promoting Socratic dialogue and critical thinking skills. *International Journal of Teaching and Learning in Higher Education*, 18(2), 142-149.
- Brookfield, S. D. (1995). *Becoming a critically reflective teacher*. San Francisco: Jossey-Bass.
- Brookfield, S. D., & Preskill, S. (2005). Discussion as a way of teaching: Tools and techniques for democratic classrooms (2 ed.). Jossey-Bass: San Francisco.
- Brouwer, N., Ekimova, L., Jasinska, M., Van Gastel, L., & Virgailaite-Meckauskaite, E. (2009). Enhancing mathematics by online assessments, two cases of remedial education considered. *Industry and Higher Education*, 23(4), 277-284.
- Brown, D., & Tandon, R. (1983). Ideology and political economy in inquiry: Action research and participatory research. *Journal of Applied Behavioral Science*, 19(3), 277-294.
- Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18(1), 32-42.
- Brubacher, J. (1947). *The history of the problems of education*. New York: McGraw-Hill.
- Bruck, P. A., & Roth, M. A. (2013). Social Innovation and the Power of Technology. In T. Osburg & R. Schmidpeter (Eds.), *Social Innovation: CSR, Sustainability, Ethics and Governance* (pp. 267-279). Berlin: Springer-Verlag.

- Bruner, J. (1966). *Toward a theory of instruction*. Cambridge: Harvard University Press.
- Bruner, J. (1986). *Actual Minds, Possible Worlds*. Cambridge, MA: Harvard University Press.
- Bruner, J. (1990). *Acts of meaning*. Cambridge, MA: Harvard University Press.
- Bruner, J. (1996). *The culture of education*. London: Harvard University Press.
- Bruner, J. (1999). Folk Pedagogies. In J. Leach & B. Moon (Eds.), *Learners and Pedagogy* (pp. 4-20). London: Paul Chapman.
- Brunstad, P. O. (2007). Military professional actions – more than – knowledge and skills. *PACEM*, 10(29), 59-70.
- BTRC. (2013). Mobile Tariff. Retrieved 2 January, 2013, from <http://www.btrc.gov.bd/index.php>
- Bullough, R. V., & Draper, R. J. (2004). Making sense of the failed triad. *Journal of Teacher Education*, 55(5), 407-420.
- Burbules, N. (1993). *Dialogue in teaching: Theory and practice*. New York: Teachers College Press.
- Burns, N., & Grove, S. (2005). *The practice of nursing research* (5 ed.). St Louis: Elsevier.
- Burr, V. (1995). *An Introduction to Social Constructionism*. London: Sage.
- Byrnes, J. P. (1996). *Cognitive Development and Learning in Instructional Contexts*. Boston: Allyn and Bacon.
- Cagiltay, N. E., Yildirim, S., & Aksu, M. (2006). Students' Preferences on Web-Based Instruction: linear or non-linear. *Educational Technology & Society*, 9(3), 122-136.
- Camp, G. (1996). Problem-based learning: A paradigm shift or a passing Fad? http://www.studentaffairs.columbia.edu/sites/dsa/files/PBL_Paradigm_or_Fad.pdf
- Cannings, T. R., & Talley, S. (2003). *Bridging the Gap Between Theory and Practice in Preservice Education: The Use of Video Case Studies*. Paper presented at the Conferences in Research and Practice in Information Technology Series.
- Carlsson, S. A. (2003). Advancing Information Systems Evaluation (Research): A Critical Realist Approach. *Electronic Journal of Information Systems Evaluation*, 6(2), 11-20.
- Carroll, J. B. (1963). A model of school learning. *Teachers College Record*, 64, 723-733.
- Carter, G., & Thomas, H. (1986). "Dear brown eyes": Experiential learning in a project oriented approach. *ELT Journal*, 40(3), 196-204.
- Carter, K. (1988). Conveying classroom knowledge through cases: A proposal for framing mentor/notice conversations about teaching. *Theory into Practice*, 27(214-222).
- Carter, K. (1989). Using cases to frame mentor-novice conversations about teaching. *Theory Into Practice*, 27(3), 214-222.
- Case, R. (1996). Changing views of knowledge and their impact on educational research and practice. In D. R. Olson & N. Torrance (Eds.), *The handbook of education and human development* (pp. 75-99). Cambridge, M. A.: Blackwell.
- Castells, M. (1996). *The Rise of the Network Society, The Information Age: Economy, Society and Culture* (Vol. I). Cambridge, MA, Oxford, UK: Blackwell.
- Chang, C., Wong, W., & Chang, C. (2011). Integration of Project-Based Learning Strategy with Mobile Learning: Case Study of Mangrove Wetland Ecology

- Exploration Project. *Tamkang Journal of Science and Engineering*, 14(3), 265.
- Chansky, T. (2004). *Freeing Your Child from Anxiety*. New York: Broadway Books.
- Charmaz, K. (2006). *Constructing Grounded Theory: A practical guide through Qualitative Analysis*. London: SAGE.
- Chaudhury, N., Hammer, J., Kremer, M., Muralidharan, K., & Rogers, F. H. (2004). Roll call: Teacher absence in Bangladesh: Harvard University and World Bank.
- Chen, D. H. C., & Dahlman, C. J. (2004). Knowledge and Development: A Cross-Section Approach *World Bank Policy Research Working Paper*. Washington DC: World Bank Institute.
- Chen, H. H., Kang, Y. K., Xing, X., Lee, A. H. I., & Tong, Y. (2008). Developing new products with knowledge management methods and process development management in a network. *Computers in Industry*, 59, 242-253.
- Chowdhury, R., & Le Ha, P. (2008). Reflecting on Western TESOL training and communicative language teaching: Bangladeshi teachers' voices. *Asia Pacific Journal of Education*, 28(3), 305-316.
- Christensen, C. R., & Hansen, A. (1987). *Teaching and the case method*. Boston: Harvard Business School Press.
- Citycell. (2015). Network Coverage. Retrieved 1 April, 2015, from http://www.citycell.com/index.php/zoom_ultra/coverage
- Clegg, S., Hudson, A., & Mitchel, A. (2005). The personal created through dialogue: enhancing possibilities through the use of new media. *ALT-J Research In Learning Technology*, 13(1), 3-15.
- Clegg, S., Hudson, A., & Steele, J. (2003). The emperor's new clothes: Globalisation and e-learning in higher education. *British Journal of Sociology of Education*, 24(1), 39-53.
- Coates, D., & Humphreys, B. (2001). Evaluation of computer-assisted instruction in principles of economics. *Educational Technology & Society*, 4(2). <http://www.ifets.info/>
- Cochran-Smith, M., & Lytle, S. (1999). Relationships of knowledge and practice: Teacher learning in community. *Review of Research in Education*, 24, 249-305.
- Cole, A. L., & Knowles, J. G. (1993). Teacher development partnership research: a focus on methods and issues. *American Educational Research Journal*, 30(3), 473-495.
- Collier, A. (1994). *Critical Realism: An Introduction to Roy Bhaskar's Philosophy*. London: Verso.
- Collin, F. (2002). *Social Reality*. London: Routledge.
- Collins, A. (2006). Cognitive apprenticeship. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning science* (pp. 47-60): Cambridge University press.
- Collins, A., Brown, J. S., & Newman, S. E. (1989). Cognitive apprenticeship: Teaching the craft of reading, writing, and mathematics. In L. B. Resnick (Ed.), *Knowing, learning, and instruction: Essays in honor of Robert Glaser* (pp. 453-494). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Collis, B. (1996). *Tele-learning in a digital world: The future of distance learning*. London: International Thomson.

- Collis, B. (1997). Supporting project-based collaborative learning via a World Wide Web environment. In B. Khan (Ed.), *Web-based Instruction* (pp. 213-219). Englewood Cliffs, NJ: Educational Technology.
- Collis, B. (2002). *The net as a tool for blended learning. What are the ingredients for success?* Paper presented at the Netlearning 2002, Ronneby, Sweden.
- Collison, G., Erlbaum, B., Haavind, S., & Tinker, R. (2000). *Facilitating Online Learning: Effective Strategies for Moderators*. Madison: Altwood Publishing.
- Committee, J. I. S. (2009). Managing Curriculum Change: Transforming curriculum design and delivery through technology: HEFC.
- Connolly, S., Simpson, D., & Petty, C. (2006). *Anxiety Disorders*. Chelsea House Publishers: Chelsea House Publishers.
- Conole, G., & Dyke, M. (2004). What are the affordances of Information and Communication Technologies? *ALT-J*, 12(2), 111-122.
- Cooper, M. M. (1998). Dialogic learning across disciplines. In F. Farmer (Ed.), *Landmark essays on Bakhtin, rhetoric and writing* (Vol. 13, pp. 81-96). Mahwah, NJ: Erlbaum.
- Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, 78, 98-104.
- Cottrell, R. R., Girvan, J. T., & McKenzie, J. F. (2002). Principles and foundations of health promotion and education (2 ed.). San Francisco: Benjamin Cummings.
- Cox, S. (2009). Learning and Teaching Guides: Case Studies for Active Learning.
http://www.heacademy.ac.uk/assets/hlst/documents/resources/ssg_cox_active_learning.pdf
- Cranton, P., & Carusetta, E. (2002). Reflecting on teaching: the influence of context. *International Journal for Academic Development*, 7(2), 168-176.
- Cremin, L. A. (1957). *The Republic and the School: Horace Mann on the Education of Free Men*. New York: Teachers College Press.
- Creswell, J. W., & Plano-Clark, V. L. (2010). *Designing and Conducting Mixed Methods Research*. Thousand Oaks, California: Sage.
- Cronbach, L. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297-334.
- Crook, S. J., Sharma, M. D., Wilson, R., & Muller, D. A. (2013). Seeing eye-to-eye on ICT: Science student and teacher perceptions of laptop use across 14 Australian schools. *Australasian Journal of Educational Technology*, 29(1), 82-95.
- Cross, J. (2004). An informal history of eLearning. *On the Horizon*, 12(3), 103-110.
- Cross, K. P. (1981). *Adults as Learners*. San Francisco: Jossey-Bass.
- Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. London: Sage Publications.
- Cunningham, M., Corprew, C. S., & Becker, J. E. (2009). Associations of future expectations, negative friends, and academic achievement in high-achieving African American adolescents. *Urban Education*, 44(3), 259-279.
- Czaja, R., & Blair, J. (2005). *Designing Surveys*. London: Sage Publications.
- D'Souza, R. (2010). Editorial: introduction to the special issue: postcolonialism, realism, and critical realism. *Journal of Critical Realism*, 9(3), 263-275.

- Danermark, B., Ekstrom, M., Jacobsen, L., & Karlsson, J. C. (1997). Generalization, scientific inference and models for an explanatory social science. In B. Danermark (Ed.), *Explaining Society: Critical realism in the social sciences*. Abingdon, Oxon: Routledge.
- Dann, H. D., Müller-Förhbrodt, G., & Cloetta, B. (1981). Sozialization junger Lehrer im Beruf. Praxisschock drei Jahre später. [Professional Socialization of young teachers. The transition shock three years later.]. *Zeitschrift für Entwicklungspsychologie und 14 Pädagogische Psychologie*, 13, 251-262.
- Darling-Hammond, L. (2006). Constructing 21st-Century Teacher Education. *Journal of Teacher Education*, 57(X), 1-15.
- Darling-Hammond, L. (2008). Teacher learning that supports student learning. In B. Z. Presseisen (Ed.), *Teaching for Intelligence* (2 ed.). London: SAGE.
- Darling-Hammond, L., & Bransford, J. (2005). *Preparing teachers for a changing world: What teachers should learn and be able to do*. San Francisco: Jossey-Bass.
- Darling-Hammond, L., & Richardson, N. (2009). Research Review. Teacher Learning: What Matters? *How teachers learn*, 66(5), 46-53.
- de Leeuw, E. D., Hox, J. J., & Dillman, D. A. (2008). *International Handbook of Survey Methodology*. London: Psychology Press.
- de Vaus, D. (2008). *Analyzing Social Science Data: 50 Key Problems in Data Analysis*. London: SAGE.
- Delanty, G. (2003). *Community*. London: Routledge.
- Delcourt, M., & Kinzie, M. (1993). Computer technologies in teacher education: The measurement of attitudes and self-efficacy. *Journal of Research and Development in Education*, 27(1), 35-41., 27(1), 35-41.
- Demetriadis, S. N., Papadopoulos, P. M., Stamelos, I. G., Fischer, F., & Norton, B. (2008). The effect of scaffolding students' context-generating cognitive activity in technology-enhanced case-based learning. *Computers & Education*, 51, 939-954.
- Denscombe, M. (2014). *The good research guide for small-scale social research projects* (5 ed.). Berkshire: Open University Press.
- Descartes, R. (1988). *Selected Philosophical Writings* (Trans. Cottingham, J. et al.): Cambridge University Press.
- Dewey, J. (1916). *How we think*. Boston, MA: Houghton Mifflin Company.
- Dewey, J. (1926). *Democracy and Education*. New York: The Macmillan Company.
- Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking in the educative process*. New York: D.C. Heath and Company.
- Dewey, J. (1949). Experience and Existence: A Comment. *Philosophy and Phenomenological Research*, IX, 709-716.
- Dick, W. (1992). An instructional designer's view of constructivism. In T. Duffy & D. Jonassen (Eds.), *Constructivism and the technology of instruction, a conversation* (pp. 91-98). Hillsdale, N.J.: Lawrence Erlbaum & Associates.
- Dickey, M. D. (2008). Integrating cognitive apprenticeship methods in a Web-based educational technology course for P-12 teacher education. *Computers & Education*, 51, 506-518.
- Diffily, D. (1996). The project approach: A museum exhibit created by kindergartners. *Young Children*, 51(2), 72-75.
- Dilworth, P., Donaldson, A., George, M., Knezek, D., Searson, M., Starkweather, K., & Strutchens, M. (2012). Editorial: Preparing Teachers for

- Tomorrow's Technologies. *Contemporary Issues in Technology and Teacher Education*, 12(1), 10-13.
- Dionne, H., & Horth, R. (1994). Challenges of literacy and development in rural Quebec *Alpha 94: Literacy and cultural development strategies in rural areas* (Clearinghouse No. RC026246). Washington, DC: Department of Education (ERIC Document Reproduction Services No. ED 386 354).
- Doig, B., Llisley, B., McLuckie, J., & Parsons, R. (2006). Using ePortfolios to Enhance Reflective Learning and Development. In A. Jafari & C. Kaufman (Eds.), *Handbook of Research on ePortfolios*. London: Idea.
- Domjan, M. (1998). *The principles of learning and behaviour* (4 ed.). Pacific Grove, CA: Brooks/Cole.
- Donnelly, R. (2006). Blended Problem-based Learning for Teacher Education: Lessons Learnt. *Journal of Learning, Media and Technology*, 31(2), 93-116.
- Dornyei, Z., & Csizer, K. (2002). Some dynamics of language attitudes and motivation: Results of a longitudinal nationwide survey. *Applied Linguistics*, 23(4), 421-462.
- Downes, S. (2004). E-learning 2.0. *Elearn Magazine: Education and Technology in Perspective*.
- Downes, S. (2007). Models for sustainable open educational resources. *Interdisciplinary Journal of Knowledge and Learning Objects*, 3, 29-44.
- Doyle, W. (1990). Case methods in the education of teachers. *Teacher Education Quarterly*, 17(1), 1-16.
- Driscoll, M. (2005). *Psychology of learning for instruction* (Vol. 3). Boston: Allyn & Bacon.
- DSHE. (2004). Evaluation report of ELTIP:Phase-2(Memo no.39722/10-GA). Dhaka: Directorate of Secondary an Higher Education.
- DuBrin, A. (2012). *Essentials of Management*. USA: South-Western.
- Duncan-Howell, J. (2010). Teachers making connections: online communities as a source of professional learning. *British Journal of Educational Technology*, 41, 324-340.
- Dyke, M. (2001). *Reflective learning and reflexive modernity as theory practice and research in postcompulsory education*. University of Surrey, Guildford.
- Dyke, M. (2009). An enabling framework for reflexive learning: Experiential learning and reflexivity in contemporary modernity. *International Journal of Lifelong Education*, 28(3), 289-310.
- Dyke, M., Conole, G., Ravenscroft, A., & de Freitas, S. (2006). Learning theories and technologies. In G. Conole & M. Oliver (Eds.), *Contemporary perspectives in e-learning research: Themes, methods and impact on practice* (pp. 82-97). London: Routledge.
- Dyke, M., Conole, G., Ravenscroft, A., & Freitas, S. d. (2007). Learning theory and its application to e-learning. In G. Conole & M. Oliver (Eds.), *Contemporary perspectives in e-learning research*. Oxon: Routledge.
- Eagly, A. H., & Chaiken, S. (2007). The advantages of an inclusive definition of attitude. *Social Cognition*, 25(5), 582-602.
- Easton, G. (2010). Industrial Marketing Management. 39, 118-128.
- Ebert-May, D., Derting, T. L., Hodder, J., Momsen, J. L., Long, T. M., & Jardeleza, S. E. (2011). What We Say is Not What We Do: Effective Evaluation of Faculty Professional Development Programs. *BioScience*, 61(7), 550-558.
- Edelson, D. C., Gordin, D. N., & Pea, R. D. (1999). Addressing the Challenges of Inquiry-Based Learning Through Technology and Curriculum Design.

- Journal of the Learning Sciences*, 8(3 and 4), 391-450. doi: 10.1207/s15327809jls0803&4_3
- EIA. (2009). An assessment of spoken English competence among school students, teachers and adults in Bangladesh, Baseline Study 1. Dhaka, Bangladesh: EIA (English in Action).
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532-550.
- EKOS. (2005). Review of the Technology Enhanced Learning (TEL) Action Plan Final Report *Saskatchewan Learning*: EKOS Research Associates Inc.
- Elliott, J. (2004). The struggle to redefine the relationship between 'knowledge' and 'action' in the academy. *Educar*, 34, 11-26.
- Ellis, N. J., & Armstrong, A. C. (2013). How context shapes practitioner research and professional learning in schools in Singapore and NSW. *Compare: A Journal of Comparative and International Education*, 1-20. doi: 10.1080/03057925.2013.767674
- Elmore, R. F. (1996). Getting to scale with good educational practice. *Harvard Educational Review*, 66, 1-26.
- Engestrom, Y. (1999). Innovative learning in work teams: analysing cycles of knowledge creation in practice. In Y. Engestrom, R. Miettinen & R. Punamaki (Eds.), *Perspectives on Activity Theory* (pp. 377-406). Cambridge: Cambridge University Press.
- Engestrom, Y., Miettinen, R., & Punamaki, R. L. (Eds.). (1999). *Perspectives on activity theory*. Cambridge: Cambridge University Press.
- Engestrom, Y., & Sannino, A. (2012). Whatever happened to process theories of learning? *Learning, Culture and Social Interaction*, 1, 45-56.
- Epanchin, B., & Colucci, K. (1999). What is a teaching case? Retrieved 19 February 2013, from <http://cases.coedu.usf.edu>.
- Erlandson, D. A., Harris, E. L., & Skipper, B. L. (1993). *Doing naturalistic inquiry: a guide to methods*. London: Sage.
- Ernest, P. (1998). *Social Constructivism as a Philosophy of Mathematics*. Albany, New York: SUNY Press.
- Evans, C., & Jones, R. (2004). Engagement and empowerment, research and relevance: Comments on user-controlled research. *Research Policy and Planning*, 22(2), 5-13.
- Farmer, J. A., Jr., Buckmaster, A., & LeGrand, B. (1992). Cognitive apprenticeship: Implications for continuing professional education. *New Directions for Adult and Continuing Education*, 55, 41-49.
- Farnham-Diggory, S. (1990). *Schooling*. Cambridge, MA: Harvard University Press.
- Fauske, J., & Wade, S. E. (2003-2004). Research to practice online: Conditions that foster democracy, community, and critical thinking in computer-mediated discussions. *Journal of Research on Technology in Education*, 36(2), 137-153.
- Fenge, L. A. (2010). Striving towards Inclusive Research: An Example of Participatory Action Research with Older Lesbians and Gay Men. *British Journal of Social Work*, 40, 878-894. doi: 10.1093/bjsw/bcn144
- Fenstermacher, G., & Richardson, V. (1991). *The elicitation and reconstruction of practical arguments about teaching*. Paper presented at the Annual meeting of the American Educational Research Association, Chicago.
- Fern, E. F. (2001). *Advanced focus group research*. Thousand Oaks, CA: Sage Publications.

- Festinger, L. (1957). *A Theory of Cognitive Dissonance*. Stanford University Press: Stanford University Press.
- Fidishun, D. (2000). *Andragogy and technology: Integrating adult learning theory as we teach with technology*. Paper presented at the Proceedings of the 2000 Mid-South Instructional Technology Conference, Murfreesboro, TN.
- Fielding, N. G. (2012). Triangulation and Mixed Methods Designs: Data Integration With New Research Technologies. *Journal of mixed methods research*, 6, 124-136.
- Fink, A. (1995). *How to analyze survey data*. London: SAGE.
- Finley, S. J., Marble, S. T., Copeland, G., & Ferguson, C. (2000). *Professional development and teachers' construction of coherent instructional practice: A synthesis of experiences in five sites*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.
- Firestone, W. A. (1993). Alternative arguments for generalizing from data as applied to qualitative research. *Educational Researcher*, 22, 16-23.
- Fitzgerald, G., Hollingsead, C., Miller, K., Koury, K., Mitchem, K., & Tsai, H. (2007). *Case-based Instruction through Technology: Does Implementation Affect Outcomes?* Paper presented at the AERA Annual Conference, Chicago.
- Flaherty, C. (1985). *Animal Learning and Cognition*. New York: Knopf.
- Flores, M. A., & Day, C. (2006). Contexts which shape and reshape new teachers' identities: A multi-perspective study. *Teaching and Teacher Education*, 22(2), 219-232.
- Fox, S. (2009). Applying critical realism to information and communication technologies: a case study. *Construction Management and Economics*, 27(5), 465-472.
- Fredriksson, U., Gajek, E., & Jedeskog, G. (2009). Ways to use ICT in Schools to optimize the impact on teaching and learning *Acta Didactica Napocensia*, 2(4), 21-31.
- Freeman, J. V., Walters, S. J., & Campbell, M. J. (2008). *How to Display Data*. Oxford: Blackwell.
- Freire, P. (1970a). The adult literacy process as cultural action for freedom. *Harvard Educational Review*, 40, 205-225.
- Freire, P. (1970b). Cultural action and conscientization. *Harvard Educational Review*, 40, 452-477.
- Friedkin, N. E., & Slater, M. R. (1994). School leadership and performance: A social network approach. *Sociology of Education*, 67, 139-157.
- Fullan, M. (2007). Change the terms for teacher learning. *Journal of Staff Development*, 28(30), 35-36.
- Fullan, M. G., & Stiegelbauer, S. (1991). *The new meaning of educational change* (2 ed.). New York: Teachers College Press.
- Fuller, F., & Brown, O. (1975). Becoming a teacher. In K. Ryan (Ed.), *Teacher Education: 74th Yearbook of the National Society for the Study of Education (Part 2)* (pp. 25-52). Chicago: University of Chicago Press.
- Gadamer, H. G. (1982). *Truth and method. (translated by Barden, B. & Cumming, J.)*. New York: Crossroad.
- Gage, N. (1985). *Hard Gains in the Soft Sciences, The Case for Pedagogy, CEDR Monograph*. Bloomington Indiana: Phi Delta Kappa.
- Gardiner, M. (2005). *Making a difference. Flinders University mentoring scheme for early career researchers. Seven years on*. Adelaide, South Australia: Flinders Press.

- Gardner, H. (1999). *The disciplined mind : What all students should understand*. New York: Simon & Schuster.
- Gauker, C. (1995). *Thinking Out Loud*. Princeton, NJ: Princeton University Press.
- Gee, J. P. (1996). *Social linguistics and literacies: Ideology in discourses* (2 ed.). London: Taylor & Francis.
- Geijsel, F., Slegers, P., Stoel, R., & Krüger, M. (2009). The Effect of Teacher Psychological, School Organizational and Leadership Factors on Teachers' Professional Learning in Dutch Schools. *The Elementary School Journal*, 109(4), 406-427.
- George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update* (4 ed.). Boston: Allyn & Bacon.
- Gerber, M. M., English, J., & Singer, G. S. (1999). Bridging between craft and academic knowledge: A computer supported, problem-based learning model for professional preparation in special education. *Teacher Education and Special Education*, 22, 100-113.
- Gibson, J. J. (1977). The Theory of Affordances. In R. Shaw & J. Bransford (Eds.), *Perceiving, Acting, and Knowing. Toward an Ecological Psychology* (pp. 67-82). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Gibson, J. J. (1979). *The ecological approach to visual perception*. Hillsdale, NJ: Lawrence Erlbaum.
- Giddings, L. S., & Grant, B. M. (2007). A Trojan horse for positivism? A critique of mixed methods research. *Advances in Nursing Science*, 30(1), 52-60.
- Gillani, B. B. (2006). Problem-based learning and the design of e-learning environments. In S. Marshall, W. Taylor & X. H. Yu (Eds.), *Encyclopedia of Developing Regional Communities with Information and communication technology* (pp. 581-586). USA: Idea Group.
- Giroux, H. (1983). *Theory and resistance: A pedagogy for the opposition*. Westport, CT: Bergin & Garvey.
- Giroux, H. (1997). Crossing the Boundaries of Educational Discourse: Modernism, Postmodernism and Feminism. In A. H. Halsey, H. Lauder, P. Brown & W. A. Stuart (Eds.), *Education: Culture, Economy, and Society* (pp. 113-130). Oxford: Oxford University Press.
- Glazer, E., & Hannafin, M. (2008). Factors that influence mentor and teacher interactions during technology integration collaborative apprenticeships. *Journal of Technology and Teacher Education*, 16(1), 35-61.
- Glazer, E. M., & Hannafin, M. J. (2006). The collaborative apprenticeship model: Situated professional development within school settings. *Teaching and Teacher Education*, 22, 179-193.
- Godambe, V. P. (1982). Estimation in survey sampling: robustness and optimality. *Journal of the American Statistical Association*, 77, 393-403.
- Golebiowska, A. (1985). Once a teacher, always a teacher. *ELT Journal*, 39(4), 274-278.
- Goodyear, P. (2001). *Effective networked learning in higher education: notes and guidelines*. UK: Centre for Studies in Advanced Learning Technology, Lancaster University.
- Goodyear, P., Asensio, M., Jones, C., Hodgson, V., & Steeples, C. (2003). Relationships between conceptions of learning, approaches to study and students' judgements about the value of their experiences of networked learning. *The Association for Learning Technology Journal*, 11(1), 17-27.
- Goodyear, P., & Zenios, M. (2007). Discussion, collaborative knowledge work and epistemic fluency. *British Journal of Educational Studies*, 55(4), 351-368.

- Gordon, J. (2005). Inadvertent complicity: Colorblindness in teacher education. *Educational Studies*, 38(2), 135-153.
- Govindasamy, T. (2002). Successful implementation of e-learning: pedagogical considerations. *Internet and Higher Education*, 4, 287-299.
- Grabinger, S. (1996). Rich environments for active learning. In D. Jonassen (Ed.), *Handbook of Research for educational telecommunications and technology* (pp. 665-692). New York: MacMillan.
- Graham, C. R. (2005). Blended Learning Systems: Definition, Current Trends, and Future Directions. In C. Bonk & C. R. Graham (Eds.), *Handbook of blended learning: Global Perspectives, local designs* (pp. 1-21). San Francisco, CA: Pfeiffer Publishing.
- Grameenphone. (2015). Media. Retrieved 5 April, 2015, from <http://www.telenor.com/media/articles/2014/grameenphone-reaches-50-million-customers/>
- Gredler, M. E. (1997). *Learning and instruction: theory into practice* (3 ed.). Englewood Cliffs, NJ: Prentice Hall.
- Greeno, J. G. (2003). Situating research relevant to standards for school mathematics. In J. Kilpatrick, W. G. Martin & D. Schifter (Eds.), *A Research Companion to Principles and Standards for School Mathematics* (pp. 304-332). Reston, VA: National Council of Teachers of Mathematics.
- Greenwood, G. E., & Parkay, F. W. (1989). *Case studies for teacher decision making*. New York: Random House.
- Gronhaug, K., & Olson, O. (1999). Action research and knowledge creation: merits and challenges. *Qualitative Market Research: An International Journal*, 2(1), 6-14.
- Grossman, P., Hammerness, K., & McDonald, M. (2009). Redefining teaching, re-imagining teacher education. *Teacher and teaching: theory and practice*, 15(2), 273-289.
- Grossman, P., Wineburg, S., & Woolworth, S. (2001). Toward a theory of teacher community. *Teachers College Record*, 103(6), 942-1012.
- Grossman, P. L., Smagorinsky, P., & Valencia, S. (1999). Appropriating tools for teaching English: A theoretical framework for research on learning to teach. *American Journal of Educational Research*, 108(1), 1-29.
- Guilar, J. D. (2006). Intersubjectivity and Dialogic Instruction. *Radical Pedagogy*.
- Gulbahar, Y., & Tinmaz, H. (2006). Implementing Project-Based Learning and E-Portfolio Assessment in an Undergraduate Course. *Journal of Research on Technology in Education*, 38(3), 309-327.
- Gultekin, M. (2007). The Effect of Project Based Learning on Learning Outcomes in the Fifth-Grade Science Education. *Elementary Education Online*, 6, 93-112.
- Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice*, 8, 381-391.
- Guzdial, M. (1995). Software-realized scaffolding to facilitate programming for science learning. *Interactive Learning Environments*, 4(1), 1-44.
- Gylfason, T. (2001). Natural Resources, Education, and Economic Development. *European Economic Review*, 45(4-6), 847-859.
- Haley, M. H. (2004). Implications of Using Case Study Instruction in a Foreign/Second Language Methods. *Foreign Language Annual*, 37(2), 290-300.

- Hamid, M. O., & Baldauf, R. B. (2008). Will CLT bail out the bogged down ELT in Bangladesh? *English Today*, 24(3), 16-24. doi: doi:10.1017/S0266078408000254
- Hammersley, M. (1992). *What's Wrong with Ethnography?* London: Routledge.
- Haq, M. N., & Islam, M. S. (2005). Teacher Motivation and Incentives in Bangladesh: A situation analysis *Regional and Country Profiles*: eldis.
- Haque, M. E., & Islam, M. M. (2012). Rural to Urban Migration and Household Living Conditions in Bangladesh. *Dhaka University Journal of Science*, 60(2), 253-257.
- Harasim, L. (2012). *Learning theory and online technologies*. New York and London: Routledge.
- Harel, I., & Papert, S. (Eds.). (1991). *Constructionism*. Norwood, NJ: Ablex Publishing.
- Hargreaves, A. (1990). Teachers' work and the politics of time and space. *International Journal of Qualitative Studies in Education*, 3, 303-320.
- Hargreaves, A., & Fullan, M. (2012). *Professional Capital: Transforming teaching in Every School*. New York: Teachers College Press.
- Hasan, K., & Akhand, M. M. (2009). Challenges & suitability of TESL at the college level in Bangladeshi context. *Journal of the Nepalese English Language Teachers Association (NELTA)*, 14, 1-2.
- Healey, M., & Jenkins, A. (2000). Kolb's Experiential Learning Theory and Its Application in Geography in Higher Education. *Journal of Geography*, 99(5), 185-195.
- Helle, L., Tynjala, P., & Olkinuora, E. (2006). Project-based learning in post-secondary education—theory, practice and rubber slings shots. *Higher Education*, 51(2), 287-314.
- Hernandez-Ramos, P. (2004). Web Logs and Online Discussions as Tools to Promote Reflective Practice. *The Journal of Interactive Online Learning*, Volume 3, Number 1, 2004, 3(1), 1-16.
- Herreid, C. F. (1997). What makes a good case? Some basic rules of good storytelling help teachers generate excitement in class. *Journal of College Science Teaching*, 27(3), 163-165.
- Herrington, J., & Oliver, R. (1999). Using situated learning and multimedia to investigate higherorder thinking. *Journal of Interactive Learning Research*, 10(1), 3-24.
- Herrington, J., & Oliver, R. (2000). An instructional design framework for authentic learning environment. *Educational Technology Research and Development*, 48(3), 23-38.
- Hilgard, E. R., & Bower, G. H. (1966). *Theories of learning*. New York: Appleton-Century-Crofts.
- Hill, W. F. (2002). *Learning: a survey of psychological interpretation*. Boston: Allyn and Bacon.
- Hirsch, E., Koppich, J. E., & Knapp, M. S. (1998). *What states are doing to improve the quality of teaching: A brief review of current patterns and trends*. Seattle, WA: Center for the Study of Teaching and Policy, University of Washington.
- Hoggart, K., Lees, L., & Davies, A. (2002). *Researching Human Geography*. London: Arnold.
- Holland, J. H., Holyoak, K. J., Nisbett, R. E., & Thagard, P. R. (1986). *Induction: Processes of Inference, Learning and Discovery*. Cambridge, MA: MIT Press.
- Hollingshead, A. B. (1949). *Elmtown's youth*. New York: John Wiley.

- Holmes, B. (2012). *Online Learning Communities for School Teachers' Continuous Professional Development: The cognitive, social and teaching aspects of an eTwinning Learning Event* (PhD), University of Lancaster UK. Retrieved from <http://dl.dropboxusercontent.com/u/73078359/Holmes%20PhD%20Online%20Learning%20Communities%20CC.pdf>
- Hopkins, P. E. (2007). Positionalities and Knowledge: Negotiating Ethics in Practice. *ACME: An International E-Journal for Critical Geographies*, 6(3), 386-394.
- Horn, I. S., & Little, J. W. (2010). Attending to problems of practice: Routines and resources for professional learning in teachers' workplace interactions. *American Educational: Research Journal*, 47(1), 181-217.
- Hossain, T., & Tollefson, J. W. (2007). Language policy in education in Bangladesh. In A. B. M. Tsui & J. W. Tollefson (Eds.), *Language Policy, Culture, and Identity in Asian Contexts* (pp. 241-157). New York: Routledge.
- Houle, C. O. (1972). *The design of education*. San Francisco: Jossey-Bass, Inc.
- House, R. J., Hanges, P. J., Ruiz-Quintanilla, S. A., Dorfman, P. W., Javidan, M., Dickson, M., & Gupta, V. (1999). Cultural Influences on Leadership and Organizations: Project GLOBE. In W. Mobley, J. Gessner & V. Arnold (Eds.), *Advances in Global Leadership* (Vol. 1, pp. 171-234). Stamford, CN: JAI Press.
- Houston, S. (2001). Beyond social constructionism: critical realism and social work. *British Journal of Social Work*, 31(6), 845-861.
- Huang, E. S., Gorawara-Bhat, R., & Chin, M. H. (2005). Self-reported goals of older patients with type 2 diabetes mellitus. *Journal of the American Geriatrics Society*, 53(2), 306-311.
- Hull, C. L. (1943). *Principles of Behavior*. New York: Appleton-Century-Crofts.
- Hutchens, J. (1998). Research and professional development collaborations among university faculty and education practitioners. *Arts Education and Policy Review*, 99(5), 35-41.
- Hutchins, E. (1995). *Cognition in the Wild*. Cambridge, MA: MIT Press.
- Illeris, K. (2007). *How We Learn: Learning and Non-learning in School and Beyond*. London/New York: Routledge.
- Illeris, K. (2009). A Comprehensive Understanding of Human Learning. In K. Illeris (Ed.), *Contemporary Theories of Learning*. Oxon: Routledge.
- Islam, T., & Selim, A. S. (2006). Current Status and Prospects for E-learning in the Promotion of Distance Education in Bangladesh. *Turkish Online Journal of Distance Education-TOJDE*, 7(1), 114-123.
- Israel, B. A., Schulz, A. J., Parker, E. A., & Becker, A. B. (1998). Review of community-based research: assessing partnership approaches to improve public health. *Annual Review of Public Health*, 19, 173-202.
- Jackson, C. K., & Bruegmann, E. (2009). Teaching students and teaching each other: The importance of peer learning for teachers. *American Economic Journal: Applied Economics*, 1(4), 85-108.
- Jarvis, P. (1995). *Adult & Continuing Education* (2 ed.). London & New York: Routledge.
- Jarvis, P. (1999). *The Practitioner-Researcher Developing Theory from Practice*. San Francisco, CA: Jossey-Bass.
- Jarvis, P. (2001). Malcolm S Knowles. In P. Jarvis (Ed.), *Twentieth Century Thinkers in Adult & Continuing Education* (2 ed., pp. 144-159): Kogan Page.

- Jarvis, P. (2004). *Adult Education and Lifelong Learning*. London: Routledge Falmer.
- Jarvis, P. (2009). Learning to be a Person in Society. In K. Illeris (Ed.), *Contemporary Theories of Learning*. Oxford: Routledge.
- Jasper, M. (1994). Issues in phenomenology for researchers of nursing. *Journal of Advanced Nursing*, 19, 309-314.
- Jeppesen, S. (2005). Critical Realism as an Approach to Unfolding Empirical Findings: Thoughts on Fieldwork in South Africa on SMEs and Environment. *The Journal of Transdisciplinary Environmental Studies*, 4(1), 1-9.
- Jethro, O. O., Grace, A. M., & Thomas, A. K. (2012). E-Learning and its effects on teaching and learning in a global age. *International Journal of Academic Research in Business and Social Sciences*, 2(1), 73-78.
- Johnson-Laird, P. (1983). *Mental Models*. Cambridge, MA: Harvard University Press.
- Johnson, B., & Christensen, L. (2004). *Educational research: Quantitative, qualitative, and mixed approaches* (2 ed.). Needham Heights, MA: Allyn & Bacon.
- Johnson, R., Onwuegbuzie, A., & Turner, L. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research*, 1(2), 112-133.
- Johnson, R. B. (2006). New directions in mixed methods research. *Research in the Schools [Special issue]*, 13(1).
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, 33(7), 14-26.
- Jonassen, D., Howland, J., Marra, R. M., & Crismond, D. (2008). *Meaningful learning with technology* (3 ed.). Upper Saddle River: Pearson Education, Inc.
- Jonassen, D. H. (1999). Designing constructivist learning environments. In C. M. Reigeluth (Ed.), *Instructional-design theories and models* (2 ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Jonassen, D. H., Howland, J., Moore, J., & Marra, R. M. (2003). *Learning to Solve Problems with Technology: A Constructivist Perspective* (2 ed.). Columbus, OH: Merrill/Prentice-Hall.
- Jonassen, D. H., & Land, S. M. (2000). *Theoretical foundations of learning environments*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Jonassen, D. H., Peck, K. L., & Wilson, B. G. (1999). *Learning with Technology: A Constructivist Perspective*. Upper Saddle River, NJ: Merrill Publishing.
- Jonassen, D. H., & Reeves, T. (1996). Learning with computers: Computers as cognitive tools. In D. H. Jonassen (Ed.), *Handbook of Research for Educational Communications and Technology* (pp. 693-719). New York: MacMillan.
- Jones, M. G., & Carter, G. (2007). Science teacher attitudes and beliefs. In S. K. Abell & N. G. Lederman (Eds.), *Handbook of research on science education* (pp. 1067-1104). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Kadepurkar, H. (2008). When teachers write coursebooks. *The Teacher Trainer*, 22(3), 10-15.
- Kafai, Y., & Resnick, M. (Eds.). (1996). *Constructionism in practice: Designing, thinking and learning in a digital world*. Mahwah, NJ: Lawrence Erlbaum.

- Kagan, D. (1993). Contexts for the use of classroom cases. *American Educational Research Journal*, 30(4), 117-129.
- Kalyane, V. L., & Devarai, R. S. (1994). Empathy in public librarianship: a subjective and qualitative analysis. *Indian Journal of Information Library and Society*, 7(1-2), 87-104.
- Kamberelis, G., & Dimitriadis, G. (2008). *On Qualitative Inquiry: Approaches to Language and Literacy Research*. University of Buffalo: Teachers College Press.
- Kant, I. (1781). *Critique of pure reason/ Critique of Pure Reason (Translated and edited in 1998 by Guyer, P. and Wood, A.)*. Cambridge: Cambridge University Press.
- Kanuka, H., & Nocente, N. (2003). Exploring the effects of personality type on perceived satisfaction with web-based learning in continuing professional development. *Distance Education*, 24(2), 228-245.
- Karasavvidis, I. (2009). Activity Theory as a conceptual framework for understanding teacher approaches to Information and Communication Technologies. *Computers & Education*, 53, 436-444.
- Katz, I. R. (2005). Beyond Technical Competence: Literacy in Information and Communication Technology. *Education Technology Magazine*, 45(6), 44-47.
- Keengwe, J., Onchwari, G., & Agamba, J. (2013). Promoting effective e-learning practices through the constructivist pedagogy. *Educ Inf Technol*. doi: DOI 10.1007/s10639-013-9260-1
- Kejak, M., & Ortmann, A. (2003). *E-learning: A Way to Solve the Human Capital Bootstrapping Problem in Transitional Economies in Central Europe*. Washington, DC: Research paper funded by World Bank's Global Development Network.
- Kelson, A., & Distlehorst, L. (2000). Groups in Problem-based Learning (PBL): Essential Elements in Theory and Practice. In D. Evensen & C. Hmelo (Eds.), *Problem-Based Learning: A Research Perspective on Learning Interactions*. London: Lawrence Erlbaum Associates.
- Kember, D., & Gow, I. (1991). A challenge to the anecdotal stereotype of the Asian student. *Studies in Higher Education*, 16, 117-128.
- Kennedy, J. M., & Vargus, B. (2001). Challenges in Survey Research and Their Implications for Philanthropic Studies Research. *Nonprofit and Voluntary Sector Quarterly*. doi: 30: 483. DOI: 10.1177/0899764001303006
- Khan, B. H. (2005). *Managing e-learning: Design, delivery, implementation, and evaluation*. Hershey, PA: Information Science Publishing.
- Khan, S. (2013). Bangla Folklore : Socio-cultural Background and the Formation-process of Oral Tradition Retrieved 13 May, 2013, from <http://wwwFOUNDATIONSaarcwriters.com>
- Kintsch, W. (2009). Learning and constructivism. In S. Tobias & T. M. Duffy (Eds.), *Constructivist instruction* (pp. 223-241). New York: Routledge.
- Kitzinger, J. (1994). The methodology of focus groups: the importance of interaction between research participants. *Sociology of Health*, 16(1), 103-121.
- Kleinfeld, J. (1988). *Learning to think like a teacher*. USA: Center for Cross-Cultural Studies, Rural College, University of Alaska.
- Knowles, M. (1973). *The adult learner: a neglected species*. Houston: Gulf Publishing Company.
- Knowles, M. S. (1980). *The modern practice of adult education: from pedagogy to andragogy*. Wilton, Conn. Chicago: Association Press; Follet Publishing Company.

- Knowles, M. S. (1989). *The making of an adult educator: an autobiographical journey* (1 ed.). San Francisco, Calif: Jossey-Bass.
- Knowles, M. S. (1990). *The adult learner: a neglected species* (4 ed.). Houston: Gulf Pub. Co., Book Division.
- Knowles, M. S., Holton, E. F., & Swanson, R. A. (2005). *The Adult Learner*. London: Elsevier.
- Koehler, M., & Mishra, P. (2005). What happens when teachers design educational technology? The development of technological pedagogical content knowledge. *Journal of Educational Computing Research*, 32(2), 131-152.
- Koehler, M. J., & Mishra, P. (2008). Introducing TPCK. In A. C. o. I. a. Technology (Ed.), *Handbook of Technological Pedagogical Content Knowledge (TPCK) for Educators* (pp. 1-29). New York: Routledge for the American Association of Colleges for Teacher Education.
- Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: enhancing experiential learning in higher education. *Academy of Management Learning and Education*, 4, 193-212.
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. New Jersey: Prentice-Hall.
- Kop, R., & Hill, A. (2008). Connectivism: Learning theory of the future or vestige of the past? *The International Review of Research in Open and Distance Learning*, 9(3).
- Kozma, R. B., & Vota, W. S. (2014). ICT in Developing Countries: Policies, Implementation, and Impact. In J. M. Spector, M. D. Merrill, J. Elen & M. J. Bishop (Eds.), *Handbook of Research on Educational Communications and Technology* (pp. 885-894). London: Springer.
- Krajcik, J. S., Blumenfeld, P. C., Marx, R. W., & Soloway, E. (1994). A collaborative model for helping teachers learn project-based instruction. *Elementary School Journal*, 94(5), 483-497.
- Kubes, M. (1998). Adaptors and innovators in Slovakia: Cognitive style and social culture' European. *Journal of Personality*, 12(3), 187-198.
- Kulturel-Konak, S., D'Allegro, M. L., & Dickinson, S. (2011). Review of gender differences in learning styles: suggestions for STEM education. *Contemporary Issues in Education Research*, 4(4), 9-18.
- Kumar, K. L. (1997). *Educational Technology: A Practical Textbook for Students, Teachers, Professionals and Trainers*. New Delhi: New Age International.
- Kuntz, S., & Hessler, A. (1998). *Bridging the gap between theory and practice: fostering active learning through the case method*. Paper presented at the Annual Meeting of the Association of American Colleagues and Universities (AAC&U), Washington, DC.
- Labaree, D. F. (2000). On the nature of teaching and teacher education: difficult practices that look easy. *Journal of Teacher Education*, 51(3), 228-233.
- Ladewski, B. G., Krajcik, J., & Harvey, c. L. (1994). A middle grade science teacher's emerging understanding of project-based instruction. *Elementary School Journal*, 94, 499-515.
- Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. *American Educational Research Journal*, 32(3), 465-491.
- Lambert, N., & McCombs, B. (Eds.). (1998). *How students learn: Reforming schools through learner centered education*. Washington, DC: APA.
- Lancaster, U. o. (2013). Participatory Research. Retrieved 14 June 2013, from <http://www.lancaster.ac.uk/researchethics/5-2-outlook.html>

- Langer, J. (2000). Excellence in English in middle and high school. *American Educational Research Journal*, 37(2), 397-439.
- Lankshear, C., & Knobel, M. (2006). *A handbook for teacher research: from design to implementation*. Berkshire: Open University Press.
- Larsen, L. L. (2012). *Pedagogical Approaches: Insights for Teachers of Adults*. Paper presented at the Teacher Education Research between National Identity and Global Trends, Trondheim, Norway.
http://pure.au.dk/portal/files/45527673/Pedagogical_Approaches_Insights_For_teachers_of_Adults_LeaLundLarsen2012.pdf
- Latif, S., & Johanson, R. (2000). Bangladesh secondary and higher education *Bangladesh education sector review* (Vol. 2). Dhaka: The World Bank/University Press Ltd.
- Latour, B. (2005). *Reassembling the Social*. Oxon: Oxford University Press.
- Laurillard, D. (1993). *Rethinking university teaching*. London / New York: Routledge.
- Laurillard, D. (2002). *Rethinking University Teaching: A Framework for the Effective Use of Learning Technologies* (2 ed.). London: London: Routledge Falmer.
- Lave, J. (1988). *Cognition in practice: Mind, mathematics, and culture in everyday life*. Cambridge, England: Cambridge University Press.
- Lave, J., & Wenger, E. (1991). *Situated learning. Legitimate peripheral participation*. Cambridge: Cambridge University Press.
- Lawless, K. A., & Pellegrino, J. W. (2007). Professional development in integrating technology into teaching and learning: Knowns, unknowns, and ways to pursue better questions and answers. *Review of Educational Research*, 77, 575 - 614.
- Lawson, T. (1997). *Economics and Reality*. New York: Routledge.
- Leary, J., & Berge, Z. L. (2006). Trends and challenges of elearning in national and international agricultural development. *International Journal of Education and Development using Information and Communication Technology*, 2(2), 51-59.
- Leont'ev, A. (1978). *Activity, Consciousness and Personality*. Engelwood Cliffs, NJ: Prentice-Hall.
- Lerner, R. M. (2002). *Concepts and theories of human development* (3 ed.). Mahwah: Lawrence Erlbaum Associates.
- Levstik, L. S., & Barton, K. C. (2001). *Doing history*. Mahwah, NJ: Lawrence Erlbaum.
- Lewins, K. M. (1991). Change makers and change models. In K. M. Lewins & J. S. Stuart (Eds.), *Educational Innovation in Developing Countries* (pp. 7-20). London: Macmillian.
- Liamputtong, P. (2009). *Qualitative Research Methods* (3 ed.). Melbourne (AUST): Oxford University press.
- Liberman, A., & Miller, L. (2000). Teaching and teacher development: A new synthesis for a new century. In R. S. Brandt (Ed.), *Education in anew era* (pp. 47-66). Alexandria, VA: ASCD.
- Lieb, S. (1991). Principles of Adult Learning. *VISION Journal*.
<http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/adults-2.htm>
- Light, G., & Cox, R. (2001). *Learning and teaching in higher education*. Thousand Oaks, CA: Paul Chapman.
- Likert, R. (1932). A technique for the measurement of attitudes. *Archives of psychology*, 140(1), 44-53.

- Lisle, J. D. (2011). The benefits and Challenges of Mixing methods and methodology: Lessons Learnt From Implementing Qualitatively Led Mixed Methods Research Designs in Trinidad and Tobago. *Caribbean Curriculum*, 18, 87-120.
- Little, J. W. (1990). The persistence of privacy: Autonomy and initiative in teachers' professional relations. *Teachers College Record*, 91(4), 509-536.
- Little, R. J. A., & Rubin, D. B. (2002). *Statistical Analysis with Missing Data* (2 ed.). New York: Wiley.
- Liu, T. C. (2005). Web-based Cognitive Apprenticeship Model for Improving Pre-service Teachers' Performances and Attitudes towards Instructional Planning: Design and Field Experiment. *Educational Technology & Society*, 8(2), 136-149.
- Llorens, S., Salanova, M., & Grau, R. (2002). Training to technological change. *Journal of Research on Technology in Education*, 35(2), 206-212.
- Lo, H.-C. (2009). Utilizing Computer-mediated Communication Tools for Problem-based Learning. *Educational Technology & Society*, 12(1), 205-2103.
- Locke, J. (1996). *An Essay Concerning Human Understanding*: Hackett Publishing Company.
- Lofstrom, E., & Nevgi, A. (2008). University teaching staffs' pedagogical awareness displayed through ICT-facilitated teaching. *Interactive Learning Environments*, 16(2), 101-116.
- Lorenz, W. (2004). Research as an element in social work's ongoing search for identity. In R. Lovelock, R. Lyons & J. Powell (Eds.), *Reflecting on Social Work Discipline and Profession* (pp. 145-162). Aldershot: Ashgate.
- Lou, Y., & MacGregor, S. K. (2004). Enhancing Project-Based Learning Through Online Between-Group Collaboration, Educational Research and Evaluation. *An International Journal on Theory and Practice*, 10(4-6), 419-440. doi: 10.1080/13803610512331383509
- Loucks-Horsley, S., Hewson, P. W., Love, N., & Stiles, K. E. (1998). *Designing professional development for teachers of science and mathematics*. Thousand Oaks, CA: Corwin Press.
- Louden, W., & Rohl, M. (2006). "Too many theories and not enough instruction": Perceptions of preservice teacher preparation for literacy teaching in Australian schools. *Literacy*, 40(2), 66-78.
- Loughran, J. (2006). *Developing a Pedagogy of Teacher Education: Understanding teaching and learning about teaching*. Oxon: Routledge.
- Lovat, T. J. (2003). *The Role of the 'Teacher' coming of Age?*. Paper presented at the Australian Council Deans of Education, Discussion Paper
- Love, P. E. D., Irani, Z., & Edwards, D. J. (2004). Industry-Centric benchmarking of information technology benefits, costs and risks for small and medium sized enterprises in construction. *Automation in Construction*, 13(4), 507-524.
- Loveless, A., DeVogd, G. L., & Bohlin, R. M. (2001). Something Old, Something New... Is pedagogy affected by ICT? In A. Loveless & V. Ellis (Eds.), *ICT, Pedagogy and the Curriculum: Subject to Change* (pp. 63-83). London: Routledge-Falmer.
- Lowerison, C., Cote, R., & Lavoie, A. (2008). Revisiting theory for e-learning: past promises, present challenges. In S. Carliner & P. Shank (Eds.), *The e-learning handbook* (pp. 421-449). San Francisco: Pfeiffer.

- Lowther, D. L., Inan, F. A., Strahl, D., & Ross, S. M. (2008). Does technology integration “work” when key barriers are removed? *Educational Media International*, 45(3), 195-213.
- Luck, P., & Norton, B. (2004). Problem Based Management Learning-Better Online? http://www.eurodl.org/materials/contrib/2004/Luck_Norton.htm
- Lunt, P., & Livingstone, S. (1996). Rethinking the focus group in media and communications research. *Journal of Communication*, 46(2), 79-98.
- Luppiciini, R. (2007). *Online Learning Communities*. Charlotte: Information Age Publishing.
- Lusted, D. (1986). 'Why Pedagogy'. *Screen*, 27(5), 2-14.
- Lynd, R. S., & Lynd, H. M. (1929/ 1959). *Middletown: A study in modern American culture*. Orlando, FL: Harcourt Brace.
- Maddux, W. W., & Galinsky, A. D. (2009). Cultural borders and mental barriers: The relationship between living abroad and creativity. *Journal of Personality and Social Psychology*, 96, 1047-1061.
- Magnusson, D., & Allen, V. L. (1983). An interactional perspective for human development. In D. Magnusson & V. L. Allen (Eds.), *Human Development: An Interactional Perspective* (pp. 3-31). New York: Academic Press.
- Maher, F. A., & Tetreault, M. K. (2001). *The feminist classroom: Dynamics of gender, race, and privilege*. Lanham, MD: Roman & Littlefield Publishers, Inc.
- Makitalo, K., Hakkinen, P., Leinonen, P., & Jarvela, S. (2002). Mechanisms of common ground in case-based web discussions in teacher education. *The Internet and Higher Education*, 5(3), 247-265.
- Malhotra, N. K. (2004). *Marketing research: An applied orientation* (4 ed.). Upper Saddle River, NJ: Prentice Hall.
- Malhotra, N. K., & Peterson, M. (2006). *Basic marketing research: A decision making approach* (2 ed.). Upper Saddle River, NJ: Prentice Hall.
- Mamun, A. (2013). BTRC to provide more WiMAX licences *The Daily Star* (online)
- Mandler, G. (1984). *Mind and Body*. NY: Norton.
- Manouchehri, A. (2002). Developing teaching knowledge through peer discourse. *Teaching and Teacher Education*, 18, 715-737.
- Manville, B. (2003). Organising Enterprise – Wide eLearning and Human Capital Management. *Chief Learning Officer*, 25(4), 12-14.
- Margerum-Leys, J., & Marx, R. W. (2003). Teacher knowledge of educational technology: A case study of student/mentor teacher pairs. In Y. Zhao (Ed.), *What should teachers know about technology?: Perspectives and practices* (pp. 123-159). Greenwich: Information Age Publishing.
- Marshall, A. (1997). *Principles of economics (Great Minds Series)*. Amherst, NY: Prometheus Books.
- Marshall, H. H. (1998). Teaching educational psychology: Learner-centered constructivist perspectives. In N. M. Lambert & B. L. McCombs (Eds.), *How students learn: Reforming schools through learnercentered education* (pp. 449-473). Washington, DC: American Psychological Association.
- Martin, A., & Sherington, J. (1997). Participatory research methods implementation, effectiveness and institutional linkages. *Agricultural Systems*, 55(2), 195-216.
- Martinovic, D., & Zhang, Z. (2012). Situating ICT in the teacher education program: Overcoming challenges, fulfilling expectations. *Teaching and Teacher Education*, 28, 461-469.

- Mason, R. (1998). Models of Online Courses. *ALN Magazine*, 2(2).
- Masud, H. C., & Murshed, M. M. (2006). Computer. Retrieved 15 August 2013, from http://www.banglapedia.org/HT/C_0328.HTM
- Mayer, R. (2004). Should there be a three-strikes rule against pure discovery learning? The case for guided methods of instruction. *American Psychologist*, 59, 14-19.
- Mayer, R. E. (2003). The promise of multimedia learning: Using the same instructional design methods across different media. *Learning and Instruction*, 13, 125-139.
- McConnell, D. (2006). *E-Learning Groups and Communities*. Maidenhead: Open University Press.
- McCormack, V. (2010). Increasing Teacher Candidate Responses through the Application of VoiceThread. *International Journal of Arts and Sciences*, 3(11), 160 - 165.
- McKenney, S. (2008). Shaping computer-based support for curriculum developers. *Computers & Education*, 50, 248-261.
- McLoughlin, C., & Lee, M. (2010). Personalised and self-regulated learning in the Web 2.0 era: International exemplars of innovative pedagogy using social software. *Australasian Journal of Educational Technology*, 26(1), 28-43.
- McManus, M., & Aiken, R. (1995). Using an intelligent tutor to facilitate collaborative learning. In B. Collis & G. Davies (Eds.), *Innovating adult learning with innovative technologies* (pp. 49-64). Amsterdam: Elsevier Science B.V.
- McMillan, D. W., & Chavis, D. M. (1986). Sense of community: a definition and theory. *Journal of community psychology*, 14(6-23).
- Means, B. (1994). Introduction: Using technology to advance educational goals. In B. Means (Ed.), *Technology and education reform: The reality behind the promise* (pp. 5-12). San Francisco: Jossey-Bass.
- Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010). Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies: Center for Technology in Learning.
- Mellar, H., Kambouri, M., Logan, K., Betts, S., Nance, B., & Moriarty, V. (2007). *Effective teaching and learning using ICT*. London: NRDC, Institute of Education.
- Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass.
- Merriam, S. B., & Caffarella, R. S. (1999). *Learning in Adulthood: A Comprehensive Guide* (2 ed.). San Francisco: Jossey-Bass.
- Merriam, S. B., Caffarella, R. S., & Baumgartner, L. (2007). *Learning in adulthood: A comprehensive guide*. San Francisco, CA: Jossey- Bass.
- Merseth, K. K. (1996). Cases and case methods in teacher education. In J. Sikula, T. J. Buttery & E. Guyton (Eds.), *Handbook of research on teacher education* (2 ed., pp. 722-744). New York: Simon & Schuster Macmillan.
- Merton, R. K., & Kendall, P. L. (1946). The Focused Interview. *American Journal of Sociology*, 51, 541-557.
- Meyer, D. L. (2009). The Poverty of Constructivism. *Educational Philosophy and Theory*, 41(3), 332-341.
- . *The Millennium Development Goals: Bangladesh Progress Report'2012*. (2013). Dhaka, Bangladesh.

- Miller, G. A. (1956). The magical number seven, plus or minus two: some limits on our capacity for processing information. *Psychological Review*, 63, 81-97.
- Milton, M., Rohl, M., & House, H. (2007). Secondary Beginning Teacher's Preparedness to Teach Literacy and Numeracy: A Survey. *Australian Journal of Teacher Education*, 32(2), 1-20. doi: 10.14221/ajte.2007v32n2.4
- Mingers, J. (1997). Multi-Paradigm Multimethodology. In J. Mingers & A. Gill (Eds.), *Multimethodology: Theory and Practice of Combining Management Science Methodologies* (pp. 1-20). Chichester, UK: Wiley.
- Mingers, J. (2001). Combining IS Research Methods: Towards a Pluralist Methodology. *Information Systems Research*, 12(3), 240-259.
- Mingers, J. (2004). Realizing information systems: critical realism as an underpinning philosophy for information systems. *Information and Organization* 14(2), 87-103.
- Ministry of Education, B. (2012). Ministry of Education, Bangladesh. Retrieved 15 May, 2012, from <http://www.moedu.gov.bd/>
- Minkler, M. (2012). *Community Organizing and Community Building for Health and Welfare* (3 ed.). New Brunswick, NJ: Rutgers University Press.
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for integrating technology in teacher knowledge. *Teachers College Record*, 108(6), 1017-1054.
- Mitchell, J. (2003). On-line writing: A link to learning in a teacher education program. *Teaching and Teacher Education*, 19, 127-143.
- Molenda, M. (1991). A philosophical critique of the claims of "constructivism. *Educational Technology*, 31(10), 44-48.
- Molloy, E. K., & Boud, D. (2014). Feedback Models for Learning, Teaching and Performance. In J. M. Spector, M. D. Merrill, J. Elen & M. J. Bishop (Eds.), *Handbook of Research on Educational Communications and Technology* (pp. 413-424). New York: Springer.
- Moon, J. (2004). *A Handbook of Reflective and Experiential Learning: Theory and Practice*. London: Routledge.
- Moon, J. (2008). *Critical Thinking*. London: Routledge.
- Morgan, D. L. (1997). Focus groups as qualitative research. London: Sage.
- Morris, P., & Williamson, J. (Eds.). (2000). *Teacher Education in the Asia-Pacific Region: a comparative study*. London: Falmer Press.
- Morse, J. M. (2003). Principles of mixed methods and multimethod research design. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 189-208). Thousand Oaks, CA: Sage.
- Morse, J. M. (2005). Evolving trends in qualitative research: Advances in mixed-method design. *Qualitative Health Research*, 15(5), 583-585.
- Mortimer, E., & Scott, P. (2003). *Meaning Making in Secondary Science Classrooms*. Maidenhead: Open University Press.
- Morton, P. (2006). Using critical realism to explain strategic information systems planning. 8(1). <http://aisel.aisnet.org/jitta/vol8/iss1/3/>
- Moursund, D. (1998). *Project-based learning in an information technology environment*. Eugene, OR: ISTE.
- Mouza, C. (2009). Does research-based professional development make a difference? A longitudinal investigation of teacher learning in technology integration. *Teachers College Record*, 111(5), 1195-1241.
- Mowrer, R. R., & Klein, S. B. (Eds.). (2001). *Handbook of contemporary learning theories*. Mahwah, New Jersey: Lawrence Erlbaum Associates.

- Mufti, E., & Peace, M. (2012). *Teaching and Learning and the Curriculum: A Critical Introduction*. London: Continuum International Publishing Group.
- Muijs, D. (2011). *Doing quantitative research in education with SPSS* (2 ed.). Thousand Oaks, CA: Sage.
- Murdoch, G. (1994). Language development provision in teacher training curricula. *ELT Journal*, 48(3), 253-259.
- Murphy, E. (1997). Constructivism: From philosophy to practice. Retrieved 6 October, 2012, from <http://www.cdli.ca/~elmurphy/emurphy/cle.html>
- Murphy, E., Dingwall, R., Greatbatch, D., Parker, S., & Watson, P. (1998). Qualitative research methods in health technology assessment: a review of the literature. *Health Technology Assessment*, 2(16).
- Myers, J. L., Well, A. D., & Lorch Jr, R. F. (2010). *Research design and statistical analysis* (3 ed.). Hove: Routledge.
- Nasir, N. S., & Hand, V. (2006). *From the court to the classroom: Managing identities as learners in basketball and classroom mathematics*. Stanford University.
- Nath, J. L. (2005). The Roles of Case Studies in the Educational Field. *International Journal of Case Method Research & Application*, XVII(3), 396-400.
- Nath, S. R., & Chowdhury, A. M. (2009). Education Watch, 2008, State of Primary Education in Bangladesh Progress Made, Challenges Remained. Dhaka, Bangladesh: Campaign for Popular Education (CAMPE).
- Nath, S. R., Haq, M. N., Begum, U. S., Ullah, A., Sattar, M. A., & Chowdhury, A. M. R. (2008). The State of Secondary Education: Quality and Equity Challenges, Education Watch report, 2007. Dhaka, Bangladesh: CAMPE, Bangladesh.
- National Information and Communication Technology (ICT) Policy (2011). Retrieved 23 February, 2013, from <http://www.most.gov.bd/E-Book/NST-policy-2011/>
- Nelson, K. (2007). *Young minds in social worlds*. Cambridge, MA: Harvard University Press.
- Nelson, L. (1999). Collaborative Problem Solving. In C. Reigeluth (Ed.), *Instructional Design Theories and Models: A New Paradigm of Instructional Theory* (pp. 241-268). Mahwah, NJ: Lawrence Earlbaum Associates.
- Nes, K., & Stromstad, M. (2003). Creating structures for inclusive development in teacher education. In K. Nes, M. Stromstad & T. Booth (Eds.), *Developing Inclusive Teacher Education* (pp. 116-129). London: Routledge Falmer.
- Newmann, T., & Wehlage, G. (1995). Successful school restructuring: A report to the public and educators (C. f. R. Schools, Trans.): University of Wisconsin.
- Ng, P. T., Lan, L. K., & Thye, J. T. (2004). Developing reflective teachers: The experience of two modules in the teacher training programme at the National Institute of Education, Singapore. *Asia Pacific Education Review*, 5(2), 200-206.
- Niaz, M. (2008). A rationale for mixed methods (integrative) research programmes in education. *Journal of Philosophy of Education*, 42, 61-68.
- Nichols, M. (2003). A theory for eLearning. *Educational Technology & Society*, 6(2), 1-8.

- Nicholson, S. A., & Bond, N. (2003). Collaborative reflection and professional community building: An analysis of preservice teachers' use of an electronic discussion board. *Journal of Technology and Teacher Education*, 11(2), 259-279.
- Nind, M., & Vinha, H. (2013). *Practical considerations in doing research inclusively and doing it well: Lessons for inclusive researchers* (Vol. 23). Southampton, GB, University of Southampton: National Centre for Research Methods.
- Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-creating Company: How Japanese Companies Create the Dynamics of Innovation*. Oxford: Oxford University Press.
- Norman, D. (1988). *The psychology of everyday things*. London: Basic Books.
- Norman, D. A. (1982). *Learning and memory*. New York: W. H. Freeman.
- Norman, D. A., & Spohrer, J. C. (1996). Learner-Centered Education. *Communications of the ACM*, 39(4), 24-27.
- O'Neil, H. F. J. (1978). *Learning strategies*. New York: Academic Press.
- O'Reilly, K. (2005). *Ethnographic Methods*. London and New York: Routledge.
- Oakley, L. (2004). *Cognitive development*. New York: Routledge.
- ODI. (2010). Bangladesh: Case Study for the MDG Gap Task Force Report. London: Overseas Development Institute.
- OECD. (2009). Education today: The OECD Perspective: Organization for Economic Co-operation and Development.
- Oliver, C. (2012). Critical Realist Grounded Theory: a new approach for social work research. *British Journal of Social Work*, 42(2), 371-387.
- Olivier, D. F., & Hipp, K. K. (2006). Leadership capacity and collective efficacy: Interacting to sustain student learning in a professional learning community. *Journal of School Leadership*, 16, 505-519.
- Oser, F. K., & Baeriswyl, F. J. (2001). Choreographies of teaching: Bridging instruction to learning *AERA's Handbook of Research on Teaching* (4 ed., pp. 1031-1065). American Educational Research Association: Washington.
- Osterman, K. F., & Kottamp, R. B. (2004). *Reflective practice for educators*. Thousand Oaks, CA: Corwin Press.
- Padmala, S., & Pessoa, L. (2008). Affective learning enhances visual detection and responses in primary visual cortex. *The Journal of Neuroscience*, 28, 6202- 6210.
- Palardy, G. J., & Rumberger, R. W. (2008). Teacher effectiveness in first grade: the importance of background qualifications, attitudes, and instructional practices for student learning. *Educational Evaluation and Policy Analysis*, 30(2), 111-140.
- Palincsar, A. S. (1986). The role of dialogue in providing scaffolded instruction. *Educational Psychologist*, 21(1/ 2), 73-98.
- Palloff, R. M., & Pratt, K. (2007). *Building Online Learning Communities* (2 ed.). San Francisco: Jossey-Bass.
- Papert, S. (1997). *The Connected Family, Bridging the Digital Generation Gap*". UK: Long Street Press.
- Paraskeva, F., Bouta, H., & Papagianni, A. (2008). Individual characteristics and computer self-efficacy in secondary education teachers to integrate technology in educational practice. *Computers & Education*, 50(2008), 1084-1091.
- Park, S. H., & Ertmer, P. A. (2007). Implementation of a technology-enhanced problem-based learning curriculum: supporting teachers' effort. *Educational Technology International*, 8(1), 91-100.

- Park, S. H., & Ertmer, P. A. (2008). Examining barriers in technology-enhanced problem-based learning: Using a performance support systems approach. *British Journal of Educational Technology*, 39(4), 631-643.
- Pascu, C. (2008). An Empirical Analysis of the Creation, Use and Adoption of Social Computing Applications *IPTS Exploratory Research on the Socio-economic Impact of Social Computing*. Seville: Spain: JRC, European Commission.
- Pathan, A. S. K., & Hassan, M. M. (2005). E-learning: can it help the education in Bangladesh. Retrieved 5th February, 2013, from <http://irep.iium.edu.my/591/1/EBPAT.pdf>
- Patra, C. C., Alam, M. Z., & Sobhan, M. A. (2010). WiMAX Network Deployment for ICT Based E-learning in Bangladesh: Challenges and Recommendation. *International Journal of Information Systems and Telecommunication Engineering*, 1(1), 39-46.
- Patra, C. C., Patra, C., Alam, M. Z., & Sobhan, M. A. (2012). ICT Structure in Bangladesh for E-learning: Present and Future. *Advances in Mathematical and Computational Methods*, 2(2), 43-49.
- Pavlov, I. (1927). *Conditioned Reflexes: An Investigation into the physiological Activity of the Cerebral Cortex (Translated and Edited by G.V. Anrep.)*. Oxford: Oxford University.
- Pawson, R. (2006). *Evidence-based policy: a realist perspective*. London: Sage.
- Pease, B. (2010). Challenging the dominant paradigm: Social work research, social justice and social change. In S. I., B.-L. K., O. J. & R. R. (Eds.), *The Sage Handbook of Social Work Research* (pp. 98-112). Thousand Oaks CA: Sage Publications.
- Perraton, H. (2000). *Open And Distance Learning In The Developing World*. London: Routledge.
- Peterson, S. E., & Myer, R. A. (1995). Innovative methods: The use of collaborative project-based learning in counsellor education. *Counselor Education and Supervision*, 35, 151-158.
- Petraglia, J. (1998). The Real World on a Short Leash: The (Mis)application of Constructivism to the Design of Educational Technology. *Educational Technology Research and Development*, 46(3), 53-65.
- Petrie, H., Hamilton, F., King, N., & Pavan, P. (2006). *Remote usability evaluations with disabled people*. Paper presented at the Proceedings of CHI 06: ACM Annual Conference on Human Factors in Computing Systems, New York.
- Phelan, A., & Sumsion, J. (Eds.). (2008). *Critical readings in teacher education. Provoking absences*. Rotterdam: Sense Publishers.
- Phillips, P., Wells, J., Ice, P., Curtis, R., & Kennedy, R. (2008). A Case Study of the Relationship Between Socio-Epistemological Teaching Orientations and Instructor Perceptions of Pedagogy in Online Environments. *Elect. J. Integ. Technol. Educ.*, 6(3-27), 3-27.
- Piaget, J. (1923, 26). *The language and thought of the child (M. Warden Trans.)*. New York: Harcourt Brace.
- Picciano, A. (2002). Beyond Student Perceptions: Issues of Interaction, Presence, and Performance in an Online Course. *JALN*, 6(1), 21-40.
- Piccoli, G., Ahmad, R., & Ives, B. (2001). Web-based virtual learning environments: A research framework and a preliminary assessment of effectiveness in basic it skills training. *MIS Quarterly*, 25(4), 401-426.
- Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1991). *A manual for the use of the Motivated Strategies for Learning Questionnaire*

- (MSLQ). Ann Arbor: University of Michigan, National Center for Research to Improve Postsecondary Teaching and Learning.
- Plato. (1999). *The Phaedrus* (Translated by Jowett, B.). Mineola, NY: Dover Publications.
- Polman, J. (2000). Designing Project-Based Science: Connecting Learners Through Guided Inquiry. New York, NY: Teachers College Press.
- Popper, K. R., & Eccles, J. C. (1977). *The self and its brain*. Berlin: SpringerVerlag.
- . Population and Housing Census 2011 (BBS, Trans.). (2012) *Socio-economic and demographic report* (Vol. 4).
- Pouezevara, S., & Khan, R. (2007). Learning Communities enabled by Mobile Technology: A Case Study of School-based, In-service Secondary Teacher Training in Rural Bangladesh *Bangladesh Country Report*. Research Triangle Park, NC: ADB.
- Pratt, D. D. (1993). Andragogy After Twenty-Five Years. In S. B. Merriam (Ed.), *Update on Adult Learning Theory. New Directions for Adult and Continuing Education* (pp. 15-23). San Francisco: Jossey-Bass.
- Prawat, R. S., & Floden, R. E. (1994). Philosophic perspectives on constructivist views of learning. *Educational Psychologist*, 29(1), 37-48.
- Prestridge, S. (2010). ICT professional development for teachers in online forums: Analysing the role of discussion. *Teaching and Teacher Education*, 26, 252-258.
- Primrose, P. L. (1991). *Investment in Manufacturing Technology*. London: Chapman & Hall.
- Protheroe, N. (2004). NCLB dismisses research vital to effective teaching. *The Education Digest*, 69(8), 27-30.
- Putnam, R., & 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.
- QSR. (2014). NVIVO 10 for Windows.
- Quartz, K. (2003). Too angry to leave: supporting new teachers' commitment to transform urban schools. *Journal of teacher education*, 54(2), 99-111.
- Quinn, N., & Holland, D. (1987). *Cultural Models of Language and Thought*. New York: Cambridge University Press.
- Qvortrup, L. (2006). *Knowledge education and learning: E-learning in the knowledge society*. Frederiksberg Denmark: Forlaget Samfundsliteratur Roskilde Universitets Forlag.
- Radulescu, C., & Vessey, I. (2009, 6-9 August). *Methodology in critical realist research: The mediating role of domain specific theory*. Paper presented at the AMCIS 2009 Proceedings. 15th Americas Conference on Information Systems, San Francisco, California, USA.
- Rahimpour, M. (1990). *Attitudes and foreign language learning*. Paper presented at the 9th world conference of applied linguistics, Thessaloniki—Halkidiki, Greece.
- Rahman, A. (1991). English within the national curriculum: A review. *Dhaka University Studies*, 48(1), 47-56.
- Rahman, A., Abdullah, M. N., Haroon, A., & Tooheen, R. B. (2013). ICT Impact on Socio-economic Conditions of Rural Bangladesh. *Journal of World Economic Research*, 2(1), 1-8. doi: 10.11648/j.jwer.20130201.11
- Rahman, S. (2004). *An Overview of ICT and OSS in Bangladesh*. Paper presented at the 3rd Asia Open Source Software Symposium, Hanoi, Vietnam.

- Raihan, M. A., & Han, S. L. (2013). Integrating Web-based e-Learning in TVET to Enhance the Literacy and Socio-economic Condition for Sustainable Development of Bangladesh. *Journal of Education and Practice*, 4(1), 1-12.
- Reason, P., & Bradbury, H. (2008). Introduction. In P. Reason & H. Bradbury (Eds.), *The Sage handbook of action research. Participative inquiry and practice* (2 ed.). London: Sage.
- Reeves, T. C. (1993). Evaluating interactive multimedia. In D. M. Gayeski (Ed.), *Multimedia for learning: Development, application, evaluation* (pp. 97-112). Englewood Cliffs, NJ: Educational Technology Publication.
- Reich, R. (2002). *Bridging liberalism and multiculturalism in American education*. Chicago: Chicago University Press.
- Reiser, J. J., Garing, A. E., & Young, M. E. (1994). Imagery, action, and young children's spatial orientation. It's not being there that counts, it's what one has in mind. *Child Development*, 65, 1262-1278.
- Remenyi, D., Williams, B., Money, A., & Swartz, E. (1998). *Doing Research in Business and Management: An Introduction to Process and Method*. London: Sage.
- Rendas, A., Rosado, P. P., & Gamboa, T. (1999). A computer simulation designed for problem-based learning. *Medical Education*, 33, 47.
- Reushle, S. E. (2011). *Collaborative Community Mentoring Program (C²MP) – Addressing the changing demands of a professional community of learners through engaging digital networks*. Paper presented at the Changing Demands, Changing Directions. Proceedings ascilite Hobart 2011, University of Southern Queensland.
- Rey, G. (1997). *Contemporary Philosophy of Mind*. Oxford: Blackwell.
- Richards, L. (2005). *Handling qualitative data: a practical guide*. London: SAGE.
- Richert, A. E. (1991). Using teacher cases for reflection and enhanced understanding. In A. Liberman & I. Miller (Eds.), *Staff development for education in the 90's* (pp. 113-132). New York: Teachers College Press.
- Ridenour, C. S., & Newman, I. (2008). *Mixed Methods Research: Exploring the Interactive Continuum*. Carbondale, IL: Southern Illinois University Press.
- Rienties, B., Brouwer, N., & Lygo-Baker, S. (2013). The effects of online professional development on higher education teachers' beliefs and intentions towards learning facilitation and technology. *Teaching and Teacher Education*, 29, 122-131.
- Rienties, B., & Townsend, D. (2012). Integrating ICT in business education: using TPACK to reflect on two course redesigns. In P. Van den Bossche, W. H. Gijsselaers & R. G. Miltner (Eds.), *Learning at the Crossroads of Theory and Practice* (Vol. 4, pp. 141-156). Dordrecht: Springer.
- Robson, C. (2002). *Real World Research* (2 ed.). Oxford: Blackwell.
- Rogers, C. R., & Freiberg, H. J. (1994). *Freedom to Learn* (3 ed.). Columbus: Charles E. Merrill Publishing Co.
- Rogers, E. M. (2003). *Diffusion of Innovations* (5 ed.): Free Press.
- Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context*. New York: Oxford University Press.
- Rorty, R. (1979). *Philosophy and the Mirror of Nature*. Princeton, NJ: Princeton University Press.
- Rose, N., & Miller, P. (2008). *Governing the Present: Administering Economic, Social and Personal Life*. Cambridge: Polity.
- Rosenberg, M. J. (2001). *E-learning: Strategies for delivering knowledge in the digital age*. New York: McGraw-Hill.

- Rossett, A. (2001). *The ASTD e-learning handbook: Best practices, strategies, and case studies for an emerging field*. New York: McGraw-Hill.
- Rossi, P. H. (1994). The War between the Quals and the Quants: Is a Lasting Peace Possible? In C. S. Reichardt & S. F. Rallis (Eds.), *The Qualitative-Quantitative Debate: New Perspectives* (pp. 23-36). San Francisco: Jossey-Bass.
- Rumelhart, D., & Norman, D. (1978). Accretion, tuning and restructuring: Three modes of learning. In J. W. Cotton & R. Klatzky (Eds.), *Semantic Factors in Cognition*. Hillsdale: Erlbaum.
- Russell, M., Bebell, D., O'Dwyer, L., & O'Connor, K. (2003). Examining teacher technology use: implications for preservice and inservice teacher preparation. *Journal of Teacher Education*, 54(4), 297-310.
- Ryan, C., & Koschmann, T. (1994). The collaborative learning laboratory: a technology-enriched environment to support problem-based learning. In D. Foster (Ed.), *Recreating the revolution: Proceeding of the National Educational Computing Conference* (pp. 160-166). Eugene: ISTE.
- Sagor, R. (2004). *The action research guidebook: A four-step process for educators and school teams*. Thousand Oaks, CA: Sage.
- Sangra, A., Vlachopoulos, D., & Cabrera, N. (2012). Building an Inclusive Definition of E-Learning: An Approach to the Conceptual Framework. *The International Review of Research in Open and Distance Learning*, 13(2).
- Saunders, M., Lewis, P., & Thornhill, A. (2003). *Research Methods for Business Students* (3 ed.). London: Prentice Hall.
- Savery, J. R., & Duffy, T. M. (2001). Problem based learning: An instructional model and its constructivist framework *Technical Report No. 16-01*. Indiana University: Centre for Research on Learning and Technology.
- Savicevic, D. (2008). Convergence or divergence of ideas on andragogy in different countries. *International Journal of Lifelong Education*, 27(4), 361-378.
- Savin-Baden, M. (2000). Group Dynamics and Disjunction in Problem-based Contexts. In S. Glen & K. Wilkie (Eds.), *Problem-based Learning in Nursing: A New Model for a New Context* (pp. 87-106). London: Macmillan.
- Savin-Baden, M., & Wilkie, K. (2006). Possibilities and challenges. In M. SavinBaden (Ed.), *Problem-based learning online*. Buckingham, England: Open Univeristy Press.
- Saxe, G. B. (1999). Cognition, development, and cultural practices. *New Directions for Child and Adolescent Development*, 83, 19-35.
- Sayer, A. (1992). *Method in social science, a realist approach* (2 ed.). London: Routledge.
- Sayer, A. (2000). *Realism and Social Science*. London: Sage.
- Saywell, D., & Cotton, A. (1999). *Spreading the Word: Practical Guidelines for Research Dissemination Strategies*. Loughborough, UK: WEDC.
- Scardamalia, M., & Bereiter, C. (2006). Knowledge building: Theory, pedagogy, and technology. In K. Sawyer (Ed.), *Cambridge Handbook of the Learning Sciences* (pp. 97-118). New York: Cambridge University Press.
- Schapiro, S. A. (2003). From andragogy to collaborative, critical pedagogy: Learning for academic, personal, and social empowerment in a distance-learning, Ph.D. program. *Journal of Transformative Education*, 1(2), 150-166.

- Schiefele, U. (2009). Situational and individual interest. In K. R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 197-222). New York: Routledge.
- Schitteck, M., Mattheos, N., Lyon, H. C., & Attstrom, R. (2001). Computer assisted learning. A Review. *Eur J Dent Educ*, 5, 93-100.
- Schon, D. A. (1987). *Educating the reflective practitioner*. San Francisco: Jossey-Bass.
- Schumacher, R., & Czerwinski, M. (1992). Mental models and the acquisition of expert knowledge. In R. Hoffman (Ed.), *The psychology of expertise*. New York: Springer-Verlag.
- Schumann, J. (1978). The acculturation model for second-language acquisition. In R. Gingras (Ed.), *Second language acquisition and foreign language teaching*. Arlington: Centre for Applied Linguistics.
- Schunk, D. H. (2012). *Learning theories: an educational perspective* (6 ed.). Boston: Pearson.
- Schwandt, T. A. (2003). Three epistemological stances for qualitative inquiry: Interpretativism, hermeneutics and social constructionism. In N. Denzin & Y. Lincoln (Eds.), *The Landscape of Qualitative Research: Theories and issues* (pp. 292-331). Thousand Oaks, CA: Sage.
- Scott, D. (2000). *Realism and educational research: new perspectives and possibilities* London: Routledge Falmer.
- Scott, D., & Usher, R. (2011). *Researching Education: Data Methods and Theory in Educational Enquiry*. London: Continuum.
- Scrimshaw, P. (1997). Computers and teacher's role. In B. Somekh & N. Davis (Eds.), *Using Information Technology effectively in Teaching and Learning: Studies in Pre-Service and In-Service Teacher Education*. New York: Routledge.
- SDNP. (2010). Status of Information Technology in Bangladesh: SDNP Bangladesh Review. Retrieved 16 August 2013, from <http://www.sdnbd.org/sdi/issues/IT-computer/article/itreview-sdnbd.htm>
- Seddon, K., & Postlethwaite, K. (2007). Creating and testing a model for tutors and participants to support the collaborative construction of knowledge online. *Technology, Pedagogy and Education*, 16, 177-198.
- Shaheen, R., Walsh, C., Power, T., & Burton, S. (2013). *Assessing the impact of large-scale teacher professional development (TPD) in Bangladesh: English in Action (EIA)*. Paper presented at the American Educational Research Association, San Francisco, California.
- Sharmin, N., & Roy, G. (2011). Computer-aided Learning and Mentoring for Improvement of Teaching Quality: An Assessment of BRAC Interventions. Dhaka: Research and Evaluation Division, BRAC.
- Shaw, I. F., & Lunt, N. (2012). Constructing Practitioner Research. *Social Work Research*, 36(3), 197-208. doi: 10.1093/swr/svs013
- Shipman, S., & Shipman, V. C. (Eds.). (1985). *Cognitive Styles: Some Conceptual, Methodological, and Applied Issues*. Washington DC: American Educational Research Association.
- Shohel, M. C., & Banks, F. (2012). School-based teachers' professional development through technology enhanced learning in Bangladesh. *Teacher Development: An international journal of teachers' professional development*, 16(1), 25-42.
- Shohel, M. M. C., & Banks, F. (2010). Teachers' professional development through the English in Action secondary teaching and learning

- programme in Bangladesh: Experience from the UCEP schools. *Procedia Social and Behavioral Sciences*, 2, 5483-5494.
- Shohel, M. M. C., & Shrestha, P. (2010, 14-18 June). *Mobile technology in communicative language teaching (CLT) practice in Bangladesh: Experience from the UCEP schools*. Paper presented at the XIV Congress on Comparative Education Societies, Istanbul, Turkey.
- Shor, I., & Freire, P. (1987). What is the 'Dialogical Method' of teaching? *Journal of education*, 169(3), 11-31.
- Shuell, T. J. (1986). Cognitive conceptions of learning. *Review of Educational Research*, 56, 411-436.
- Shulman, H., & Colbert, J. A. (Eds.). (1988). *The intern teacher casebook. Eugene, OR: ERIC Clearinghouse on Educational Management, Educational Research, and Development*. ERIC Clearinghouse on Teacher Education: Washington, DC.
- Shulman, L. (1992). Introduction. In J. Shulman (Ed.), *Case methods in teacher education* (pp. xiii-xvii). New York: Teachers College Press.
- Shulman, L. S. (1986). Those who understand: knowledge growth in teaching. *Educational Researcher*, 15, 4-14.
- Shulman, L. S. (1987). Knowledge and Teaching: Foundations of the New Reform. *Harvard Educational Review*, 57(1), 1-22.
- Shulman, L. S., & Shulman, J. H. (2004). How and what teachers learn: Shifting perspective. *Journal of Curriculum Studies*, 36(2), 256-271.
- Shulman, L. S., & Sykes, G. (Eds.). (1983). *Handbook of teaching and policy*. New York: Longman.
- Sieber, J., O'Neil, H. F., & Tobias, S. (1977). *Anxiety, Learning and Instruction*. Hillsdale, NJ: Erlbaum.
- Siemens, G. (2004). Connectivism: A learning theory for the digital age. <http://www.elearnspace.org/Articles/connectivism.htm>
- Siemens, G. (2006a). *Connectivism: learning and knowledge today*. Paper presented at the Education.au Global Summit 2006: Technology connected futures, Sydney, Australia.
- Siemens, G. (2006b). Connectivism: Learning theory or pastime of the self-amused? http://www.elearnspace.org/Articles/connectivism_self-amused.htm
- Siemens, G. (2006c). *Knowing knowledge*. Vancouver, BC: Lulu.
- Silverman, R., Welty, W. M., & Lyon, S. (1992). *Case studies for teacher problem solving*. New York: McGraw-Hill.
- Simina, V., & Hamel, M. J. (2005). CASLA through a constructivist perspective: WebQuest in project-driven language learning. *Cambridge Journals*, 17(2), 217-228.
- Simpson, M. (2006). Field experience in distance delivered initial teacher education programmes. *Journal of Technology and Teacher Education*, 14(2), 241-254.
- Sims, R. (1999, 5-8 December). *The interactive condundrum: Interactive constructs and learning theory*. Paper presented at the Ascilite 99: Responding to Diversity. Proceedings from the 16th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE), Brisbane.
- Skinner, B. F. (1938). *The behavior of organisms: An experimental analysis*. New York: Appleton-Century.
- Skinner, B. F. (1968). *The technology of teaching*. New York: Appleton-Century-Crofts.

- Smith, A. (2009). *Teaching Students in Inclusive Settings*. Toronto: Pearson Publishing.
- Smith, M. (2006). Overcoming Theory-Practice Inconsistencies: Critical Realism and Information Systems Research. *Information and organization*, 16(3), 191-211.
- Smith, P. L., & Ragan, T. J. (2005). *Instructional Design* (3 ed.). Danvers, MA: Wiley.
- Snowmn, J., McCown, R., & Biehler, R. (2012). *Psychology applied to teaching* (13 ed.). Belmont, CA: Wadsworth.
- Sockman, B., & Sharma, P. (2008). Struggling toward a transformative model of instruction: It's not so easy! *Teaching and Teacher Education*, 24(4), 1070-1082.
- Sorenson, A. B. (1992). Action research in work life. *Norwegian Journal of Social Research*, 33, 213-230.
- Spiro, R. J., Coulson, R. L., Feltovich, P. J., & Anderson, D. (1988). *Cognitive flexibility theory: Advanced knowledge acquisition in ill-structured domains*. Paper presented at the Proceedings of the 10th Annual Conference of the Cognitive Science Society, Hillsdale.
- Sridhar, K., & Sridhar, V. (2007). Telecommunications infrastructure and economic growth. Evidence from developing countries. *Applied Econometrics and International Development*, 7(2), 91-116.
- Stahl, G. (2005). Group cognition in computer-assisted collaborative learning. *Journal of Computer Assisted Learning*, 21, 79-90.
- Steedman, P. (2000). On the relations between seeing, interpreting and knowing. In F. Steier (Ed.), *Research and Reflexivity* (pp. 53-62). London: Sage.
- Stein, M. K., & Wang, M. C. (1988). Teacher development and school improvement: The process of teacher change. *Teaching and Teacher Education*, 4, 171-187.
- Sternberg, R. J. (Ed.). (1999). *Handbook of creativity*. New York, NY: Cambridge University Press.
- Stewart, D. W., Shamdasani, P. n., & Rook, D. W. (2007). *Focus groups: Theory and practice* (2 ed.). Thousand Oaks, CA: Sage.
- Stigler, J. W., & Hiebert, J. (1999). *The Teaching Gap: Best Ideas from the World's Teachers for Improving Education in the Classroom*. New York: The Free Press.
- Stones, R. (1996). *Sociological Reasoning: Towards A Past-Modern Sociology*. Macmillan: Houndmills, Basingstoke.
- Storch, N. (2005). Collaborative writing: Product, process, and students' reflections. *Journal of Second Language Writing*, 14, 153-173.
- Strong, K., & Hutchins, H. (2009). Connectivism: a theory for learning in a world of growing complexity. Impact: Journal of Applied Research in Workplace E-learning. *Journal of Applied Research in Workplace E-learning*, 1(1), 53-67.
- Sultana, A., & Sultana, I. (2010). *E-School: A Web-Service Oriented Resource Based E-learning System*. Paper presented at the International Conference on Networking and Information Technology, Manila, Philippines.
- Swailles, S., & McIntyre-Bhatty, T. (2002). The "Belbin" team role inventory: Reinterpreting reliability estimates. *Journal of Managerial Psychology*, 17(6), 529-536.

- Sykes, G., & Bird, T. (1992). Teacher education and the case idea. In G. Grant (Ed.), *Review of research in education* (Vol. 18, pp. 457-521). Washington, DC: American Educational Research Association.
- Szyperski, C., & Ventre, G. (1993). A characterization of multi-part interactive multimedia applications. Berkeley, CA: International computer science institute.
- Tapscott, D., & Williams, A. D. (2006). *Wikinomics: How Mass Collaboration Changes Everything*. New York: Penguin Group.
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53-55.
- Taylor, C., & S., W. (2001). Knowledge, truth and reflexivity. *Journal of Social Work*, 1(1), 37-59.
- Teddlie, C., & Tashakkori, A. (2009). *Foundations of Mixed Methods Research*. Thousand Oaks, CA: Sage Publications.
- Thomas, R. M. (2003). *Blending qualitative and quantitative research methods in theses and dissertations*. Thousand Oaks, CA: Corwin.
- Thomdike, E. L. (1914). Units and scales for measuring educational products. *Indiana University Bulletin*, 72(10), 128-141.
- Thompson, P. (2013). Learner-centred education and 'cultural translation'. *International Journal of Educational Development*, 33, 48-58.
- Thornton, H. (2006). Teachers Talking: the role of collaboration in secondary schools in Bangladesh. *British Association for International and Comparative Education*, 36(2), 181-196.
- Timperley, H. (2011). *Realizing the Power of Professional Learning*. Berkshire: Open University Press/McGraw-Hill Education.
- Tinio, V. L. (2002). ICT in Education: UN Development Programme.
- Tomei, L. A. (2003). *Challenges of Teaching with Technology Across the Curriculum: Issues and Solutions*. Hershey PA and London: IRM Press.
- Tondeur, J., Keer, H. v., Braak, J. v., & Valcke, M. (2008). ICT integration in the classroom: Challenging the potential of a school policy. *Computers & Education*, 51, 212-223.
- Torraco, R. J. (1997). Theory Building Research Methods. In R. A. Swanson & E. F. H. III (Eds.), *Human Resource Development Research Handbook*. San Francisco: Berrett-Koehler.
- Tu, C. H., & Mclsaac, M. (2002). The relationship of social presence and interaction in online classes. *American Journal of Distance Education*, 16(3), 131-150.
- Tufte, E. R. (2001). *The Visual Display of Quantitative Information*. Connecticut: Graphic Press.
- Tweedell, C. B. (2000). *A theory of adult learning and implications for practice*. Paper presented at the Midwest Educational Research Association Annual Meeting, Chicago, IL.
- Uden-van, J. M., Ritzen, H., & Pieters, J. M. (2013). I think I can engage my students. Teachers' perceptions of student engagement and their beliefs about being a teacher. *Teaching and teacher education*, 32, 43-54.
- UNESCAP. (2013, 15 August 2013). Annual Data. from <http://www.unescap.org/stat/data/statdb/DataExplorer.aspx>
- UNESCO. (1997). *Adult Education in a Polarizing World*. Paris: UNESCO.
- UNESCO. (2004). Education for all: the quality imperative. France: United Nations Educational, Scientific and Cultural Organization.
- UNESCO. (2005). *Information and communication technologies in schools: A handbook for teachers*. Paris: UNESCO.

- UNESCO. (2006). Teachers and Educational Quality: Monitoring Global Needs for 2015. Montreal: UNESCO Institute for Statistics.
- UNESCO. (2008). ICT Competency Standards for Teachers: Policy Framework. UK: United Nations Educational, Scientific and Cultural Organization.
- UNESCO. (2012a). UNESCO Country Programming Document for Bangladesh 2012-2016. Dhaka, Bangladesh.
- UNESCO. (2012b). UNESCO Strategy on Teachers (2012-2015). Retrieved 3rd November, 2012, from <http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-all/advocacy/global-action-week/gaw-2013/unesco-publications/>
- Urry, J. (2003). Social networks, travel, and talk. *British Journal of Sociology*, 54, 155-175.
- Use of Technology in Teaching and Learning. (2013). Retrieved 2nd March, 2013, from <http://www.ed.gov/oii-news/use-technology-teaching-and-learning>
- Usher, R., Bryant, I., & Johnston, R. (1997). *Adult Education and the Postmodern Challenge: Learning*. London: Routledge.
- Vagias, W. M. (2006). *Likert-type scale response anchors*. South Carolina: Clemson International Institute for Tourism & Research Development, Department of Parks, Recreation and Tourism Management.
- Valverde, L. (1982). The self-evolving supervisor. In T. Sergiovanni (Ed.), *Supervision of teaching* (pp. 81-89). Alexandria: Association for Supervision and Curriculum Development.
- Van Patten, J., Chao, C. I., & Reigeluth, C. M. (1986). A review of strategies for sequencing and synthesizing instruction. *Review of Educational Research*, 56(4), 437-471.
- Vanderback, R. (2005). Masculinities and fieldwork: Widening the discussion. *Gender, Place and Culture*, 12(4), 387-402.
- VanGundy, A. B. (1987). *Creative Problem Solving*. New York: Quorum.
- Vaujany, D. (2008). Capturing reflexivity modes in IS: a critical realist approach. *Information and Organization*, 18(1), 51-72.
- Vayda, A. P., McCay, B. J., & Eghenter, C. (1991). Concepts of process in social science explanations. *Philosophy of the Social Sciences*, 21(3), 318-331.
- Veenman, S. (1984). Perceived problems of beginning teachers. *Review of Educational research*, 54(2), 143-178.
- Venkatesh, V., Brown, S. A., & Bala, H. (2013). Bridging the qualitative-quantitative divide: Guidelines for conducting mixed-methods research in information systems. *MIS Quarterly*, 37(1), 21-54.
- Vermunt, J. D., & Endedijk, M. D. (2011). Patterns in teacher learning in different phases of the professional career. *Learning and Individual Differences*, 21, 294-302. doi: 10.1016/j.lindif.2010.11.019
- Vermunt, J. D. H. M. (1992). *Learning styles and guidance of learning processes in higher education* Amsterdam: Lisse Swets Zeitlinger.
- Vescio, V., Ross, D., & Adams, A. (2008). A review of research on the impact of professional learning communities on teaching practice and student learning. *Teaching and Teacher Education*, 24(1), 80-91.
- Vithal, R., Christiansen, I., & Skovsmose, O. (1995). Project work in university mathematics education: A Danish experience. *Educational Studies in Mathematics*, 29(2), 199-223.

- Volman, M. (2005). A variety of roles for a new type of teacher Educational technology and the teaching profession. *Teaching and Teacher Education*, 21(1), 15-31.
- Voogt, J., Tilya, F., & van den Akker, J. (2009). Science teacher learning for MBL-supported student-centered science education in the context of secondary education in Tanzania. *Journal of Science and education and technology*, 18, 429-428.
- Voss, K. E., Stem, D. E. J., & Fotopoulos, S. (2000). A comment on the relationship between coefficient alpha and scale characteristics. *Marketing Letters*, 11(2), 177-191.
- Vrasidas, C., & Mclsaac, M. (2000). Principles of Pedagogy and Evaluation for Web-based Learning. *Education Media International*, 37(2), 105-111.
- Vrasidas, C., & Mclsaac, M. (2001). Integrating technology in teaching and teacher education: Implications for policy and curriculum reform. *Educational Media International*, 38(2/3), 127-132.
- Vygotsky, L. (1978). *Mind in Society*. Cambridge Mass: Harvard University Press.
- Vygotsky, L. (1986). *Thought and language*. Cambridge: MIT.
- Vygotsky, L. (1987). Thinking and speech: The collected works of L.S. Vygotsky. In R. W. Rieber & A. S. Carton (Eds.), *Problems of general psychology* (Vol. 1, pp. 39-285). New York: Plenum.
- Waitoller, F. R., & Kozleski, E. B. (2013). Working in boundary practices: Identity development and learning in partnerships for inclusive education. *Teaching and Teacher Education*, 31, 35-45.
- Walker, A., Recker, M., Robertshaw, M. B., Olsen, J., Leary, H., Ye, L., & Sellers, L. (2011). Integrating Technology and Problem-based Learning: A Mixed Methods Study of Two Teacher Professional Development Designs. *The Interdisciplinary Journal of Problem-Based Learning*, 5(2), 70-94.
- Walker, J., & Almond, P. (2010). *Interpreting statistical findings: a guide for health professionals and students*. Maidenhead: Open University Press.
- Walsh, C. S., Power, T., Khatoon, M., Biswas, S. K., Paul, A. K., Sarker, B. C., & Griffiths. (2013). The 'trainer in your pocket': mobile phones within a teacher continuing professional development program in Bangladesh. *Professional Development in Education*, 39(2), 186-200. doi: 10.1080/19415257.2013.766232
- Ward, J., Huckstep, B., & Tsakanikos, E. (2006). Sound-color synaesthesia: to what extent does it use cross-modal mechanisms common to us all? *Cortex*, 42, 264-280.
- Ward, R., River, L., & Fenge, L. (2008). Not hidden, silent or invisible: A comparison of two participative projects involving older lesbians and gay men in the UK. *Journal of Gay and Lesbian Social Services*, 20(1/ 2), 147-165.
- Warwick, P., Hennessy, S., & Mercer, N. (2011). Promoting teaching and school development through co-enquiry: Developing interactive whiteboard use in a 'dialogic classroom'. *Teachers and Teaching: Theory and Practice*, 17(3), 303-324.
- Wegerif, R. (2007). *Dialogic education and technology: Expanding the space of learning*. New York: Springer.
- Weigel, V. (2002). *Deep learning for a digital age: Technology's untapped potential to enrich higher education*. New York: Jossey-Bass.
- Wells, G. (1999). *Dialogic inquiry: Towards a sociocultural practice and theory of education*. Cambridge: Cambridge University Press.
- Wertsch, J. V. (1998). *Mind as action*. New York: Oxford University Press.

- Wetcher-Hendricks, D. (2011). *Analyzing quantitative data: an introduction for social researchers*. Hoboken, N.J.: John Wiley & Sons.
- Whipp, J. L. (2003). Field experiences in Urban schools scaffolding critical reflection in online discussions: Helping prospective teachers think deeply about field experiences in Urban schools. *Journal of Teacher Education*, 54, 321-333.
- White, H. (2001). A PBL Course that Uses Research Articles As Problems. In B. Duch, S. Groh & D. Allen (Eds.), *The Power of Problem-Based Learning* (pp. 131-140). New York: Stylus Publishing.
- Whitehead, A. N. (1967). *The Aims of Education and other Essays*. New York: Free Press.
- Wild, M. (1998). Creating a role for performance support systems in teacher education. *Technology, Pedagogy and Education*, 7(2), 269-295.
- Wilkinson, S. (2004). Focus group research. In D. Silverman (Ed.), *Qualitative research: Theory, method, and practice* (pp. 177-199). Thousand Oaks, CA: Sage.
- Williams, D., Coles, L., Wilson, K., Richardson, A., & Tuson, J. (2000). Teachers and ICT: current use and future needs. *British Journal of Educational Technology*, 31(4), 307-320.
- Williams, D. C., Hemstreet, S., Liu, M., & Smith, V. D. (1998). *Examining how middle schools students use problem-based learning software*. Paper presented at the ED-MEDIA/EDTelecom 98 World Conference on Educational Multimedia and Hypermedia, Freiburg, Germany.
- Wilson, B., Jonassen, D., & Cole, P. (1993). Cognitive approaches to instructional design. Retrieved 1st January, 2012, from <http://www.cudenver.edu/~bwilson/training.html>
- Wilson, E. K. (2006). The impact of an alternative model of student teacher supervision: Views of the participants. *Teaching and Teacher Education*, 22, 22-31.
- Wood, D., Bruner, J., & Ross, G. (1976). The role of tutoring in problem-solving. *Journal of Child Psychology and Psychiatry*, 17, 89-100.
- Woolfolk, A. E. (1993). *Educational psychology*. Boston: Allyn and Bacon.
- Worden, J. W. (1991). *Grief counselling and grief therapy: a handbook for the mental health professional*. London: Routledge.
- Worthy, J. (2000). Conducting research on topics of student interest. *Reading Teacher*, 54(3), 298-299.
- Yin, R. K. (1994). *Case study research: design and methods* (2 ed.). Thousand Oaks, CA: Sage.
- Young, R., & Collin, A. (2004). Introduction: constructivism and social constructionism in the career field. *Journal of Vocational Behaviour*, 64(3), 373-388.
- Zeichner, K., & Tabachnik, B. R. (1981). Are the effects of university teacher education washed out by school experiences? *Journal of Teacher Education*, 32, 7-11.
- Ziegenfuss, D. H., & Lawler, P. (2008). Collaborative course design: changing the process, acknowledging the context, and implications for academic development. *The International Journal for Academic Development*, 13(3), 151-160.
- Zwaan, R. A. (2004). The immersed experiencer: toward an embodied theory of language comprehension. *The Psychology of Learning and Motivation*, 43, 35-62.