Breaking Barriers:

Exploring Digital Practices of Teacher Educators in Nepal

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CERTIFICATE OF ORIGINAL AUTHORSHIP

I, Suman Laudari, declare that this thesis is submitted in fulfilment of the requirements for the award of PhD, in the School of Education, Faculty of Arts and Social Sciences at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

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Dedicated to my **PARENTS**. Thank you for the seed of inspiration.

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ABSTRACT

This thesis presents a qualitative case study of digital practices of teacher educators at two Nepalese universities. In doing this, the study examined factors that facilitated or inhibited teacher educators' technology use, how they gained the digital competencies required to use technologies and how such learning supported their teaching.

The study, which was conducted between the end of 2016 and mid 2017, is primarily informed by semi-structured interview data collected with 25 teacher educators teaching BEd and MEd courses. Additional data were collected using focus group discussions with four groups of pre-service teachers and interviews with three policymakers.

To uncover the digital practices of teacher educators, Activity Theory was used as an analytical framework. The study used the conceptual tools that Activity Theory offers heuristically to anchor the discussions and drew on the literature on teacher educators' digital competencies, professional learning and use of technologies for analysis.

The analysis of the data revealed that even when there were elements at the institutional or broader level that were not supportive of technology use, teacher educators sought learning opportunities inside and outside the teacher education institutes and engaged in those to enhance their digital competencies. Through the development of their digital competencies, teacher educators were able to implement the use of digital tools into their practice. Whilst the in-class use of digital technologies was not sophisticated, teacher educators used technologies outside the classroom to keep the classroom discussion ongoing and to engage students in learning activities. The findings of this study demonstrate that significant transformations occurred in their pedagogical practices.

The significance of this study is that it contributes to an understanding of teacher educators' digital practices - why teacher educators use technologies; how they enhance their digital competencies; how their learning supports technology use in their curricular practices; and, what changes those practices can bring. Other areas to which this study contributes are the theoretical implications of using Activity Theory to study digital practices and policy implications concerning technology use in teacher education.

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GLOSSARY

Affiliated campus: Colleges affiliated to a particular university to teach their courses. Affiliated colleges can be privately or community-owned. They have their own administration and manage the financial resources primarily on their own.

Camtasia: Camtasia is a computer software suite which can be used for creating video tutorials by capturing screencast, or by using the feature to record Microsoft PowerPoint.

Constituent campus: Colleges run under a university as the teaching campuses. The campus can have their own faculties and departments but teach the curriculum and syllabus prescribed by the university. Each constituent unit has its own chief executive officer to whom broad powers are delegated by the governing board for the organisation and operation of the constituent unit.

Digital competencies: This term has been defined as knowledge, skills and attitude required to use digital tools in pedagogical activities.

Digital practices: This is an overarching theme of this thesis. It is defined as-teacher educators' ICT-related behaviour. In this thesis, it comprises of digital competencies, technology-related professional learning, use of digital tools in teacher education activities and different factors that inhibit or sustain such practices.

Digital technologies: A key element of focus in this study is digital technology. It is a broad term as it can include various technologies that use and process digital information such as mobile phones, internet, computer or artificial intelligence. Unless otherwise stated, when digital technology is referred to in this study, it relates to the technologies that are used in educational contexts, and they can include different devices/tools such as computer/laptop, smartphones and associated programmes and

applications, multimedia tools and programmes, and web-based technologies. A list of what tools teacher educators used is discussed in Chapter 7 of this study. Other terms that are used to synonymously to digital technology are information communication technologies (ICTs), educational technologies (EdTech).

Facebook Group: Place for small group communication, and for people to share their common interests and express their opinion on Facebook. The page has different privacy settings, which help to make it private or public.

Google-Group: A Google-provided service that offers a platform for group discussions and a gateway for newsgroups.

Google Sites: It is a service offered by Google. It is a wiki and Web page-creation tool freely available for anyone to be able to create simple websites to support and promote collaborations.

Kahoot: It is a game-based learning platform freely available to teachers to create quizzes in different formats.

Moodle: Moodle is a free and open-source virtual learning management system. A similar virtual learning platform is known as Blackboard.

NiceNet: It is an online educational course management system, also known as Internet Classroom Assistant (ICA). It is run by a non-profit organisation and is one of the last sets of such tools available at no cost to instructor-developers.

Padlet: It is an application to create an online bulletin board that teachers can use to display information for any topic.

LIST OF ABBREVIATIONS

AT	Activity Theory
CHAT	Cultural Historical Activity Theory
DC	digital competencies
DoE	Department of Education Nepal
ICT	information communication technology
ITU	International Telecommunication Union
MoEN	Ministry of Education Nepal
OLE	Open Learning Exchange Nepal
OLPC	One Laptop Per Child
PD	professional development
PL	professional learning
PLN	professional learning network
PSTs	pre-service teachers
TEIs	teacher education institutes
TEs	teacher educators
UGC	University Grants Commission
UNDESA	United Nations Department of Economic and Social Affairs

Chapter 1 – Introduction to the Research

1.1 Background

Digital technologies have permeated all aspects of human lives. Because they have influenced the lives of people and their daily activities, using these tools for educational purposes has become a common expectation in society (McGarr & McDonagh, 2019). As well, because a positive overtone is associated with digital technologies, as they are considered to have potential to transform educational practices, there is a growing trend to make technologies a part of educational activities (Ilomäki, Paavola, Lakkala, & Kantosalo, 2016). International reports argue that when students are taught with and about technology use, they can then contribute to their society's economic progress and compete with the global workforce (e.g. Government of Nepal Ministry of Education, 2013; Organisation for Economic Co-operation and Development, 2018). As a consequence, there are implicit and explicit expectations and responsibilities for teachers and lecturers to use ICT tools in educational activities.

Whilst teachers are expected to use digital technologies to enhance teaching/learning experiences, they are also expected to support students' safe, ethical and responsible use of digital tools when solving day-to-day problems (e.g. Ferrari, 2012). This implies that teachers should be digitally competent to use the technologies in educational practices.

Teachers can become digitally proficient only when they receive sufficient opportunities to use technology and to learn and enhance their digital skills in their own education during pre-service teacher (PST) education courses and in-service professional learning/development activities. Of these, PST education is the first place where formal tertiary educational training begins. Thus, PSTs' experiences during

teacher training influence their future use of digital technologies (Jegede, 2009; Tondeur et al., 2012). Also of significance are teacher educators' (TEs) personal digital practices – how, when and why they use digital technologies and how their own ICT-related training influences their practice in PST education.

As TEs are considered to be role models in enhancing PSTs' digital competencies (Tondeur, 2018), their use of technology and how they engage students in discussions on the pedagogical and theoretical underpinnings of technology use influence future teachers' use of digital technologies (Krumsvik, 2014). Therefore, to educate future teachers how technologies can be used in educational activities, TEs should have digital competencies (Jones, Albion, & Heffernan, 2016).

TEs are said to be second-order teachers (Murray & Male, 2005) as they primarily educate future teachers rather than school students (Rubadeau, 2018; Uerz, Volman, & Kral, 2018). An implication of this is that TEs' digital competencies – defined as the skills, attitude and knowledge required to use digital technologies in pedagogical practices (Instefjord & Munthe, 2017) – are different from those of other professionals because, in addition to infusing technologies in their practice, they are required to discuss the didactic underpinnings of their use of technologies (Krumsvik, 2014). Only when TEs consciously use digital tools and provide a rationale for this, can the PSTs realise the theoretical and pedagogical principles behind the TEs' ICT practices. However, TEs' digital practices, which constitute their technology use, related competencies and their own technology-related professional learning, are not well understood and researched, despite studies showing that TEs do not have the required competencies to demonstrate technology use in classrooms (Borthwick & Hansen, 2017; Mouza, 2016; Wetzel, Buss, Foulger, & Lindsey, 2014). To that end, this

study attempts to shed light on these areas with a focus on teacher educators (TEs) in Nepal. The next section describes the context of the study.

1.2 Context

In the context of Nepal, the discourse on ICT in education has appeared in policy documents, such as School Sector Reform Plan (Government of Nepal Ministry of Education, 2009), and National Curriculum Framework (Government of Nepal Ministry of Education, 2005) for at least a decade. However, it is only recently that concrete steps have been taken to infuse ICT into pedagogy and content with the introduction and implementation of ICT in the Education Master Plan (2013-2017) (Government of Nepal Ministry of Education, 2013) and School Sector Development Plan (2016-2023) (Government of Nepal Ministry of Education, 2016b). However, with Nepal's ICT-related development still in its infancy (ITU, 2017; UNDESA, 2016), the country's integration efforts are affected by barriers associated with funding, resources, training and technology infrastructure (Koirala et al., 2016).

Nonetheless, recent trends in the evolution of digital technologies are facilitating technology use in education in Nepal. For instance, Nepal has experienced unprecedented growth of mobile phone ownership and access to the internet, with the number of mobile phones in Nepal in 2018 outnumbering the total population of the country (Nepal Telecommunication Authority, 2019; OnlineKhabar, 2018). Likewise, there has been a surge in internet use, with more than 15 million active users of the internet across Nepal (Kafle, 2018). Of these users, 90 per cent access the internet using their mobile phones (Nepal Telecommunication Authority, 2019).

Whilst these facts are encouraging, when it comes to using technology meaningfully in Nepalese classrooms, teachers are not well prepared (Koirala et al., 2016). One reason for the lack of skills is that teachers and TEs do not receive enough

training in technology use, and they do not have the experience of technology use in their own education.

As an ICT enthusiast English as a foreign language (EFL) teacher and teacher educator, my experience informs me that teachers and pre-service teachers (PSTs) experience minimal use of technology in teaching and learning in teacher education courses. For example, as a student in a Bachelor of Education (BEd) course between 2003 and 2007 at a constituent campus of Tribhuvan University, I never experienced the use of digital technology in teaching and learning. Whilst there were no information and communications technology (ICT), related resources and infrastructure at my campus, I did not have a reason for personal use either – even if I wanted to use one, I did not have personal access to a computer and the internet because personal computers and internet services were not generally affordable and accessible.

During my Master of Education (MEd) degree at a Kathmandu University in Nepal, however, I experienced the use of technology, but it was limited to the use of PowerPoint, which the TEs primarily used to project lecture notes. When I reflect on my experience now, I realise that most of my TEs received very little support and professional learning/development opportunities to use digital technologies meaningfully. Whilst there was very limited support from the institution, we expected all our TEs to use technology, as did the university management – at least the use of PowerPoint. Therefore, when they used digital tools, they were required to overcome the barriers resulting from the lack of knowledge and skills.

In my brief career as an EFL teacher educator in Nepal, I used a range of digital tools, such as social networking sites, blogs, email and Microsoft Office programmes in my practice. I was not mandated by the teacher education institute (TEI) to use technologies, nor did I receive any training on their use. I developed most of my skills

on my own, primarily through self-guided learning, and I used the technologies at my disposal because I wanted to enhance the teaching, learning experiences. In doing this, as a TE, I had to break through the barriers associated with infrastructure and access that stemmed from the lack of institutional readiness and the economic realities of the TEIs.

At training and formal or informal gatherings, I met other Nepalese TEs who were interested in technology use in EFL practices. Through interactions with them, I realised that, like me, they also had very limited experience of technology use in their own education, and there was little support at the TEIs. Therefore, they had to overcome different barriers associated with access, resources, infrastructure and institutional support for technology uptake in their practice. Nonetheless, they explored approaches to integrate technologies to facilitate their practices because they believed that ICT use in teaching allowed them to engage in activities that were otherwise not possible. This seeded in me an interest to undertake this doctoral study and to explore Nepalese TEs' digital practices - primarily EFL TEs' ICT-related learning, digital technology use in classrooms, and the underpinning factors that influence TEs' digital practices.

1.3 Research Objectives

In the process of defining the objectives of this research, the following three underpinning goals emerged, which were realised as a result of the analyses of the context of the research and the review of literature on technology use by TEs. The three goals of this study are as follows:

1. Investigate the activities that Nepalese EFL TEs undertake to enhance their digital competencies, which include digital knowledge, skills and attitude, and with whom they develop such abilities.

2. Explore how their digital competencies support their ICT-related teaching practice and the objectives they achieve by integrating technology into their practices.

3. Discuss how external and internal factors underpin and influence TEs' digital practices.

1.4 Research Questions

This study was guided by the overarching objectives stated in the previous section. To address these objectives, I proposed the following three research questions.

1. How do different factors influence the digital practices of Nepalese EFL teacher educators?
2. With whom and in what ways do they develop their digital competencies?
3. How does such learning enable the emergence of changes in TE practices?

As shall be discussed in Chapters 3 and 4 in greater detail, this study uses a qualitative case study methodology to collect data, and Activity Theory to analyse the data.

1.5 Rationale for the Study

This research is guided by the belief that TEs have a pivotal role in the uptake and the integration of digital technology in educational activities. As previously mentioned, being the second-order teachers who induct the student teachers (future first-order teachers) who work in future school settings (Murray & Male, 2005), TEs' technology practices and justifications influence what happens in future classrooms. Nonetheless, TEs' digital practices are under-researched despite being of significance (Foulger, Graziano, Schmidt-Crawford, & Slykhuis, 2018; McGarr & McDonagh, 2019; Uerz et al., 2018)

One reason behind the limited attention given to TEs' practices is the argument that they are 'hidden professionals' (Livingston, 2014), with only limited information available on their professional lives, their practices, the challenges they encounter, and their professional learning needs (Lunenberg, Dengerink, & Korthagen, 2014; Ping, Schellings, & Beijaard, 2018). One of the areas that have limited information available is TEs' 'digital competency' (Krumsvik, 2014; Ottestad, Kelentrić, & Guðmundsdóttir, 2014). The review of the literature demonstrates that few studies have explored how TEs enhance their digital competencies (Uerz et al., 2018). While TEs' ICT-related professional learning is considered important (Czerniawski et al., 2018; Czerniawski, Guberman, & MacPhail, 2017), only a few studies have actually explored how, and with whom, TEs enhance their digital capabilities.

Scholars (From, 2017; Pettersson, 2017) have argued that there is a need for research into the influence of broader contextual conditions related to TEs' digital competencies to enhance the understandings of digital practices in educational contexts. By exploring what factors influence and underpin TEs' digital practices, the activities they undertake to enhance their digital competencies, and how their practices bring changes in curricular activities, this study intends to shed light on some important issues concerning TEs' digital practices, particularly in Nepal.

Knowledge of TEs' digital competencies is important because TEs do not always receive the support that they need to remain professionally competent, despite being the linchpins in any educational reform practice (Hitch, Mahoney, & Macfarlane, 2018; Tack, Valcke, Rots, Struyven, & Vanderlinde, 2018). Understanding TEs' ICT-related professional learning is important because it has pedagogical and policy implications. With such knowledge, appropriate programmes can be designed to support

and promote TEs' ICT-related professional development. Only when they receive professional support, can they become ready to integrate digital tools meaningfully.

At the time this study was initiated, discussions on digital competence centred mostly around pupils' skills and abilities being the end products; thus, the number of studies on TEs' digital competence and practices was fairly limited (Ottestad et al., 2014). However, with the increasing number of studies being published in the field (Adnan & Tondeur, 2018; McGarr & McDonagh, 2019; Uerz et al., 2018), it is clear that this is a growing field. Therefore, by providing a comprehensive study focussing on three distinct aspects of TEs' digital practices – professional learning; actual use of technology in teacher education practices; and influences of external/internal factors – this study contributes to an under-researched area. By exploring various aspects of a TE's digital competencies, this study informs its readers about how their digital practices might look in the Nepalese context, where technology use in higher education is in its infancy.

1.6 Significance of the Study

This study is significant for three reasons. First, as discussed in the preceding section, the study will generate findings and discussion, and contribute to the knowledge of TEs' digital competencies, a research field that warrants more empirical study. In particular, it sheds light on the internal and external factors that influence TEs' digital competencies and practices, the activities they engage in to develop their digital competencies, and how such activities support the use of digital tools in curricular activities.

Second, much of the research in the field of TEs' digital competence has centred mostly in the Nordic and Flanders regions in Europe (Instefjord & Munthe, 2017; McGarr & McDonagh, 2019; Ottestad et al., 2014; Røkenes, 2016) and the USA

(Foulger et al., 2018). Hence, this study, having collected data from Nepal, not only expands the discussions to other regions/continents but also showcases the status of TEs and their practices in a context where technology use in education is still sparse.

Third, because this study focuses on Nepal, its findings are expected to contribute to the discourse of technology integration in teacher education courses in Nepal and other countries with similar economic and educational status. Because this study will be the first of its kind in the context of Nepal, it is expected to have policy and pedagogical implications for technology use in teacher education courses there. By bringing its findings to the notice of the scholars and the policymakers at the ministry and universities, I hope to generate even more discussion on this topic.

1.7 Boundaries of the Study

In order for a researcher to keep a study manageable and to attain the research objectives, it is necessary to clearly delineate the focus of the study by setting the boundaries. In the literature, such boundaries are also called delimitations, which are decisions that a researcher makes consciously to limit the scope and the boundary of a research study (Simon & Goes, 2018). While setting the boundaries/delimitations, a researcher is advised to lay out what should or should not happen in the study, and what the key terms in the study mean in consideration of the scope and the resources available (Bryman, 2015). In this way, both researchers and readers can identify where the study is situated in the broad field/area of research.

The first delimitation of the study is that it is based on data collected from Nepalese TEs who are in the profession of English language teaching (ELT) or English as a foreign language (EFL). It was decided that data from a homogenous group would be more manageable and informative, given the limitation in resources required to collect and handle the data. As well, the decision to limit the study to ELT/EFL TEs'

practices was influenced by a pragmatic reason, namely, the researcher's unfamiliarity with the content and lack of pedagogical knowledge in areas other than ELT/EFL.

The second delimitation is that while the ELT/EFL TEs constitute most of the research participants, a decision was made not to explore the pedagogical and theoretical underpinnings of digital ELT/EFL practices in depth (as a linguistics study might do). It was believed that the data related to TEs' digital practices could be better interpreted using Activity Theory and related theoretical tenets. A non-linguistics related theory was therefore chosen. If this study were to be mostly focused on applied linguistics and ELT, its findings might not be relatable to the readers outside this field. In contrast, using a socio-cultural theory to analyse the data would allow the findings to be accessed and relatable by readers unfamiliar with linguistic theories.

The third delimitation is also related to the choice of participants. TEs are a heterogeneous group of professionals; they can be educators in a teacher education course, supervisors at school, and professional in-service teacher trainers (Lunenberg et al., 2014; Ping et al., 2018). Whilst the practices of all groups of professionals are significant, it was beyond the scope of this study to explore the digital practices of all kinds of TEs.

Therefore, for the purpose of this study, only those teaching in Nepalese pre-service courses, primarily Master of Education (MEd) and Bachelor of Education (BEd) courses, were selected for two reasons. First, a pre-service teacher education course is the first formal place of teacher training. Second, unlike in professional training of teachers or school supervision, TEs work with large numbers of students, and what happens in their classroom is likely to influence a lot of classrooms (Ping et al., 2018).

1.8 The Plan of the Thesis

This chapter has set out the context of the present study, the problem statement, research objectives, research questions and the significance of the study.

Chapter 2 is a review of literature in two parts. In the first part, studies on teacher educators, their digital competencies, ICT-related professional learning, use of ICT by TEs and the factors that influence technology use are reviewed. The second section makes a case for the study by exploring the educational status of Nepal and reviewing some key policy documents.

In Chapter 3, the theoretical framework that undergirds this study is reviewed. The discussions focus on explaining why Activity Theory is an appropriate theoretical framework for this study. The discussion begins by examining the three generations of research that have shaped Activity Theory. Following this, 'Expansive Learning' and some related theoretical notions are discussed vis-à-vis the study.

In Chapter 4, information on the methodology and research design are presented. The discussion focuses on the methodological decisions that were undertaken during the course of the study, and the justifications for making them. Information about the research context, participants, tools, and data analysis is also presented.

Chapter 5 marks the presentation of data. In this chapter, the discussion examines the data related to the factors that influenced the participating TEs' use of digital tools. The findings are teased out and discussed using the theoretical framework and the literature.

In Chapter 6, the focus of the discussion is on how participating TEs learned about the educational use of digital tools. The data, findings, analyses and discussions

shed light on the learning activities undertaken by TEs to enhance their digital competencies and the skills they gained out of such activities.

In Chapter 7, the focus is on teasing out how participating TEs' ICT-related professional learning supported the uptake of ICT tools in teacher educational activities. It also analyses and discusses the changes in teacher education activities resulting from the use of digital tools.

Chapter 8 presents the conclusions and recommendations of this study. Based on the analysis of findings and related discussions in chapters 5, 6 and 7, conclusions are drawn and presented in three sections based on the research questions set out earlier in this Chapter. The implications of the study are presented, and the recommendations for future research discussed.

1.9 Conclusion to the Chapter

The purpose of this study is to explore Nepalese teacher educators' digital practices and how these practices influence what happens in school classrooms. This chapter has introduced the background, context, focus and the rationale for this study. In the next chapter, the literature that informed this study is reviewed.

Chapter 2 – A Review of Literature

Chapter 1 outlined the background, context, problem statement, research objectives, questions and the boundary of the present study. It was discussed that teacher educators are expected to use digital tools but receive little institutional support. Therefore, teacher educators are required to overcome barriers of different nature at different levels in engaging in their digital practices. In presenting the reasons for engaging in this study, it was established that teacher educators' (TEs) digital practices remain under-researched despite receiving research interests. Thus, this study is timely.

In this chapter, a review of literature which informs this study is presented. The review is divided into two parts. The first part explores the literature related to four aspects of digital practices, namely TEs' digital competencies, their technology-related professional learning, their use of ICT tools in teacher education activities and the factors that influence their practices.

The review begins by examining the literature related to digital competencies, the significance of TEs' digital competencies. Following that, different digital competencies frameworks and their relevance to this study are explored. Next, studies on TEs' ICT-related professional learning are reviewed, which suggests that TEs' ICT-related professional learning and development is under-researched. Following this, factors that are argued to impact technology integration are explored. The review of literature establishes that both external and internal factors can be barriers in technology integration efforts.

The second part of the review explores the educational context of Nepal, with a focus on technology use in higher education. This section provides a brief overview of the present education system in Nepal, ICT in education in Nepal and its position in two global ICT indices. This information is useful to comprehend the larger social realities

that educators negotiate with when using technologies in classrooms. Next, educational policies concerning ICT use in higher education are reviewed and discussed. The review of policy reveals that while there are suggestions for the use of technology in higher education, these are not prominent and visible.

2.1 Digital Competencies

Digital competence - which is an important aspect of digital practices - refers to the skills required for technology use. Many other terms, such as digital literacy, information literacy, 21st-century skills, and media literacy, have been used to refer to ICT expertise. It has been argued that these terms refer to similar skills (Ilomäki, Kantosalo, & Lakkala, 2011; Krumsvik, 2008). While some of them are limited in their scope, others are broad.

In the recent literature, 'competency' is favoured over 'skills' because the former is considered to be broader than the latter in terms of its coverage (Ilomäki et al., 2016). For instance, apart from technological skills, digital competence is argued to encompass sociological and emotional aspect of using digital devices (e.g. Instefjord & Munthe, 2016), technological competencies for proper use of digital tools, knowledge of relevant ICT policies, awareness of ethics, and safety issues related to ICT practice (Ferrari, 2012; Janssen et al., 2013; Krumsvik, 2008, 2014; Redecker, 2017).

Because digital competencies encompass different skill sets, there is no consensus on its definition (From, 2017; Janssen et al., 2013; Røkenes & Krumsvik, 2014); there are varying interpretations, and it is associated with different capability areas (Gallardo-Echenique, de Oliveira, Marques-Molias, & Esteve-Mon, 2015). For example, the digital competency (also known as DigiComp) framework developed under the commission of European Union defines digital competencies as "the set of knowledge, skills, attitudes (thus including abilities, strategies, values and awareness)

that are required when using ICT and digital media to perform tasks" (Ferrari, 2012, p.3).

The DigiComp framework by Ferrari (2012) lists seven areas as the core component of digital competencies. These seven areas include information management, collaboration, communication and sharing, creation of content and knowledge, ethics and responsibility, evaluation and problem solving, and technical operation knowledge.

This study draws on Ferrari's (2012) definition when referring to digital competencies. However, as teacher educators are unique professionals, they need a specific set of competencies for seamless integration of ICT in teacher education activities (Krumsvik, 2014; McGarr & McDonagh, 2019; Redecker, 2017). In order to understand why TEs' digital competencies are different, it is first necessary to understand their professional characteristics. So, the next section briefly examines who teacher educators are before exploring the characteristics of their digital competencies.

2.2 Teacher Educators

Teacher educators represent a heterogeneous group of practitioners that are engaged in pre-service teacher education, in-service teacher training and teacher supervision in schools (Hadar & Brody, 2017; Lunenberg et al., 2014). They are defined as "someone who provides instruction or who gives guidance and support to student teachers, and who, thus, renders a substantial contribution to the development of students into competent teachers" (Koster, Brekelmans, Korthagen, & Wubbels, 2005, p. 157). In the present study, TEs represent the faculty members engaged in training/educating pre-service teachers in university or teacher education campuses.

TEs are considered to be second order teachers because they do not teach the school children directly but train and educate future teachers (Murray & Male, 2005). Thus, they have responsibilities to make their pedagogical behaviour congruent with what they preach their students as they have a profound impact on the quality of education in schools (Uerz et al., 2018). In that context, TEs' digital practices are likely to impact technology integration in school classrooms.

Despite playing an important role in educational activities and being the linchpin in any educational reform practice, they are argued to be hidden professionals (Livingston, 2014) and do not always receive the support that they need to remain professionally competent (Tack et al., 2018). Only limited information is available regarding their professional lives, their practices, the challenges they encounter as well as their professional learning needs and practices (Hitch et al., 2018; Lunenberg et al., 2014; Ping et al., 2018). As in these areas, there is not much information about teacher educators' digital competencies, an important aspect of TEs' digital practices. While there are growing interests in teacher educators' digital competencies (e.g. Adnan & Tondeur, 2018; Lindqvist, 2019), it is still under-researched (Tondeur et al., 2019). Therefore, the findings of this study are expected to contribute to this knowledge area.

In the next section, the discussion explores digital competencies in the context of teacher education and teacher educators.

2.3 Digital Competence in Teacher Education

TEs' digital competence (DC) is more complex than the ICT proficiencies required in other professions. That is because they are required to perform dual tasks when integrating technologies in their practice. First, they need to model appropriate use of digital resources through their practice. Second, they are required to provide theoretical and pedagogical underpinnings of such uses to foster similar knowledge in

future teachers to integrate technology (Foulger et al., 2018; Krumsvik, 2014; Uerz et al., 2018).

While the demand for dual tasks makes TEs' digital competencies unique and complex, digital competencies are also significant in training pre-service teachers (PSTs) (Tondeur, Roblin, van Braak, Fisser, & Voogt, 2013; Voogt & Knezek, 2013). The significance of TEs' digital abilities in pre-service teacher training have also been identified by Foulger et al. (2018. In their) in their teacher educators' technology competencies (TETCs) framework, they affirm that TEs should be able to integrate technologies in their practice to enhance pedagogical practices and support the development of the pre-service teachers' technology use related knowledge, skills, and attitudes. For TEs to do perform dual tasks, they should possess abilities to use ICT tools and justify such uses didactically (Røkenes & Krumsvik, 2016).

In looking at the features of a TEs' digital competencies, Krumsvik (2014) argues that TEs need to possess proficiency in using digital technologies and have sound pedagogical and theoretical underpinnings to become digitally competent. Krumsvik (2014) maintains that TEs need to possess 'Digital Bildung', namely, knowledge of socially, culturally ethical and responsible use of technologies and be mindful of the implications of their practices in pre-service teachers' learning strategies and development of didactic knowledge. When using ICT tools TEs are required to discuss these different aspects with their PSTs, so they can help their students grow Digital Bildung. This ethical and socially responsible use of technology is also identified as an important area of teacher educators' digital competencies by Foulger et al. (2018).

This study concords with the arguments of Krumsvik (2014) when discussing digital competencies and practices of teacher educators. The TEs need to be mindful of

the ways they can appropriate a given technology to be able to sustain the use of ICT tools in teacher education practices. Therefore, references are made to Krumsvik's (2014) framework when commenting on TEs' ICT-related professional learning and practise. This enables to explore if teachers have gained the awareness that Krumsvik (2014) identifies to be important.

This study also draws on Instefjord and Munthe's (2016) argument that a digitally competent TE has a social awareness of his/her digital practice. While Instefjord and Munthe (2016) agree with Krumsvik's (2014) contentions, they propose a new digital competence model that amalgamates Krumsvik's (2014) model with Mishra and Koehler's (2006) TPACK model and Zhao, Pugh, Sheldon, and Byers' (2002) findings on the condition for classroom technology innovation. Through this, they argue that a TEs' DC comprises three components: technology proficiency, pedagogical compatibility and social awareness.

While technology proficiency relates to technical skills and confidence to use digital tools and resources, the pedagogical competence comprises the knowledge of how digital tools can be used to enhance practices and to achieve curricular goals. The third component, social awareness is about TEs' mindfulness of social aspects of the classroom and institutions, and the abilities to negotiate those when using technology (Instefjord & Munthe, 2016). It is believed, in this study, that the TEs' social awareness is an important aspect of their DC because technology use was in its infancy in their context, and they were identified as early adopters of technology. Therefore, they needed to be mindful of the impact of their practice in the existing teacher education curriculum and syllabus, PSTs' access to technology and socio-cultural norms.

A recent study by Uerz et al. (2018) identifies what constitutes a teacher educators' digital competence in a systematic review of the scant literature in the field.

Having analysed 26 scholarly papers, they identified four domains of TEs' competence. They argued technological expertise; knowledge of educational use of technology and related pedagogical underpinnings; technology and teaching related beliefs; and, professional learning were key parts of a TE's digital competence. This study considers how educators gain these different areas of knowledge and how they contribute to their use of digital tools in teacher education activities while discussing the data related to their ICT-related professional learning.

While several other frameworks on digital competencies have been proposed (e.g. Adnan & Tondeur, 2018; Foulger et al., 2018; Mishra & Koehler, 2006; Redecker, 2017), it is beyond the scope of this study to review and draw on those to discuss the data.

2.4 Significance of Teacher Educators' Digital Competencies

While teachers' and pre-service teachers' technological capabilities have been studied extensively, 'TEs' digital competencies' is an understudied area, and thus requires more research (Ferdig, 2017; McGarr & McDonagh, 2019; Uerz et al., 2018).

Teacher educators' abilities to model ICT use in teaching and learning is argued to influence the development of skills in PSTs. For instance, Gill, Dalgarno, and Carlson (2015), using a collective case study methodology, undertook a series of interviews with pre-service teachers to explore their practices and perceptions on preparedness to teach with ICT. They concluded that some pre-service teachers in their study lacked the expertise to link technologies with pedagogies and content while others were unable to critically reflect and link their technology use to the theoretical underpinnings of using ICTs in pedagogical activities.

Gill et al. (2015) further argued that PSTs' lack of preparedness to teach with digital technologies could be related to classroom experience at the university. They claimed that 'the development of preparedness is in most cases slow or minimal where there is no actual use of ICTs for learning and teaching" (p. 56). This suggests that TEs' digital competencies and actual use of ICT in their practice impacted the development of such abilities as future teachers.

Another study that correlated the development of PSTs' digital competencies with TEs' practice was conducted by Røkenes and Krumsvik (2016) using the data from four cohorts of English as a second language (ESL) PSTs over four academic semesters. The study concluded that not all pre-service teachers developed the skills equally and their skill development was both facilitated and obstructed by factors such as the ICT use modelled by TEs' use of ICT to scaffold learning experiences and the opportunities provided by TEs to link theories and the practice. Based on these findings, Røkenes and Krumsvik (2016) concluded that TEs need to upgrade their digital skills and engage PSTs in hands-on experiences in technology use and pedagogical support.

All three studies above concluded that the teacher educators' digital competencies and ICT practices influenced pre-service teachers' preparedness to teach with ICTs. Similar conclusions were also made by Tondeur et al. (2012) through a systematic review of 23 studies published between 2000 and 2013. They argued that the limited development of digital competencies in pre-service teachers is related "to a lack of teacher educators as role models using technology" (p. 138). These findings, therefore, buttress the argument that teacher educators need to enhance their digital skills and reflect on their practices (OECD, 2006, 2010).

It is also argued in the literature (Instefjord & Munthe, 2016; Lund, Furberg, Bakken, & Engelien, 2014; Tømte, Enochsson, Buskqvist, & Kårstein, 2015) that

teacher educators' digital competencies were under-developed in their respective studies. A common argument in these studies is that technology integration was not a prominent issue in teacher training courses and that overarching policy to guide technology integration at the TEIs was missing, which meant that TEs' digital competencies did not receive the required attention. Thus, the TEs were not supported to develop competencies required to teach with ICT. For example, in two similar studies of teacher training institutes in Norway and the Flanders region by Instefjord and Munthe (2016) and Tømte, Kårstein, and Olsen (2013), the researchers concluded that TEs' digital competence and the use of ICTs in teacher preparation courses were found to be neglected by teacher education institutes (TEIs).

Lund et al. (2014) argue that TEI's negligence is related to the absence of an overarching plan at TEIs to focus on digital competence in teacher education programs. An overarching policy has to comprise of discussion on didactic use of technologies and seamless infusion of technology in TEs' practice (Ottestad et al., 2014). Only when an overarching policy is made available will they receive the support that they require for their digital competencies and practices. TEIs need to support their TEs to sustain their digital practices and to promote a seamless use of ICTs in educational activities (Becker et al., 2017; Phuong, Cole, & Zarestky, 2018).

It is suggested by Kirschner, Wubbels, and Brekelmans (2008) that "teacher education programmes should stimulate the pedagogical use of ICT to improve existing teaching practice and contribute to the development of new, innovative teaching practices" (p. 435). In order to do that, TEs need to possess digital competencies so that they can use digital tools in teaching and learning. Only when TEs embed technology in their practices, can PSTs gain practical experiences of technology use (Bakir, 2016; Koh, Chai, & Tay, 2014) and develop dimensions of digital competence namely digital-

competence, learning strategies, and digital Bildung (Røkenes & Krumsvik, 2016), which are required for seamless use of technology (Krumsvik, 2014).

While research studies in ICT preparedness of pre-service teachers have pointed to the fact that TEs are not prepared enough to teach with ICT, there is limited evidence on how teacher educators actually develop those competencies. In order to critique whether TEs can provide experiences of technology use and foster different aspects of digital competencies, it is necessary to understand how, where, and with whom teacher educators develop their ICT competencies. To that end, the ensuing section explores teacher educators' ICT-related professional learning.

2.5 Teacher Educators' ICT Related Professional Learning

Teacher educators are a significant group of professionals because they are the teachers of future teachers who will work with school students (Murray & Male, 2005; Uerz et al., 2018). Therefore, the quality of their practices is likely to impact classroom delivery and student outcome in schools (Goodwin et al., 2014; Loughran & Hamilton, 2016; Ping et al., 2018). Thus, it becomes the responsibility of TEs to remain up-to-date in their field, through the engagement in professional development or professional learning activities.

Professional development (PD) and professional learning (PL) both contribute to the professional enhancement of teacher educators. However, they are considered to be different. The former is about one-size fits all activities, such as one-off training, workshops or seminars, lectures, that happen to teachers (Scherff, 2018). In some instances, PD activities are argued to be decontextualised from the work situation and are episodic and didactic (Webster-Wright, 2009). Nonetheless, when it comes to learning about digital tools, one-off PD activities can help TEs learn about specific digital tools or resources.

As regards to PL, it is considered to consist of learning activities that are designed to meet TEs' needs. Thus, they are interactive and sustained. Individual TEs are encouraged to take responsibility for their own professional learning and to try what they learn in their practice (Scherff, 2018). Some of the professional learning activities include self-directed learning, learning with colleagues and peers face-to-face and virtually. Calvert (2016) maintains that teachers' participation in professional learning activities is influenced by their agency (see Section 3.5 for a detailed discussion on agency).

While there are differences between PD and PL, and there are arguments that the latter may be better in sustaining TEs' digital practices, it is believed in this study that both kinds of activities hold potential in enhancing TEs' digital competencies and promoting technology use in curricular activities. Therefore, efforts have been made to explore what research has established about ICT-related professional development and learning in the context of teacher educators.

A search for literature, however, showed that limited information is available on TEs' professional development and learning in general (Czerniawski et al., 2018; Flores, 2018). Ping et al. (2018) affirmed that TEs' professional learning/development, as a research field, remains fragmented and under-researched. Furthermore, studies also argue that the knowledge base and professional competencies required to become competent TEs are not clearly stated (Flores, 2018; Goodwin et al., 2014; Ping et al., 2018; Tack et al., 2018). So, TEs' engagement in professional learning and development activities is argued to be ad hoc and dependent on chance and goodwill (Tack et al., 2018).

Ping et al. (2018) analysed 75 research papers published between 2000 to 2015 on teacher educators' professional learning practices and concluded that there is no

clear knowledge base required for TEs. The review showed that TEs undertake different activities to enhance their professional competencies, which include learning through academic engagement, learning through collaborative activity, learning through attending professional development programmes and learning from reflective activity.

In a similar vein, Phuong et al. (2018) analysed 22 studies related to TEs' professional learning published between 2005 and 2015 and identified 81 distinct activities that the TEs engaged in for professional development. They argued that professional development activities, such as workshops, seminars, conferences, professional meetings, advanced degrees, and training courses, were more popular than informal learning. Nonetheless, self-directed learning activities, such as informal mentoring, team or group learning, and peer relationships also helped teacher educators gain professional competencies.

A common finding from the two studies above is that TEs engaged in both formal and informal activities. Of all, in both cases, it was found that TEs learned by participating in collaborative activities with colleagues. This finding aligns with a finding made by Tack et al. (2018), where they argued that TEs were interested in participating in collegial learning.

Studies related to TEs' ICT-related professional development also highlighted that peer-learning is a way to enhance their digital competencies. For instance, Albion, Tondeur, Forkosh-Baruch, and Peeraer (2015), in their review of a technology integration project in Vietnam, argued that TEs' knowledge to integrate technology can be supported through learning partnership between teacher educators. Similar findings were also reported by Lindqvist (2019). Having analysed interview data from 12 university teachers in Sweden, the study stresses that collaborative learning with colleagues can support teacher professional learning.

However, it is argued that both PD and PL activities are required for effective use of technologies because whilst PL activities help TEs gain knowledge and skills based on personal needs, PD activities help to make their learning fit the organisational needs and goals (Lindqvist, 2019). Nonetheless, TEs do not always receive PD opportunities at TEIs. For instance, Tack et al. (2018), based on the data from 611 teacher educators in the Flanders region, argued that TEs' PD is still neglected by the educational stakeholders. This finding highlights that TEs are hidden professionals (Livingston, 2014), which is a plausible explanation to why limited opportunities are available for TEs for their PD at the TEIs. The implication of this finding is that TEs' ICT-related PD is not supported by TEIs, although such support is necessary to promote and sustain technology uptake in teacher education activities (Becker et al., 2017; Zhu, 2015).

When educational stakeholders plan for any technological innovation, it has to include TEs as they are the ones that can bridge the gap between planning and practice (Albion et al., 2015). For instance, in a review of a technology integration project in a US university, Wetzel et al. (2014) identified the need to involve TEs in more PD activities to make them proactive in infusing and modelling technologies to pre-service teachers. As well, Wetzel et al. (2014) argues that TEs' PL can be supported by engaging them in peer collaboration so that they can support each other in technology uptake.

Discussing what an ICT-related professional development activity should include, Archambault, Wetzel, Foulger, and Kim Williams (2010) maintain that any technology-related learning activity has to provide opportunities to explore what technologies could be used and how they facilitate teaching and learning activities. Along the same line, Albion et al. (2015) maintain that learning with ICT has to be the

primary focus of professional development activities related to ICT integration. That is because technology-related professional development opportunities based on technology can help boost confidence and provide context to explore the possibilities of their use in the class (Albion et al., 2015). For this reason, online courses, which are based on ICT, can offer feasible learning opportunities to teacher educators. Therefore, attention has been paid in this study to explore whether TEs attended online courses and how those supported their ICT-related professional learning.

This section has shown that teacher educators' professional learning is an area that is gaining interest. However, there is still limited information available as to how TEs can enhance their digital competencies. Some of the studies reviewed above highlighted that TEs engage in various activities for their professional development. In particular, some studies demonstrated that TEs prefer to engage in collegial and collaborative learning with their colleagues. It is a contention in this study that TEs can learn by interacting with their colleagues face-to-face and virtually in both formal and informal learning opportunities.

2.6 Use of Technology by Educators

Similar to teacher educators' technology-related professional learning, there is limited information on TEs' actual use of digital technologies and their impact on teaching and learning. Therefore, the review in the following paragraphs looks into technology use strategies of teachers and lecturers to illustrate key aspects in the literature.

Arguing that teachers' use of technology has a significant role in enhancing learning, McKnight et al. (2016) collected data from 44 teachers from seven different K-12 schools in the USA. Having analysed the data collected through a survey, focus group discussions and individual interviews, the authors identified that the educators

leveraged digital technologies for five distinct purposes which included communication and information management, providing personal and equitable access and opportunities to learning activities, collaboration with colleagues, research and exploration, and assessment and feedback. Through such use, teachers were able to transform teaching and learning activities.

Concurring results were reported as to the digital instructional strategies by Yarbro, McKnight, Elliott, Kurz, and Wardlow (2016). They collected self-reported data through an online log system data from 97 K-12 teachers of mathematics and English language arts over a year to investigate the technology use strategies. Through the analysis of data from teachers, six approaches to technology use were identified. These uses were similar to the ones reported by McKnight et al. (2016). One reason for the overlap in the findings is that both the studies were carried out as part of an ICT integration project. Whilst there is an overlap, it is suggested that educators use ICT tools for communication and collaboration.

Another study that examined teachers' technology use was by Sipilä (2011). The author collected data from 99 Finnish teachers teaching primary and secondary levels. By analysing the teacher's responses to a survey instrument, it was concluded that educators mainly used ICT for "informational, organisational, evaluative and lesson planning activities" (p. 49). Whilst the results of this study are slightly historical considering the evolution in technology, in a more recent study as well teachers were found to have used technology for administrative tasks. For instance, Sipilä (2014) collected survey data of 292 Finnish teachers and concluded that the most prominent activities that teachers accomplished using technology were administrative and planning related. The self-reported data from the teachers showed that they used technologies for

purposes such as communication, direct instruction and information production rather than pedagogical.

It is not just the school teachers who are reported to use digital technologies for administrative and logistical purposes but also lecturers at university. In a study that Hiralaal (2013) carried out amongst the university educators in South Africa, the author concluded that educators used ICTs mainly for "informational, organisational, lesson planning and administrative purposes rather than pedagogical" (p. 176). Hiralaal (2013) further argued that the lecturers were not able to integrate technologies in pedagogical activities because they lacked knowledge and skills required for curricular use of digital tools.

The review of the studies above demonstrates that whilst ICT tools are leveraged for different objectives, completion of administrative tasks was found to be a prominent activity that teachers and lecturers undertook using such tools. This finding, therefore, suggests that while enhancing access to technology may maximise its use, it may not be used for the pedagogical purpose because TEs' digital competencies influence whether TEs use a given technology for educational activities (Hiralaal, 2013). As well, many other factors influence the pedagogical use of digital tools (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012). In the next section, efforts have been made to discuss the factors that influence the uptake of technology in educational activities.

2.7 Factors Influencing Technology Use

When an educator decides to use technology, she/he faces a multitude of elements and issues to successfully integrate technologies. While some factors facilitate technology use, others inhibit. Therefore, these factors have been given different names in the literature. While some identify them as essential conditions (Becuwe et al., 2017; Hamel, Turcotte, & Laferrière, 2013), others call them contextual factors (Mishra &

Koehler, 2006; Porras-Hernández & Salinas-Amescua, 2013) and some call them barriers (Ertmer, 1999; Ertmer et al., 2012).

The influencing factors have also been categorised in different ways in the literature. Some of these classifications are very specific, such as factors related to resources, training and technological support, institutional vision and support, knowledge, skills and attitude, and curriculum design and assessment (Drent & Meelissen, 2008; Francom, 2016; Hew & Brush, 2007; Kopcha, 2012).

A more popular category classifies the influencing factors into external and internal barriers. The external factors are labelled as first-order barriers, and they are argued to include aspects such as resources (software and hardware), planning/preparation time, and administrative and technological support (Ertmer, 1999, 2005). The internal factors are labelled as second-order barriers, and they are associated with teachers' beliefs, motivation and attitude (Ertmer, 1999, 2005). It is a contention in this study that not all factors are barriers as some of them facilitate TEs' digital practice. The sections below tease out the factors mentioned in this section in two categories: external and internal factors.

2.7.1 External factors

An external factor is a condition that is beyond a teacher's control but impacts their technology use. Studies have revealed that various external factors influence the educational use of digital tools (Cunningham, 2015; Reid, 2014). It is beyond the scope of this study to discuss each element separately. Therefore, the discussion focuses only on some recent studies and general discussion on the factors.

One external factor identified to influence ICT integration is time. For example, in their qualitative research, Blundell, Lee, and Nykvist (2016) identified 43 extrinsic

factors in teachers' narratives. Of all, time for ICT-related professional learning and lesson planning was identified to be the most recurrent and influencing factor. Likewise, Brenner and Brill (2016) also found that early career K-12 teachers' technology use efforts were constrained by the lack of time to prepare lessons and engage in professional development activities.

Similarly, Vasinda, Ryter, Hathcock, and Wang (2017), in their autoethnographic study, concluded that time was an important influencing factor in the uptake of iPad in their pedagogical practice. Likewise, Francom (2016) found that time availability impacted technology use. Drawing on survey data from 1079 public K-12 schools, Francom (2016) argued that the time TEIs make available to their TEs for lesson planning and PL, therefore, influences ICT uptake in their practices.

Others (Albugarni & Ahmed, 2015; Cárdenas-Claros & Oyanedel, 2016; Cunningham, 2015; Hamel et al., 2013; Laferrière, Hamel, & Searson, 2013) argue that the lack of training for teachers on technology use can deter technology use in education. Having drawn on interview data from nine university teachers in Chile, Cárdenas-Claros and Oyanedel (2016) concluded that many of those tutors lacked skills because they did not have training opportunities to upskill their digital skills and knowledge. This finding concurred with that of DelliCarpini (2012) who found that educators' use of technologies was influenced by the lack of training to enhance the skills. Therefore, TEIs need to support TEs by providing PD opportunities for effective use of ICTs. Only when TEs have skills, can they integrate digital tools in their practice.

Non-aligning assessment and curriculum are also found to impact technology use efforts of educators (Blundell et al., 2016; Hamel et al., 2013; Laferrière et al., 2013). For instance, having analysed the responses from 40 teachers from a college located in an Australian city, Blundell et al. (2016) noted that the existing assessment

systems and a requirement to complete the material (e.g., course content) manifested as barriers in the technology use practices.

Other external factors that impacted technology use were associated with access to technology and lack of financial resources to provide easy access to technology. For example, Hamel et al. (2013) and Laferrière et al. (2013) in their analysis of an ICT innovation project in Quebec, Canada, concluded that equal access to ICT resources was one of the issues that impacted technology use. Similarly, Cárdenas-Claros and Oyanedel (2016) noted that access to technology was a factor that impacted the technology practices of university teachers in Chile. Likewise, Blundell et al. (2016) and Reid (2014) maintained that access to technology is a major challenge in teachers' technology integration effort.

The issue of access and ICT infrastructure was found to be more prominent in studies based in developing countries. For example, Albugarni and Ahmed (2015), in their qualitative study involving interviews with different educational stakeholders in Saudi Arabia, reported that lack of access and related ICT facilities impacted technology use in educational activities. Likewise, a study by Cunningham (2015) noted that issues of access and ICT infrastructure, such as lack of suitable e-content, obstructed technology integration efforts in Kenyan universities.

Similarly, studies from developing countries have reported that as well as access and infrastructure, issues of economic resources required to expand and upkeep existing facilities and policy uncertainty also deterred the implementation of e-learning system in public universities in Iraq (Al-Azawei, Parslow, & Lundqvist, 2016). Research studies based in Tanzania (Mwakyusa & Mwalyagile, 2016), Indonesia (Lim & Pannen, 2012), Egypt (Sobaih & Moustafa, 2016) also identified the issues discussed above as factors that obstructed technology uptake in universities.

As regards to the South Asian context, search for literature yielded a limited number of empirical studies. An opinion paper by Khan, Hossain, Hasan, and Clement (2012) reported that lack of finance, infrastructure, policies, corruption, and political commitment were the major constraints in ICT integration in Bangladesh. While a study from Pakistan by Qureshi, Ilyas, Yasmin, and Whitty (2012) also identified infrastructure as a constraining factor, it further reported that there were issues of privacy and technical assistance that deterred the use of e-learning platform in Pakistani universities.

Likewise, the review of the literature shows that limited scholarly evidence is available on barriers that exist in ICT integration in Nepal. While studies on technology have started to emerge (e.g. Dhakal & Pant, 2016; Pangeni, 2016), their focus is on the issues other than barriers. Hence, the study has interests in unpacking the external factors that educators negotiate when they decide to use technologies.

2.7.2 Internal factors

Internal factors are beliefs, knowledge or skills required to use technology. It is argued that lack of knowledge, skills or non-aligning beliefs have noticeable impact in an educators' digital practices (Cheok, Wong, Ayub, & Mahmud, 2016; Ertmer et al., 2012; Francom, 2016; Garling, 2016; Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010; Vasinda et al., 2017). Research studies have established that teacher-related factors influence technology use. For example, an often cited paper by Hew and Brush (2007) noted educators' beliefs were found to be one of the most prominent factors to obstruct teachers' technology use in the 48 empirical studies that they reviewed.

Likewise, Tondeur, van Braak, Ertmer, and Ottenbreit-Leftwich (2017), in their meta-aggregative review of 14 studies, reported that teachers' beliefs influenced technology integration both positively and negatively. When beliefs align with the technology, they encourage TEs' to uptake digital tools in curricula activities, whereas when the beliefs do not align, educators do not use technologies despite easy access to ICTs.

A study by Ertmer et al. (2012), which involved interviews and classroom observations of 12 award-winning K-12 teachers for their exemplary ICT-related work, established that technology-related beliefs and attitudes had a significant impact on educators' use of technologies in teaching. It was concluded in the study that the participating teachers' use of digital tools was underpinned by their beliefs. These findings align with those of Drent and Meelissen (2008). In their study of 210 teacher educators, they stated that teacher attitude was the anchoring point of innovative use of ICT in their pedagogical practices.

The significance of teacher disposition towards technology use in the classroom was also highlighted by Kim, Kim, Lee, Spector, and DeMeester (2013). Having collected data from 22 teachers involved in a four-year-long digital technology-related professional development activity, the authors concluded that of various factors, teachers' beliefs influenced their use of technologies the most. Similar findings were reported by Smarkola (2008) in her qualitative study. Based on the interview data of a group of ten pre-service teachers and nine experienced teachers, the study indicated that the attitude and skills could influence ICT practices and use.

Similar conclusions were made by Koh et al. (2014) by analysing the design talks of teachers teaching in a Singaporean school. The researchers concluded that the teachers' technology use experience and beliefs impacted their readiness and the extent

of technology integration in their lessons. Similar findings were also reported by Prestridge (2012) and Vasinda et al. (2017). Both the studies established that technology practices were influenced by teachers' pedagogical beliefs, technology-related beliefs and skills. It is for these reasons that participating TEs' beliefs are explored and efforts are made to examine how their beliefs influence their participation in ICT-related professional learning and uptake of digital tools in teacher education activities.

Other than beliefs and attitude, studies have also highlighted that TEs' digital skills and knowledge influence technology use in class. For example, a study by Vasinda et al. (2017), which involved the autoethnographic accounts of four teacher educators, concluded that their lack of technological knowledge, especially being unable to keep abreast to the rapid development in technology; and being unable to troubleshoot technology issues hindered iPad use in teaching. Similar findings were reported by Francom (2016) and Tondeur et al. (2017), where they found that the lack of knowledge and skills required to use technology obstructed technology use.

Concurring results were also reported by Blundell et al. (2016). Analysing the interview data collected from 60 teachers, they concluded that knowledge and skills required to navigate technologies impacted the technology efforts of educators. Similar results were also reported by Sipilä (2014) who argued that educators' digital competencies influence the extent and the frequency of ICTs use in the classroom.

The review of the studies above suggests that technology-related beliefs and knowledge required for educational use of technology play an important role in educators' digital practices. It is believed that knowledge and beliefs are of high significance in the context of this study for two reasons in sustaining teacher educators' digital practices. Firstly, the participating TEs were early adopters of technology, and, as laid out in Section 1.2, their practices depended on choices rather than obligation.

Secondly, technology use in the research context was in its infancy, which meant that the use of technology was not a part of educational activities in general. Therefore, their knowledge, skills and beliefs are believed to underpin the TEs' digital practices - whether TEs engaged in ICT-related learning to enhance their digital competencies or whether they used technology in curricular activities was influenced their internal factors.

The ensuing section explores the educational context of Nepal, which includes discussion on ICT in the Nepalese education system and the review of some pertinent documents.

2.8 Present Education System in Nepal

The present formal school education in Nepal consists of two levels; eight years of basic education (grades 1-8) and four years of secondary school (9-12). The school education is followed by four years of bachelor's degree and two years of master's degree, followed by higher degree research programmes (Government of Nepal Ministry of Education, 2013). There is also a provision of one to three years long vocational education training after the tenth grade. The vocational programmes are run under the supervision and affiliation of The Council of Technical Education and Vocational Training (CTEVT).

The Ministry of Education Nepal (MoEN) is the highest regulatory body in education. The MoEN provides the policy direction for the management of both the school and higher education. The Department of Education (DoE) is the primary implementing agency of educational plans and programmes initiated by the MoEN. The DoE designs and supervises overall programs and activities in the school level throughout the country (Government of Nepal Ministry of Education, 2013). According to the DoE, there are 29,014 government schools across the country. The number of

teachers teaching in those schools were 95809 (elementary level) and 14711 (secondary level) as of 2017.

As for higher education, the University Grants Commission (UGC) is the implementing agency of the MoEN. The UGC implements the higher education policies drafted by MoEN, and they monitor and regulate the higher education delivery to promote and sustain standards of higher education in Nepal (University Grants Commission, 2018). Also, it is UGC that disburses government grants to the publicly funded universities and other higher education institutes.

With that information about the present education system in Nepal, in the next section, a brief overview of ICT in Education in Nepal is presented.

2.9 ICT in Education in Nepal

The Ministry of Education Nepal (2013) writes in its key documents that the need for ICT in education has been long realised, so they are investing efforts in promoting computer literacies and the use of technologies in education in Nepal. An example of this was providing training to teachers through radio. As Dixit (2009) noted, such training started in the late 1990s, and it was still ongoing in 2009. The radio training was delivered by the National Centre for Education Development (NCED).

To promote computer literacy and to encourage the use of ICT in education, Computer Science is taught as an optional subject in secondary schools, and there are various courses related to Computer Engineering/Computer Science and information technology in bachelor's and master's degrees.

Also, upon the approval of the MoEN, Tribhuvan University has started a Bachelor of Education in ICT and Master of Education in ICT course to prepare

technical human resources required to promote ICT integration in education in Nepal (Government of Nepal Ministry of Education, 2013).

The other notable programme related to ICT use in school education is One Laptop Per Child (OLPC). The MoEN, in collaboration with Open Learning Exchange Nepal (OLE), a non-government organisation (NGO), initiated the OLPC programme in 2008 (OLE, 2018). The program started with two schools as the pilot project. At the time of writing this thesis, the programme was implemented in 225 public schools across 34 districts (OLE, 2018) in the belief that the low-priced computers that OLPC offers to schools can promote equitable access to education in the rural schools (Maski Rana, 2018).

As well as providing computers to schools, the Department of Education has collaborated with OLE to create digital learning materials for students of grade 2 to 6. These materials are available through OLE's web page or mobile applications (OLE, 2018).

The MoEN has also been providing financial support to set-up and strengthen the ICT infrastructure to the schools; some schools received a sum of Nepali rupees 140,000 (equivalent to US$ 1,400 at the conversion rate of $1 = 100NPR) from the educational authority on the condition that they make local contribution of 60,000 NPR (US$ 600). While there is no exact statistics of how many schools have received such funding, the representative of MoEN who participated in this study suggested that a few hundred schools have received such benefits.

In continuation of emphasizing ICT use in education, the MoEN acknowledges that digital skills are one of the eight competencies of a qualified teacher. In the 'Teacher Competency Framework (2016)', it is stated that a professionally competent teacher is able to use ICT for effective teaching and learning (Government of Nepal

Ministry of Education, 2016a). While it is not stated clearly, an underlying assumption of recognizing technical expertise as a key competency area is that graduating teachers will have developed the technological skills alongside pedagogical and content knowledge required to become a teacher. However, only when technologies become integrated into all the modules in teacher education, can the future teachers gain the didactic competencies required to teach with technologies (Bakir, 2016). For that to happen, teacher educators are required to use technologies, which they can do only when they have the competencies to do so.

Whilst this review established that there are policies concerning technology education, there is not as much discussion regarding technology use in teacher education courses. For example, as it will be discussed later in section 2.11, only some directives are available on technology use in teacher education courses. As regards to technology use in the EFL teacher education programmes, there is even less evidence in a documented form.

Similarly, as regards to the use of the computer, it has been reported that such ICT equipment was mostly used for administrative purposes (Government of Nepal Ministry of Education, 2013; Koirala et al., 2016). Likewise, a lack of constant power supply has been reported to have impacted the use of computers in Nepalese schools. For instance, UNESCO Institute for Statistics (2014) reported that only 6% and 24% of the total primary and secondary schools respectively had electricity connections. Even when the electric supply was managed, lack of a regular, stable and affordable internet supply also impacted the educational use of computers in the schools (Regmi, 2017).

With that review, the next section now discusses how Nepal compares with the other countries in the key global ICT indices. This information is useful in understanding ICT penetration in different aspects of day-to-day lives.

2.10 Nepal in Global ICT Indices

The ICT Development Index (IDI) was the first indicator considered to ascertain Nepal's telecommunication status. The International Telecommunication Union (ITU) computes the IDI every year as a benchmark to measure the indicators of the information society, digital divide and ICT performance across the globe. According to the latest IDI score, Nepal stands 140 out of 176 countries that the study included (ITU, 2017). Nepal dropped four positions from 2015 and one position from 2016. Therefore, the IDI is in a declining trend.

The following table presents a comparative IDI sub-index of Nepal (on the right column) and the aggregate score of other developing economies (on the left column). In general, Nepal's sub-indexes are lower than the aggregate score of other developing economies.

Table 2.1: IDI sub-index of Nepal as presented by ITU [Source: ICT Development Index 2017 (ITU, 2017)

Index	Aggregate Score of the Developing Countries	Nepal's Score
Fixed telephone subscriptions per 100 inhabitants	8.54	2.98
Mobile-cellular telephone subscriptions per 100 inhabitants	96.25	111.70
International internet bandwidth per internet user (Bit/s)	53,000	3,885.64
Percentage of households with computers	34.35	11.15
Percentage of households with internet access	40.43	15.00
Percentage of individuals using the internet	38.98	19.69
IDI use sub-index	3.32	1.73
Fixed (wired) broadband subscriptions per 100 inhabitants	8.71	0.78
Active mobile-broadband subscriptions per 100 inhabitants	43.58	30.78

While Nepal rates lowly on many of the scores, as it can be seen on the table above, the mobile subscription in Nepal was 111.70 as compared to the 96.25 (per 100) aggregate score of other developing countries. The score suggested that the mobile subscription in Nepal has surpassed the total number of populations. This report is in congruence with the latest news report from Nepal telecommunications (Internet World Stats, 2017; Nepal Telecommunication Authority, 2019).

However, the table above also shows that only 11.15% of households have a computer, and just 15.00% of those have internet access at their homes. However, the statistics look better when the active mobile broadband is considered; the statistics indicate that 30.78% of subscribers use internet through mobiles. Nevertheless, what the statistics do not highlight is that Nepal's mobile broadband service is one of the most

expensive in the world (Subedi, 2018). As a result, despite having a broadband subscription, people do not use the internet through their mobile phones, unless very necessary.

The next index considered is the United Nations' e-government survey to examine the penetration of ICT in different aspects of people's lives. The survey assesses the use of digital technologies for e-governance, e-participation and the digital interactions between government and people. The index suggests that Nepal falls in the last 15 countries, standing 165 out of 168 countries, with a score of 0.2344 (UNDESA, 2016).

The statistics also suggest that Nepal is at the 110th position in e-participation with a score of 0.2941 out of one, the highest possible score. Nepal's rating implies that Nepal falls much behind its neighbouring South Asian nations such as India, Sri Lanka and Bangladesh in its e-readiness and e-participation index.

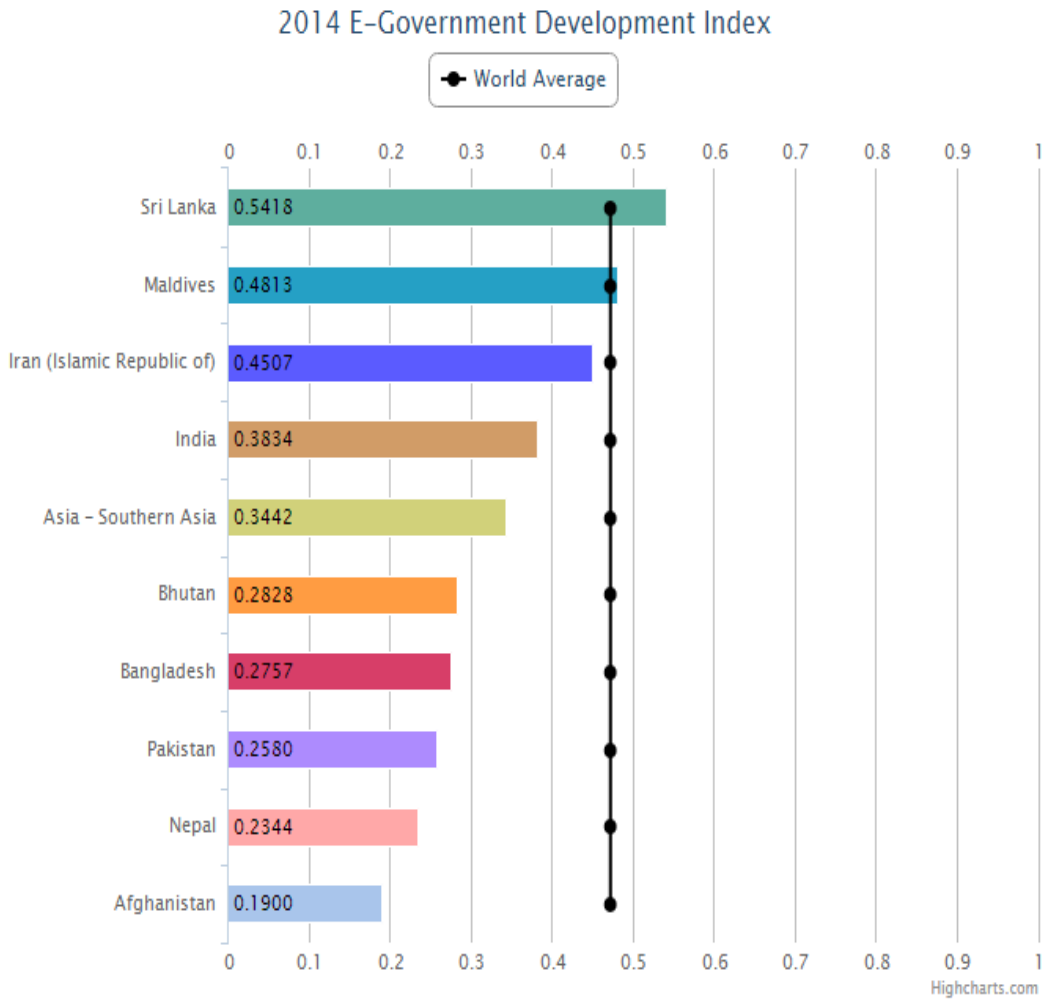

Figure 2.2: E-Government Development Index of Nepal. (Source: UN DESA)

The index above shows Nepal's position in global ICT indices, which suggest that the ICT penetration is not an integral part of day-to-day lives as in the developed world, such as Australia. The two ICT indices and their sub-index suggested that the participating teacher educators' digital practices are influenced by the issues of ICT access and infrastructure.

The following section presents the review of policy documents related to ICT in higher education in Nepal.

2.11 Policies on ICT in Education

During the review of policy documents, it was noted that other than what is published by MoEN, other dossiers, such as periodic national plans, were also found to have contained policy information relating to the use of ICT in education. For instance, the 14th Three Year Periodic Plan stated that "ICT will be made an inherent part of education in Nepal to address the issue of quality, access and digital divide" (Nepal Planning Commission, 2016, pp. 132-134). Along the same line, the 13th Three Year Plan was also found to have stated that ICT use guidelines would be developed to embed digital technologies in all aspects of educational activities by 2016.

Because the national development plan contained discussion on the integration of digital technologies in education, some educational policy documents also included discussions on ICT use in education in Nepal. While several such documents were reviewed, the following, which are deemed pertinent to this study, have been included in the discussion here.

1. National ICT policy, 2015
2. ICT in Education Master Plan, 2013-2017
3. Higher Education Policy, 2015
5. School Sector Development Programme, 2016-2022
6. Review of Curriculum

2.11.1 National Information Communication Technology Policy (2015)

The National ICT policy (Ministry of Information and Communication, 2015) recognises that "ICT can help address structural problems in education systems by enabling expanded access to education services and helping to bridge quality gaps in education" (p. 5). The document states that ICT will be infused in the entire Nepali educational system to support administrative activities and to enhance the activities of teaching and learning (e.g., p. 9). Being specific to higher education, the document

states that the ICT capacities of tertiary level educational institutions will be enhanced so that learning outcomes improve through the use of digital tools.

Additionally, this document also states that the entire population of Nepal will have access to the internet by 2020, and, at least, 75% of the total population will be digitally literate by that time. Such a statement carries values as regards to promoting technology use in education. However, when that is considered against the IDU statistics discussed above in Section 2.10, it can be argued that much is yet to be done in the area of technology infrastructure to achieve those goals as ICT access is very limited.

Furthermore, the document does not specify who makes the general population digitally literate and whether schools, teachers and TEs have any roles in that. This is important in that the ICT in Education Master Plan (2013-2017) (see the ensuing section for a detailed discussion) aimed to use school labs as the community centre for ICT literacy. For this to happen, teachers and students need to possess the knowledge and skills required to use digital tools.

As for the access of internet for all, studies have pointed that connecting rural areas to the internet is very challenging in Nepal, primarily because of mountainous geography (Shields, 2011), cost and policy issues (Regmi, 2017).

Nonetheless, to state that ICT will be integrated into all educational activities in schools and the tertiary level is significant as they align with the MoEN's effort to integrate ICT into mainstream education. The other reason such statements are important is that they can be expected to create discussions and planning towards the directions of using technologies in education.

2.11.2 ICT In Education Master Plan (2013-2017)

The ICT in Education Master Plan (2013-2017) (Government of Nepal Ministry of Education, 2013) was one of the key policy documents reviewed in this study. This document laid out the goals, objective, plans and procedure of a five-year-long ICT project that MoEN initiated.

The project aimed to embed digital technologies in education to bring equity in access to education, promote the quality of educational delivery and promote digital literacy. Other goals of this project were to reduce the digital divide and to improve the service delivery system in education (Government of Nepal Ministry of Education, 2013).

The document listed four components as its major activities. These were developing ICT infrastructure, training human resources, creating digital learning materials and enhancing education systems. Of the four components, the second one, namely, 'developing human resources' is of interest to the present study. The document identified teachers, ICT trainers, decision-makers and managers at schools as the key stakeholders to influence technology integration in education.

Likewise, it also noted that there is a "lack of skilled ICT human resources at the schools and training centres" (Government of Nepal Ministry of Education, 2013, p. 18). Thus, the document states that they will train/hire master trainers with expertise in ICT in education, who will then train select groups of teachers from schools. Then, those teachers are expected to cascade their learning to their colleagues at the schools.

As regards to teacher education, while the document acknowledged that it was an area of concern, there was no discussion whether teacher education referred to short-term in-service teacher training or pre-service teacher education courses or both.

Likewise, the document does not discuss anything about the possible roles and the potential contribution of teacher educators and pre-service teacher education activities.

Therefore, it can be argued that key policy documents on technology integration (such as the one discussed in this section) overlooked the role of teacher educators and the pre-service teacher education courses.

2.11.3 School Sector Development Plan (2016-2023)

School Sector Development Plan (SSDP) (Government of Nepal Ministry of Education, 2016b) was included in the review because it was a successor of the ICT in Education Master Plan (2013-2017) and continued the activities it initiated and implemented. SSDP (2016-2023) identified ICT as a medium for improving classroom delivery, increasing access to learning materials and enhancing the efficiency of educational governance and management.

It is further stated in the SSDP that embedding ICT in mainstream education will enhance the access to quality in education and give students technological skills to be globally competitive. For that, the MoEN writes in SSDP (2016-2023) that it aims to set up the physical infrastructure required for technology use, and offer professional development opportunities on technologies use to teachers to enable them to embed ICTs in teaching/learning activities. Likewise, MoEN aims to create e-learning resources in maths, science and English subjects for teachers' and students' use.

While the document lays a plan for teachers' professional learning and development, the document has failed to consider the potential contributions that the teacher education courses make by educating pre-service teachers on technology use.

The SSDP also states that most existing teachers do not have the required expertise to embed technologies. Therefore, training them on ICT use takes extra

investment and effort. Whilst this argument is valid, MoEN has failed to notice that they could minimise such efforts and costs if the reforms they are initiating are reflected in teacher education courses. By promoting technology use in teacher education courses, many future teachers could be trained in technology use.

2.11.4 Higher Education Policy (2015)

The other document included in this review is the 'Higher Education Policy' (2015) (Government of Nepal Ministry of Education, 2015) document, which was developed by the MoEN, in consultation with the University Grants Commission and the university representatives. It set priorities and strategies to promote quality in higher education in Nepal. The reading of the document established that this document, like other national level directives and policies, identified the use of digital technologies to be a mechanism to ensure quality in education.

Furthermore, this document stated that higher education has failed to leverage digital technologies to enhance quality and to remain competitive internationally (p. 2). Therefore, it noted that the higher education institutes in Nepal should aim to enhance the digital skills and attitude of the students through technology use (p. 3).

However, like other policy documents, it has failed to lay out the activities to be undertaken to integrate technologies despite expecting everyone involved in higher education activities to use technologies in teaching and learning.

2.11.5 EFL teacher education curriculum

The review of the curriculum included the curriculum of the Bachelor of Education (BEd) and the Master of Education (MEd) in English language education at Tribhuvan University and MEd in English language teaching (ELT) at Kathmandu University. The focus of the review was to ascertain what components and content these

documents included in the syllabus to educate future EFL teachers on technology integration in their practice.

The reading of the curriculum showed that there is some rhetoric on technology use in EFL education. For example, it was observed during the review of the documents that ICT to teach EFL was included as a chapter in the one module in the MEd Course at Tribhuvan University. However, neither university had an independent and compulsory module on technology integration in EFL education courses. The lack of a dedicated course on technology use was also noted by Dhakal and Pant (2016) in their review of teacher education curricula both the university.

As regards to Kathmandu University, the readings of the curricula of EFL teacher education established that there is some rhetoric related to technology use in education. It was noted that ICT tools are promoted as pedagogical tools because the university considers them to be mechanisms to bring qualitative changes in classroom delivery and educational activities (KUSOED, 2016). An example of this is the effort placed in blending its courses through the use of virtual learning management system called Moodle. During the collection of data, it was observed that Moodle was an integrated part of the teaching/learning activities (see Chapter 6 for more discussion on Moodle use).

As for the ICT component in MEd in the ELT programme, it was observed that 'technology in language teaching' is included as a chapter in one module in their MEd course. Similarly, it has an elective module on technology use in English language teaching (KUSOED, 2014). The module is titled 'EDEL 334 ICT in English language teaching and learning'. The course introduction states that the module aims at creating discussion on how technology could be used for teaching and learning of English language through collaboration and project-based approach. Likewise, it also noted that

> "This course reflects the changes in the information, exchange of technology and will be able to provide the students with the required level of skill to use computers in teaching-learning English. Students will acquire skills to use computers for processing documents, developing teaching, learning materials (audio/visual) and organizing collaborative learning of English. Students will also undertake projects based on the application of [ICT tools] in English teaching throughout the course. The course focuses to develop the ability of designing audio/visual teaching aids and effective presentation with the help of some basic software and [it aims] to develop skills of using some software [related to] English teaching and learning" (p. 12).

The private university seemed to have some policy discourse on technology use. As well as having a chapter on technology use in one module, the teacher education institute was found to have the policy to promote Moodle use to blend their courses.

2.11.6 Implications of policy review

The readings of the dossiers on ICT in education demonstrated that there is a general expectation at the policy level for the use of technologies in the entire higher education system. Therefore, it has been suggested in the higher education policy and the national ICT policy that the potential of the technologies should be leveraged.

Likewise, there is an expectation that future teachers will gain technological expertise alongside content and pedagogical knowledge. This expectation is reflected through the 'Teacher Competency Framework-2016' (Government of Nepal Ministry of Education, 2016a) and SSDP (2016-2023).

However, the review of the policy documents also established that the use of ICT in teacher education is overlooked. For instance, while the teacher competency

framework lists the competencies of a graduating teacher, the MoEN has failed to state how this will be attained in the pre-service teacher education courses.

Furthermore, there were no professional standards or ICT standards for teachers, pre-service teachers or teacher educators. Though the 13th Five Year Periodic Plan of Nepal Government (Nepal Planning Commission, 2014) and the ICT in Education Master Plan (Government of Nepal Ministry of Education, 2013) stated that ICT standards and competencies framework would be designed by 2017, the documents were not publicly available till mid-2019.

As for the teacher-training course, the primary teacher preparation programs in Nepal, Bachelor's in Education (BEd) and Master's in Education (MEd) have a limited content/information related to ICT use. There is a discrete component on 'Modern Technologies' in 'English Language Teaching Methodology' in English as a foreign language (EFL) course in MEd level.

Teacher educators and pre-service teachers both make use of technology such as email, social networking sites, data projectors and virtual learning spaces. Though such practices might be informative, whether it contributes to the effective integration of educational technology in school classrooms is the concern (Bakir, 2015). For effective integration of technology in the future teachers' practices, technology training has to be an integral part of the entire teacher training courses (Bakir, 2016). As Røkenes and Krumsvik (2014) also contend, educators have to demonstrate to the pre-service teachers how different ICT tools could be combined into pedagogy and content by using them seamlessly in pedagogical activities.

2.12 Conclusion to the Chapter

The review of literature in this chapter demonstrated that TEs are the linchpin in educational reform practices. Despite being called hidden professionals, as they do not always receive the support they require, they play an important role in educational reforms. Because they are second-order teachers and teach future teachers, the quality of their practices influences the educational undertakings in the school classroom. In that context, their digital practices – their competencies and uptake of ICT tools in pedagogical practices - impact future teachers' technology uptake in educational practices.

The review also demonstrated that TEs' digital competencies are different from that of other professionals as they are required to demonstrate the use of digital tools and discuss the didactic underpinnings of such usage. For educators to be able to use digital tools in the desired way, they have to engage in technology-related professional development/learning activities. However, the literature suggested that TEs are not able to support the development of future teachers' digital competencies. That is because they lack the digital competencies, and they do not always receive the necessary support to develop such proficiencies. Further, teacher educators' ICT-related professional learning has not been thoroughly investigated to understand what activities meet educators' learning needs. Also, lacking is the information on the purposes of technology use by teacher educators.

While limited information is available on TEs' actual ICT use, it was seen through the review that their practices are influenced by external and internal factors. While the external factors are issues beyond the control of teachers, such as access, infrastructure, ICT support at the institutions, internal factors that influence technology use are knowledge, beliefs and skills.

The review of the educational context of Nepal demonstrated that limited policies and directives are available on technology use in higher education practices. While educators are expected to use digital technologies, there is no guidance on what they are expected to do. A lack of clear policy has not been helpful in creating a conducive environment to sustain educators' digital practices.

In the following chapter (Chapter 3), the theoretical framework that this study draws on to generate, analyse and understand the data has been presented.

Chapter 3 – Theoretical Framework

In the previous chapter, a review of literature was presented. The review established that as second-order teachers, TEs' digital practices are important for seamless uptake of digital technologies in educational activities. Therefore, their digital practices warrant discussions based on empirical data.

In this chapter, the discussion focuses on the review of the theory that undergirds this study, which is built on the belief that for a seamless use of technology in his/her practice, as well as having right attitude, skills and knowledge, a TE has to negotiate with the socio-cultural context of the classroom and the institute. Therefore, in seeking to understand the complex interplay between teacher educators, their technology practice and the context that surrounds them, this study draws on Activity Theory also known as Cultural Historical Activity Theory (CHAT) (Engestrom, 1987).

However, unlike most studies founded on Activity Theory, this study does not implement any interventions. Instead, it draws on the components of Activity Theory to make sense of the findings in the study. In that sense, the use of Activity Theory is heuristic in nature and deliberately discerning rather than dogmatic.

The chapter begins with a brief historical overview of the Activity Theory to ascertain the aspects that are most relevant to the present study. In delineating second generation research in Activity Theory, the constructs are discussed and contextualised in the present study, and the activity system that this study draws upon during the analysis is presented. Followed by this, agency and contradictions are discussed. Agency, which is related to TEs' technology-related beliefs and attitude, is believed to have played an important role in TEs' digital practices in an environment where TEs

had to overcome different barriers, which manifest as contradictions in the activity system.

3.1 Activity Theory

Propounded by Engestrom (1987; 1999), 'Activity Theory' is founded on Vygotsky's (1978) concept of socio-cultural tools mediating human learning and Leontiev's (1981) work on 'activity'. Activity Theory provides a framework to understand changes (Engeström, Engeström, & Suntio, 2002) as Activity Theory analyses "development within practical social activities' (Sannino, Daniels, & Gutiérrez, 2009). This theory holds that we are surrounded by various contexts in learning and living; thus, those contextual factors inform the practices (Terpstra, 2015). Activity Theory can successfully study the influences of those factors without taking a reductionist approach (Engeström & Miettinen, 1999) and provides a conceptual framework that helps to locate the major loci, including people and tools, that influence human cognition when participating in an activity (Lim & Hang, 2003).

Engeström (2001) maintains that the theoretical foundations of Activity Theory have passed through three phases of research: the first phase focuses on mediation; the second discusses the collective activity and individuals; the third one, which is the most contemporary phase, is about multiple, interacting activity systems and boundary-crossings between them. Whilst one phase of the theory has contributed to the development of the subsequent one, the names do not suggest that the latter is a better version than the former. All of the generations of the Activity Theory exist in their own right and can be useful in understanding the teacher educators' digital practices. The ensuing sections discuss those three phases and how they support the analysis of the data in the present study.

3.2 First Generation Activity Theory

The first generation of Activity Theory (see Figure 3.1) emerges from Vygotsky's work on socio-cultural mediation of actions, which avers that "humans' interactions with their environment cannot be direct but are instead always mediated through the use of tools and signs" (Igira & Gregory, 2009, p. 435). Therefore, human consciousness emerges from human activity that is mediated by physical as well as cognitive tools, including culture and language.

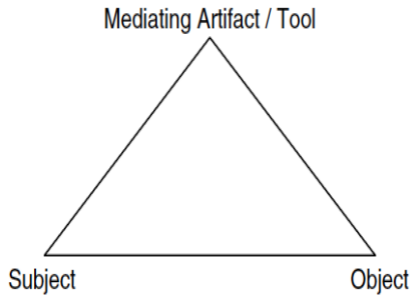

Figure 3.1: Vygotsky's tool-mediated action triangle (adapted from Yamagata-Lynch, 2010)

In mediated action, the subject is the individual (or individuals) involved in an activity. The mediating artefact/tool comprises physical tools, prior knowledge and experience, or significant others (such as a more experienced person) and they contribute to the subject's activity. The object is the motive behind the activity. In the present study, subjects are teacher educators; mediating artefacts and tools include the TEs' beliefs, digital tools and ICT resources; and, the object is to use digital technologies to enhance teaching and learning process.

The tool-mediated action model espouses that cognitive and physical artefacts mediate the actions of the subject upon the object. Vygotsky believed that individuals are in a constant meaning-making process of the world in interactions with the

environment that surround them while engaging in activities that modified artefacts, tools and other people in their environment (Yamagata-Lynch, 2010). A key contribution of Vygotsky's theory was that semiotically produced cognitive tools were also mediators other than physical tools.

Mediation is an important aspect of Vygotsky's work on the cognitive development of the mind. It is built on the notion that tools "mediate or shape the way human beings interact with reality" (Uden, Richards, & Gasevic, 2008, p. 18). As "humans do not act directly on the physical world, but rather use tools as a way of indirectly mediating actions" (Maher, 2006, p. 14), AT emphasises tool-mediated action in context (Russell, 2002) because tools, in an activity system, not only connect subjects with the motive of activity but with the people (Leontiev, 1981). AT presupposes that all human actions are mediated and human experience is shaped by the socially-culturally grounded tools and artefacts (Kuutti, 1996; Nardi, 1996).

The significance of mediation in AT can be illustrated further with the following quote by Kaptelinin and Nardi (2006). They contend:

> "In activity theory, people act with technology; technologies are both designed and used in the context of people with intentions and desires. People act as subjects in the world, constructing and instantiating their intentions and desires as objects. Activity theory casts the relationship between people and tools as one of the mediations; tools mediate between people and the world." (p. 10)

Therefore, human learning is mediated by cultural artefacts, including semiotic and materials artefacts. (Lantolf, 2000). It is contended that humans can find solutions to the issues and master social situations by using culturally grounded physical and intellectual tools (Instefjord, 2015). In that sense, the teacher educators' technology-related professional learning and the practices that follow are mediated by web-based

platforms, online courses, formal/informal professional networks (physical tools), and the TEs' ICT knowledge/skills, ICT-related beliefs and agency (cognitive tools).

Human beings not only act on their environment with tools, but they also think and learn with tools. As a result, mediation shapes both external activities and the internal ones (Russell, 2002). Therefore, the kind of tools that the TEs access in their effort to learn about technology determines what they learn and how they learn. Thus, when TEs' learning activity is considered, relationships between the tools of various kinds and how they mediate the learning is considered.

Other than mediation, the first-generation of research in AT also focused on how individual development happens through the process of internalisation. It is "how the individuals processed their learning through the mediated action to develop individual consciousness through social interactions" (Yamagata-Lynch, 2010, p. 17). Internalisation was considered to be the development of consciousness in individuals because it leads to appropriation.

Appropriation is "the process of…taking something that belongs to others and making it one's own" (Wertsch, 1998, p. 53). In due course of practice, the subjects may begin to realise the values of the cultural artefacts, which they meet in a specific (and possibly different) contexts (Instefjord, 2015). Such realisation leads to making the artefacts a part of the identity, which is appropriation (Kaptelinin & Nardi, 2006). Given the participating TEs are the early adopters of ICT tools in their practice, it is believed in this study that internalisation and appropriation are significant in their digital practices.

Whilst the first generation of research in Activity Theory contributed to its development, the focus of Vygotsky's work remained on individuals and did not address the cultural evolutions (Engeström, 2001; Igira & Gregory, 2009). Russian

scholar Leontiev (1981) considered the collective nature of work in his work, which is popularly known as the second-generation activity theory (Engeström, 2000).

3.3 Second Generation Activity Theory

Second generation Activity Theory (Figure 3.2) explores the collective nature of human activity. The object-oriented activities, namely, the reasons individuals or groups of individuals participate in an activity, is the unit of analysis with three hierarchical levels: operations, actions and activity (Barab, Evans, & Baek, 2004; Yamagata-Lynch, 2010).

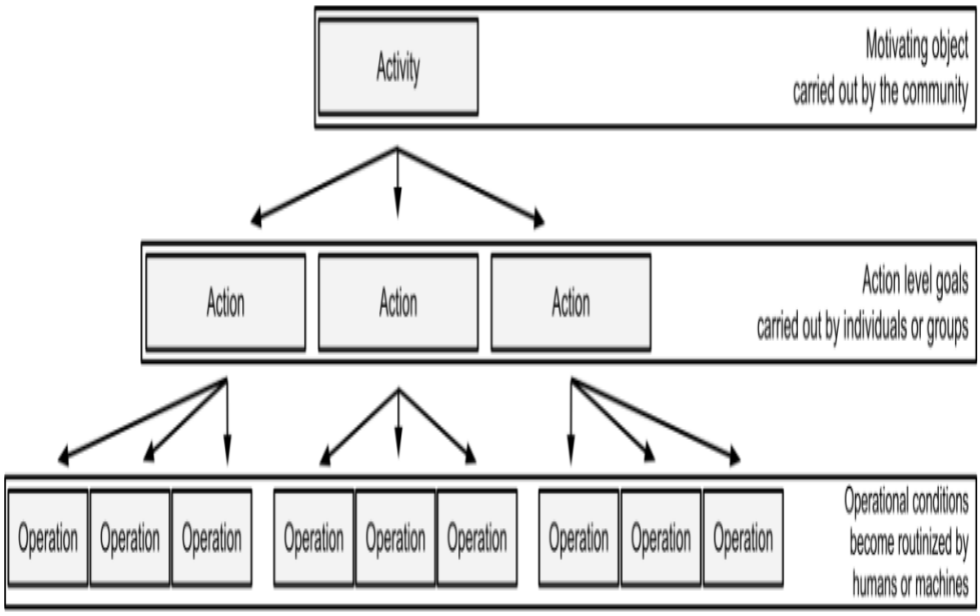

Figure 3.2: Hierarchical levels of an activity (adapted from Leontiev, 1981)

Operations are the basic level of human activity, and after a series of operations, actions take place at the next level. Goal driven actions are temporary and help the participants to achieve the ultimate purpose of the activities as they lay the foundations of the object-oriented activities (Engeström, 2000; Yamagata-Lynch, 2010).

In the case of an EFL teacher educator who is willing to use digital technologies in a writing class, learning about the use of a Google Doc to teach process writing is an

example of operations. When the teacher educator learns the basics of the tool (i.e., successfully engages in operations), she/he then shifts attention to using Google doc in lessons, which are goal-driven actions. The object-drive activities include the activities that the educational institute carries out to support TEs in their use of digital tools. The support can come in different forms, such as providing ICT facilities, professional development opportunities or other required resources, such as time for planning lessons that use technology. Such object-oriented activities guide teachers' engagements at the operations and actions level with the desire to improve students' EFL writing skills.

The basic framework of an activity system is founded on the second generation of AT, which Engestrom (1987) expanded by adding analytic tools useful in modelling the activity systems as demonstrated below in Figure 3.3.

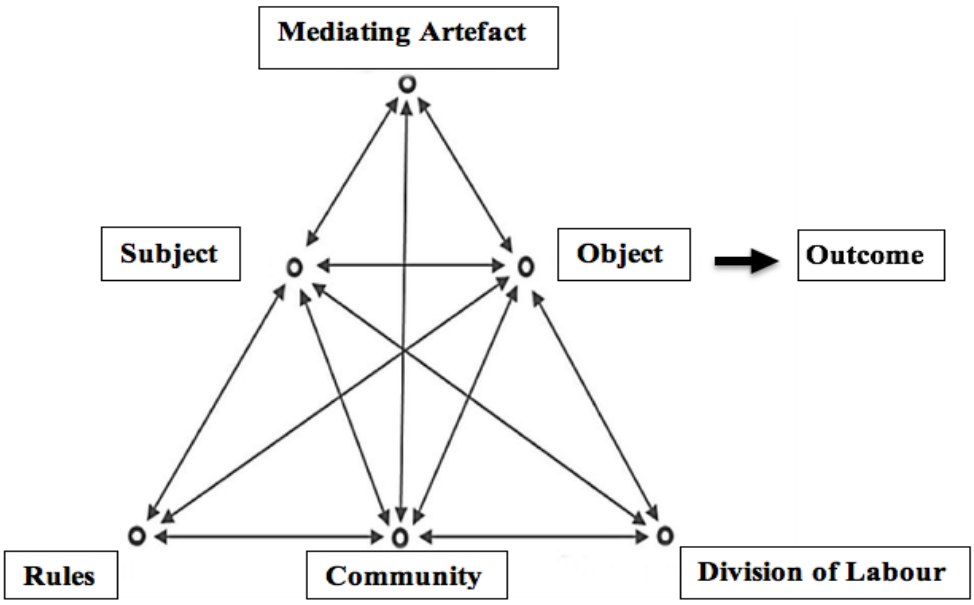

Figure 3.3: The diagrammatic representation of an activity system (Engeström, 2001)

As can be seen in the Figure above (Fig. 3.3), an activity system comprises different elements (Gedera & Williams, 2016). Those elements are subject, object, tool, division of labour, community and rules.

3.3.1 Subject

In the model (Figure 3.3), the subject is the actor, and it is his/her/their perspectives that are considered in the analysis (CRADLE, 2016). The subject is generally aware of the motive of the activity (Leont'ev, 1978). In this study, the subjects are the EFL teacher educators teaching BEd/MEd teacher education courses, English language teaching or English language education in two Nepalese universities. As shall be discussed in Chapter 7, most TEs used different kinds of digital tools in their curricular activities to enhance their practice.

3.3.2 Mediating Artefacts

When a subject decides to undertake an activity, their actions are mediated by tools and artefacts of different nature. Such tools can be physical (tangible tools) or cognitive (abstract concepts such as language, knowledge, belief and skills). In the present study, the tools included a broad range of artefacts that TEs could draw to engage in an activity. While the physical tools involved traditional tools (such as books, pen, board and physical classroom), digital technologies (laptop, internet, smartphones, web 2.0) and related software, programmes and applications; the cognitive tools considered in analysis were teacher educators' digital competencies (digital skills, knowledge, attitude and beliefs), their agency, English language competencies and pedagogical/content knowledge.

3.3.3 Object

The object is the driving factor in an activity (Kaptelinin, 2005). It is the object that is transformed into outcome with the help of the artefacts. Unlike other components of the activity system, the object is shown in a circle to imply that the "…object-oriented actions are always, explicitly or implicitly, characterized by ambiguity, surprise, interpretation, sense-making, and potential for change" (Engeström, 2001, p. 134). Engeström (2000) maintains that the object provides a stimulus for actions and their continuity. The object in the activity – when TEs are considered as the subject and their digital practices as an activity system – is to use digital technologies in their pedagogical activities when teaching teacher education courses and the outcome is to enhance the teaching/learning experiences. Chapter 7 teases out the outcome of technology use in teacher education activities.

The objects differentiate the activities from each other, but they do not necessarily transform into outcomes immediately but through phases. The subject and the object are in a mutual relationship as the subjects transform the objects, and the constituents of the object transform the subject, which is called internalisation. This can be related to TEs' learning about technology use, and later, after gaining required skills, their practices are transformed by their newly learnt knowledge, and when the technology features as an inevitable part of the TEs' practices that can be called internalisation. Practice and internalisation change activities into actions and then to the operations, and they "become more automatic, requiring less conscious effort" (Jonassen & Rohrer-Murphy, 1999 p. 63).

3.3.4 Community

The community in the activity system refers to different individuals, groups and sub-groups that have allegiance to the subject and are involved in the activity. The different members in the community are said to have a communal motive and that "drives the collective activity system" (Engeström, 2000, p. 964). The communal motives are related to the outcome and embedded in activities. Thus, they are the lifelines of the activity as they ensure the ultimate continuity, order, and meaning to the activities in the system. A lack of communal motive results in contradictions (see Section 3.4 below) and misfits in the activity.

The community involved the educational authorities at the national level, TEIs, institutional leadership, colleagues, administrative/management staffs at the TEI, and pre-service teachers. Because TEs used various sources of learning to enhance their digital competencies, the community also involved members from their professional learning community and the wider EFL fraternity. As for the communal motive, this study explores in Chapter 5 to what extent different stakeholders shared TEs' motives of integrating digital tools in the teacher education institutes.

3.3.5 Division of labour

Division of labour is the specification of responsibilities, power and status to the member of the community (CRADLE, 2016). So, it refers to both the vertical and horizontal division. Because the activity system is made up of multiple actions that are carried out by different individuals, the responsibilities of people are divided both vertically and horizontally. Division of labour is consolidated by the distribution of the product (motive) of the activity (Leont'ev, 1978).

In the context of the present study, the division of labour included the roles and responsibilities of the members of the community. Within the context of TEI, the horizontal division of duty was the responsibilities assumed by different departments at the institutional level, which included the IT manager, support staff, finance and management staffs. The vertical division of duty included the roles and responsibilities of TEs, institutions and higher authorities concerned. When TEIs engaged in digital practices outside the context of TEI, there were other divisions of roles as well. For instance, those included the roles played by the online course provider/instructor when TEs participated in an online course.

3.3.6 Rules

The rules are the overt or covert norms and standard procedures that afford or constrain actions and their interactions in the activity system (Kuutti, 1996). Rules regulate the community's actions and interactions while operating with the tools – both physical or cognitive (skills, knowledge, beliefs and attitude) artefacts that mediate actions – and their interactions in the activity system. The figure below (Figure 3.4) is a

diagrammatic representation of these tools in the context of this study.

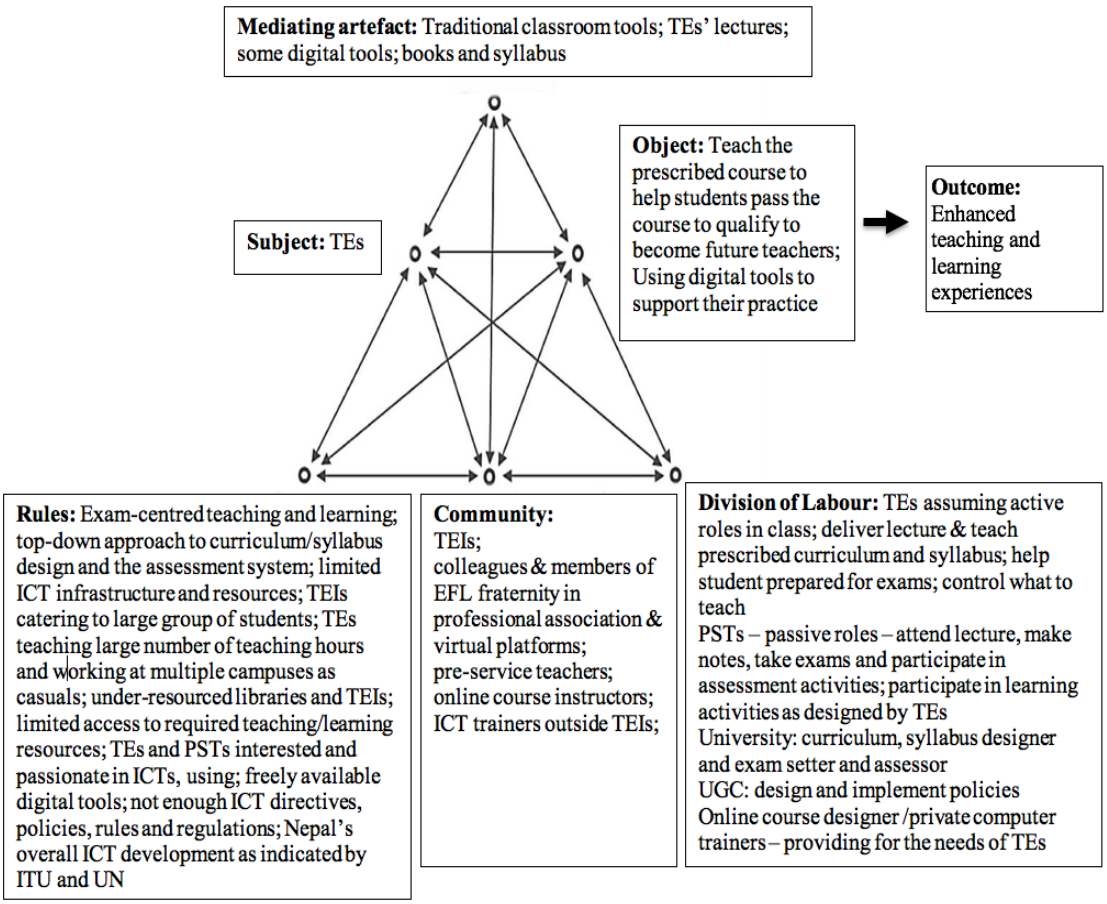

Figure 3.4: The basic activity system under consideration in this study

As can be seen in the figure above, the rules included contextual factors at the macro level (national policies, Nepal's ICT development indices, see Section 2.10 and 2.11), meso level (e.g., institutional realities, curriculum, syllabus and exam) and micro level (classroom realities and internal factors). When a TE decides to use digital tools in his/her practices, it enters the educational sphere with its own cultural and contextual realities as discussed above. Therefore, these factors influence TEs' practices in different ways. While some facilitate TEs' digital practices, others obstruct.

As well as examining the digital practices as demonstrated in the activity system above (Figure 3.4), the study also explores the activity systems related to different sources that TEs draw upon for their ICT-related professional learning. The information

gleaned from these systems will be helpful in ascertaining different features of such learning activity and their contribution to enhancing TEs' digital competencies.

3.4 Third Generation Activity Theory

All of these units in the activity theory framework are meaningful, and they assist in understanding human activities. Because activity systems exist within a socio-cultural setting, such as a classroom, a school or a society, to comprehend TEs' digital practices, it is necessary to consider how these factors coalesce to influence (hinder or facilitate) what, how, why and when they use ICT technologies in the EFL teacher education activities. Because some of the elements of the activity system demonstrated above (Figure 3.4) may exist as activity systems in their own right, their influence can be understood better when seen from the lens of the third-generation activity system (Figure 3.5).

The third generation of Activity Theory recognises the existence of other activity systems and their influence on the primary/basic activity systems. Under this notion, the unit of analysis is expanded to two minimal interactive activity systems (Engestrom, 2001). It is argued that the activities are not secluded units but crisscross in the hierarchies and systems, and they are impacted by other activities and alterations in the milieu (Kuutti, 1996). It is for these reasons the activity systems related to different learning activities are discussed in Chapter 6.

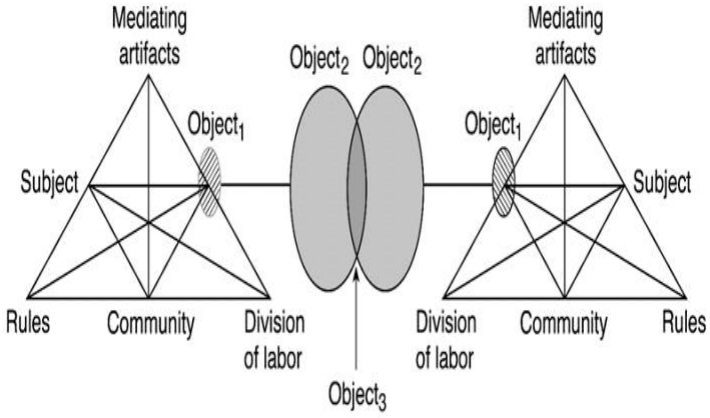

Figure 3.5: The diagrammatic representation of two interacting activity systems (Engeström, 2001)

Engeström (2001) asserts that the third-generation Activity Theory is underpinned by five assumptions. The first of these is that the Activity system, which is collective, tools-mediated, and object-oriented, is the primary unit of analysis. Second, it is a community of manifold perspectives, concerns and concentrations. These multiple perspectives can be the sources of contradictions and a source of innovation (Engeström, 2001).

The third assumption is that activity systems take time to get transformed and shaped. Hence, they can be understood against their own history. Therefore, in an activity system analysis, an understanding of the dynamics, the histories of the activity and its objects need to be considered (Engeström, 2018). Therefore, before discussing TEs current technology-related professional learning activities, the analysis explores how TEs gained the basic computer skills and their impact on their more recent digital practices.

The fourth assumption believes that contradiction is the source of disturbances and conflict, which results in change or development. Because it is one of the principles

of Activity Theory that has been studied extensively in this study, it is discussed in greater detail below in section 3.4.

The fifth assumption argues that the activity system has a possibility of expansive transformation. When contradictions in an activity system become more noticeable, some participants question and deviate from the established norms. Such deviation can lead to a collaborative deliberation, which initiates change in the object and the motive of the activity, which is known as expansive learning (Engeström, 2001, 2018).

Engeström and Sannino (2010) define expansive learning as "…learning in which the learners are involved in constructing and implementing a radically new, wider and more complex object and concept for their activity" (p. 2). That is so because learners are continually learning about things which are not predefined and not yet there to construct a new object for their activity and implementing that into the practice (Engeström & Sannino, 2010). From that perspective, TEs' digital practices which involves learning about technology volitionally and using ICT tools in teacher education practice without a mandate reflects expansive learning because their new practices are likely to introduce changes in the teacher education process.

Expansive learning is undergirded by a few theoretical tenets: communities as learners, transformation and creation of culture, horizontal movement and hybridisation, and formation of theoretical concepts (Engeström & Sannino, 2010). From these theoretical premises, the study draws on the notion of horizontal movement and creation of culture to discuss how teachers' learning of technology is a horizontal movement from having limited knowledge about ICT to learning about and with different digital tools. Likewise, the study will focus on how TEs have been able to implement their ICT skills in teaching and learning and enhance pedagogical practices in EFL teacher

education. The study refers to these constructs of expansive learning when discussing data related to teachers' practices. However, the study does not completely base its discussions on expansive learning because it does not involve any intervention to map TEs' practices to different elements of expansive learning.

While expansive learning is the transformation of the object, subjects' involvement in such expansion is influenced by their willingness. Therefore, subjects' volition, or in other words 'agency', plays an important role as well. Thus, the next section looks into the notion of agency.

3.5 Agency

Agency, in a broader sense, is understood as the human capacity to be the authors of one's own activity using mediating tools. It relates to how subjects initiate and continue their activities by providing them with shapes and directions.

Agency is defined as an individual's abilities to take purposeful action, which is defined by his/her will, independence and volition (Engeström, 2006; Lipponen & Kumpulainen, 2011). It is also related to one's abilities to solve an existing problem, situation or contradiction with the use of cultural means (Thorne, 2015). In such a situation, it is one's agency that influences their negotiation, ownership and the control of the issue or the mediating artefacts (Sannino, 2016).

Because the notion of agency has been discussed in various canons of literature, there are various interpretations of it. These can be categorised into three categories: agency as a variable, agency as capacity and agency as a phenomenon (Priestley, Biesta, & Robinson, 2015). Whilst the first category sees agency in relation to structure, which is abilities for independent actions on behalf of the principal (Biesta & Tedder, 2007),

the second category is about one's abilities to critically assess a given (problematic) situation and shape a response to that (Biesta, Priestley, & Robinson, 2015).

The third category, however, disagrees that agency is just an individual capacity or a fixed disposition. It argues that agency should be considered vis-à-vis something that is achieved through one's engagement with the conditions presented in the environment (Biesta & Tedder, 2006; Emirbayer & Mische, 1998; Priestley et al., 2015). Agency is considered as something that emerges out of the actors' actions by means of the context or something that is done in social practice (Lipponen & Kumpulainen, 2011).

Emirbayer and Mische (1998), in their seminal paper, argue that agency emerges out of the dynamic interplay of three dimensions: influences from the past, orientations towards the future and engagement with the present. That suggests that agency is an ongoing process situated in the context and the history of the individuals, and is multi-faceted and relational (Edwards, 2007, 2015).

From the review of literature, it was found that teacher-agency has been a subject of little explicit research and lacks theoretical grounding (Biesta et al., 2015). There is limited scholarly work around teacher-educators' agency despite it being important for several reasons, including teacher/teacher educator professional development (Lipponen & Kumpulainen, 2011). Lipponen and Kumpulainen (2011) further argue that agency is a prerequisite in teachers' meaningful engagement in the learning environment and in transforming their practices.

Adopting the view of 'agency as phenomenon', this study argues that TEs' agency is TEs' abilities and intention to engage in digital practices using the resources in their disposal, and that such engagement is influenced by their past experiences of using and learning about digital technologies and is oriented towards their future

activities of EFL teacher education. While TEs' agency is believed to be pivotal in their continuous engagement in their digital practices, their agency is related to their ICT-related beliefs and experiences. Thus, it is in the interest of this study to investigate how TEs' agency comes into play in their undertaking of technology-related learning opportunities and using different digital tools in teacher education practices, and what beliefs underpin their agentic actions.

3.6 Contradiction

One of the five principles of the third generation Activity Theory is 'contradiction'. Because activities are developmental, and the process of activity is discontinuous - as the activities are not isolated and straightforward - different factors give rise to imbalances in the activity system when a new element is adopted (Gedera, 2016). These imbalances are called contradictions. They manifest in an activity system as obstacles, interruptions, misfit, conflicts and caveats (Engeström, 2001).

However, they are not problems as they provide opportunities for changes and developments (Tay, Lim, & Lim, 2013). They are inevitable because activity systems continuously work through contradictions (Engeström, 2000; Gedera, 2016). Recognition of contradictions in the activity system directs the focus to the origin of the disturbances, which can result in changes (Engeström, 2000). The acknowledgement of the contradictions provides opportunities to explore other possibilities (Engeström & Sannino, 2010).

Contradictions can appear within or between the components of the systems. Four levels of contradictions have been identified based on their occurrence. They are primary, secondary, tertiary and quaternary (Engestrom, 1987). While primary contradiction occurs within the elements of an activity system, the secondary contradictions occur between the elements of the activity system. Tertiary

contradictions "arise when activity participants face situations where subjects have to use an advanced method to achieve an objective" (Gedera, 2016, p. 58).

The quaternary contradictions appear between the primary and the secondary activity systems. Because activities are interrelated, if the actions in the primary activity system are influenced by the happenstance in an external activity system, it is considered to be a quaternary contradiction. An example of the quaternary contradiction is policy-making activities at the national level – despite being an independent activity that happens outside the TEIs negatively influencing TEs' classroom based digital practices.

Because human actions are situated in culturally, tool-mediated and historically developed activities, the extent of technology use by TEs in their practice depends on multiple factors that surround teachers and their interplay (Brummelhuis, 1995; Murphy & Rodriguez-Manzanares, 2008). Likewise, TEs' beliefs, attitude and competencies influence the technology practices of teacher educators (Murphy & Rodriguez-Manzanares, 2008). Activity theory can tap into these "complex interactions and relation…of constitutive elements of the system under investigation" (Engeström & Meittinen, 1999, p. 9).

The identification of misfits or the external influences in ICT integration is stated to be useful in describing the organisational dynamics in the process of knowledge creation (Karakus, 2014). For example, Gedera (2016) used the notion of contradictions to identify the challenges that students and teachers felt when blended learning was used in a university course. Gedera (2016) argued different kinds of contradictions were identified in the process of use of blended learning. These results were similar to that of Ramanair (2016) in that he also looked at the contradictions, and

concluded that contradictions existed between the subject and the object as the teachers' (subjects) conceptualisation of the object (teaching spoken English) was not correct.

Similarly, Blundell et al. (2016), in their case study of six teachers, used Activity Theory to identify the extrinsic influences in the use of digital technology and contextualised that knowledge to reduce the effect of such influences. Likewise, Tay et al. (2013) examined contradictions that educators experienced when digital technologies were introduced in classrooms. Both the studies identified that contradictions of different nature influenced technology uptake in teaching and learning.

Tay et al. (2013) also considered the influence of the internal factors in the technology use and concluded that teachers' beliefs, as a separate activity system, created contradictions in TEs' technology uptake. This finding establishes that it is necessary to consider the contradictions caused by beliefs because they influence technology uptake and integration (Castro & Nyvang, 2018; Ertmer et al., 2012; Garling, 2016; Hasan, 2017).

In some cases, even when the subjects' beliefs align with technology use, contradictions can occur if the community does not believe in ICT use. Guzman (2016) argued that even when educators are enthusiast about technology use, secondary contradictions can occur due to a misalignment with the community. This finding was echoed further by Castro and Nyvang (2018) in their review of technology use practices of the professors in a Costa Rican university. They concluded that some professors, who integrated ICT in their practice, experienced tensions such as compared to other professors who did not use any technology in their practice.

The present study considers contradictions as the misfit between the different components in the teacher educators' technology use related activity system (as shown in Figure 3.4 above). The study identifies contradictions from the data and discusses

how they influence TEs' digital practices. Identification of, and discussion on contradictions helps in exploring context-sensitive ways to infuse technology into teacher education courses.

3.7 Conclusion to the Chapter

The purpose of this study is to understand the digital practices of EFL teacher educators, a less studied area in technology-supported education. Because technology enters the socio-cultural sphere of a classroom, teacher educators' practices and competencies are influenced by various factors at the broader level and the individual level. To understand the interplay between such factors and to analyse the data pertaining to teacher educators' digital competence and practices, Activity Theory and related theoretical tenets have been found as the most useful.

Therefore, in this chapter, efforts were put to explore the foundational and historical overview of Activity Theory and their relationships to this study. Similarly, it was argued that the subject, as the self in an activity system, has a pivotal role to play in sustaining the activities in an activity system. Likewise, the subject's agency was identified to influence the expansion of the object. Therefore, a brief review of the agency was presented, and a plan on how it will be drawn upon during the analysis was laid out. Following this, the notion of contradiction was reviewed. It was argued that the perspectives of contradictions would be used to discuss the interplay of different factors in teacher educators' activity system.

In the next chapter, the methodology of the research is discussed.

Chapter 4 – Methodology

In Chapter 3, the theoretical framework of this study was presented. The chapter focused on the reasons Activity Theory (AT) was considered appropriate to this study, and it established that elements of AT would be used heuristically in this study to illuminate its findings. In addition, a brief historical overview of AT was presented and the elements of the activity systems were mapped against the aspects this study considered during the analysis. Other constructs of AT were also reviewed and their relevance to this study is discussed.

In this chapter the overall research design of this study is presented, situating it as qualitative research which uses case study as the method. The case itself is then presented, along with information about the research participants, data collection tools and procedures. This is followed by the information data analyses. Next, the issues of rigour are considered. The efforts made to achieve rigour and maintain quality are discussed with reference to four issues that can impact research design and results. Finally, the ethical considerations appropriate to the research are presented.

To help readers make an informed decision about extrapolating the application of the findings of this study to their context, detailed descriptions of the methodological choices have been provided.

4.1 Qualitative Research

This research draws on qualitative research methods. It focuses on meaning in context (Merriam & Tisdell, 2016), which occurs in a natural setting in order to understand and interpret reality as people perceive it, thereby allowing a researcher to explore the everyday lived experiences of research participants (Denzin & Lincoln, 2018).

A qualitative research methodology was deemed appropriate for this study because it captures the participants' perspectives and beliefs, which interact with their realities and behaviours (Maxwell, 2013). It can help to comprehensively understand how people interpret and assign meaning to their experiences and construct their worlds (Merriam & Tisdell, 2016). A qualitative approach also helps to gain understanding of an intricate situation that would otherwise be elusive (Maxwell, 2013) – such as technology use in an environment where a broader context is likely to influence teacher educators' digital practices. This belief forms the epistemological position of the research in this study. Further to this, TEs were believed to possess some digital skills, which fostered through experiences and training and that influenced their digital practices. A qualitative study was therefore considered useful because it could explore these nuances.

As has been laid out in three previous chapters, the key focus in this study is the digital practices of teacher educators (TEs) in a Nepalese context where technology penetration is low (e.g. see Internet World Stats, 2017), the technology use environment is not very supportive (e.g. Koirala et al., 2016; Maski Rana, 2018; Regmi, 2017) and there are institutional and classroom realities that influence TEs' practices. Therefore, it is believed in this study that use of ICT (or realities being studied) vary depending on different factors, such as the context in which it is used, physical facilities, skilled manpower - hence, whether implementation of ICT and its use can vary from place to place. This is the ontological position of this study.

The TEs participating in this study were expected to have their own perspectives on digital practices, which would be shaped by their lived experiences and how they interpret and attribute meaning those experiences. In a qualitative study a researcher can capture how individuals form subjective meaning out of individualised experiences

(Merriam, 2009) and generate knowledge by considering the varying nature of individual beliefs, emotions and experiences (Creswell, 2018).

Interpretivism is one of the philosophical positions that broadly underpins qualitative research. According to Merriam and Tisdell (2016), "[it] assumes that reality is socially constructed, that is, there is no single, observable reality. Rather there are multiple realities, or interpretations, of a single event" (p. 9). Because this study was guided by the belief that Nepalese TEs' digital practices are idiosyncratic, which is influenced by their realities and teaching context, it fits well within the interpretivist position.

4.2 Case Study

Case study is a kind of qualitative research design. It is often used to explore a contemporary issue in a real-world context over which a researcher has little or no control (Yin, 2014). A case can be an individual, groups, organisation, event or a scenario (Stake, 2005).

It is argued that case study design is appropriate when research topics are broadly defined, and there is an assumption that the contextual condition impacts the understanding of the issue being studied (Yin, 2012). The use of a case study research was deemed suitable for this study as its topic of concern is broad: digital practices of Nepalese teacher educators in relation to three distinct aspects technology use in education, namely learning about digital tools, how such learning supports their practice, and the influence of external and internal contextual factors in digital practice.

Likewise, it is argued that the nature of the research question is a basic parameter to determine whether a case study method is suitable. Yin (2014) maintains that case study research is suitable when the research questions being asked are about

"how" or "why". Because all the research questions in this study are "how" questions, case study research was considered appropriate for it.

In answering the research questions, this study draws on multiple sources of data (see Section 4.3) collected from different participants because this helps to enhance the validity of the study by verifying the information collected from a single source of data (Merriam & Tisdell, 2016; Miles, Huberman, & Saldana, 2014). With the help of such data from multiple sources, themes and patterns may be generated so that the issue being studied (i.e., Nepalese TEs' digital practices) can be analysed, interpreted and discussed in detail.

4.2.1 Identifying the case

This is a collective case study (Creswell, 2018) – also called a multiple-case study (Yin, 2014) – in that it is based in two universities and their teacher education campuses in Nepal. The cases in this study are the teacher education institutes (TEIs) offering Bachelors of Education (BEd) or Master of Education (MEd) degrees in English language education in Nepal.

Whilst one of the universities was public, the other was privately funded. The public university offered teacher education courses from 25 different constituent and 250 affiliated campuses[1] across the country. Based on the locations of its institutes, regional, semi-urban or urban, the availability of ICT resources and infrastructure in each was expected to differ. Therefore, to encapsulate and represent the realities in its campuses across the country (and their influences in digital practices), 10 campuses

[1] See the 'Glossary' section for the definition of constituent and affiliated campuses.

were purposively selected: five were constituent and five were affiliated. Of the total, four campuses were located in the urban areas (capital city or other bigger cities) and six were located in regional areas across the country.

In regard to the private university, it had only one TEI for teacher preparation courses in the capital city. It offered only MEd programmes in English, Mathematics, and Educational Leadership. At the time of data collection, the private university was only able to offer limited enrolments in each of its teacher preparation courses.

Although the public and private universities campuses differed in their scope, availability of resources and the number of students they catered for, this study does not do a comparative, cross-case analysis. It was believed that comparing institutes that were contrastingly different would not help in achieving the objectives of the research because, in a case study, it is necessary to consider the contextual conditions that influence the cases during the meaning making process (Yin, 2012).

Additionally, as the issue of interest is TEs' digital practices rather than the differences in the university, comparing TEIs would be of little help in achieving the objective of the research. Therefore, this study explores their practices at the personal level rather than at the institutional level.

4.2.2 Participants and sampling

Whilst the cases for this study are the teacher education institutes at two universities, this study is primarily based on the data collected from the teacher educators teaching at those TEIs because the study explored the TEs' digital practices. Therefore, the data for this study were collected from 25 TEs teaching English language education courses at 10 TEIs at the public and one TEI at the private university in Nepal. A decision was made to collect data from 25 TEs from 11 different TEIs because

the study explores whether different contextual factors led to TEs having different kinds of digital experiences. Section 4.3 has information on the data collection tools and processes.

The TEs were purposively selected. In purposive sampling, "particular settings, persons, or activities are selected deliberately to provide information that is particularly relevant to [research] questions and goals, and that can't be gotten as well from other choices" (Maxwell, 2013, p. 308). Some of the factors considered during sampling were TEs' teaching experiences as EFL practitioners; the locations of the TEIs where they taught; and whether they used technologies in their practice.

The EFL practitioners were selected as the key informants for two reasons. The first was related the researcher's experience of being an EFL lecturer and TE in Nepal. Because of my prior association with this professional group, I was able to use the contact details of a small group of TEs working across Nepal to identify possible informants for the interview. The second reason was based on the argument that EFL practitioners have always been at the forefront in using ICT tools for pedagogical purposes (Akcay, Mancilla, & Polat, 2015; Albirini, 2006) because English is the dominant language of the internet (David, 2004).

The TEs had diverse teaching experiences and their ages ranged between 30 and 60 years. While some of them had started teaching six/seven years ago, others had been teaching for more than 20 years. Table 4.1 summarises the details.

Table 4.1: Participant information summary table

Pseudonym	Age Group	Qualification	Experience In Years	Location of campus	Other roles
TE1	30-40	MPhil ongoing	6	Urban area, public university	N/A
TE2	30-40	MEd & MA	6	Regional area, public university affiliated campus	EFL teacher trainer
TE3	30-40	MEd	8	Urban area, public university	Consultant EFL teacher trainer
TE4	30-40	MEd	8	Urban area, public university	EFL teacher trainer & policy advisor
TE5	30-40	MEd x 2	10	Urban area, public university	EFL teacher trainer, policy advisor & researcher
TE6	30-40	MEd & LLM	10	Urban area, public university constituent campus	EFL text book author, consultant policy advisor & EFL teacher trainer
TE7	30-40	PhD Ongoing	10	Urban area, private university	Consultant researcher & EFL teacher trainer
TE8	30-40	MEd	12	Regional city, constituent public campus	EFL teacher trainer & consultant researcher
TE9	30-40	MEd	12	Regional city, affiliated campus	Full-time school teacher & EFL teacher trainer
TE10	40-50	PhD	15	Urban area, private university	Consultant researcher
TE11	40-50	MEd	15	Regional city, affiliated public campus	Full-time programme coordinator at a high school & EFL teacher trainer
TE12	50-60	PhD	20	Urban area, constituent campus	Policy advisor to universities, University Grants Commission and Ministry of Education, on EFL teaching/learning and education, consultant researcher & EFL teacher trainer and trainers of trainers
TE13	50-60	PhD	20	Urban area, private university	EFL teacher trainer, text-book author, researcher and policy advisor
TE14	50-60	PhD	22	Urban area, public university constituent campus	Full-time researcher at the public university's research wing

TE15	50-60	PhD	27	Urban area, public university constituent campus	Faculty Head MEd in EFL course
TE16	45-50	PhD	18	Regional city, constituent and affiliated campuses	Translator, writer & EFL teacher trainer
TE17	35-40	MEd	7	Urban area, constituent and affiliated campuses	EFL teacher trainer
TE18	30-35	MEd	9	Urban area, public university constituent campus	Consultant EFL project manager & teacher trainer
TE19	35-40	MEd	7	Regional city, affiliated campus	Teacher Trainer
TE20	40-45	MEd	7	Regional city, affiliated campus	School inspector at a District Education Office & EFL teacher trainer
TE21	35-40	MPhil	10	Regional city, affiliated campus	N/A
TE22	40-45	MEd	11	Urban area, public university constituent campus	N/A
TE23	35-40	MPhil	2	Urban area, private university	Consultant policy advisor on EFL materials development to the MoEN
TE24	35-40	MA	8	Regional city, public university affiliated campus	EFL teacher trainer
TE25	35-40	MEd	6	Regional city, public university affiliated campus	EFL teacher trainer

As can be seen from Table 4.1, the participating TEs were given alphanumeric codes instead of pseudonyms to protect the anonymity and not reveal their gender as giving pseudonyms to female participants would risk revealing the identity.

For the purposes of this study, the participants are categorised into two sets based on their age; those under the age of 40 (n = 16) are identified as younger TEs and the rest (n = 9) are labelled as older TEs.

It is also important to note that three of the 25 TEs had studied abroad, in the UK and Australia. While this would have provided them with opportunities to experience technology, the analysis of their data did not demonstrate that their overseas study experiences necessarily resulted in better technology use. Therefore, they have not been identified explicitly.

Additionally, other than EFL TEs, data were collected from four groups of pre-service teachers from four TEIs, two policymakers from the two TEIs at the two universities, and a Ministry of Education Nepal's (MoEN) representative. This decision was made in order to verify the information provided by TEs.

The participants for the focus group discussions (FGDs) were pre-service teachers (PSTs) selected from four TEIs: the TEI at the private university (n =6); the main TEI campus of the public university (n = 10); a constituent campus in an urban area (n = 8); and affiliated campus in a regional city (n= 6). The researcher visited the MEd classes, briefed the PSTs about the purpose of the research, and requested their voluntary participation.

The other set of data was collected from three policymakers. These included Dean of the TEI at the private university; an online education programme head at the public university; and an under-secretary from the Ministry of Education, Nepal who played an authoritative role in designing, implementing and supervising the ICT in education programme. The interviews with the policymakers provided insights into policy discourse and helped to understand how certain factors beyond the TEs' control influenced their digital practices.

The data collection tools and procedures are discussed next.

4.3 Data Collection Tools and Procedures

A case study is based on the data collected using multiple sources to corroborate findings and for detailed description (Stake, 2005; Yin, 2012). With two or more sources of data, one source can "offset … the strengths of another, thereby maximising the validity of research" (Dörnyei, 2007 p. 43).

Creswell (2018) argues that the common sources of information in case studies are observations, interviews, focus groups, documents and audio-visual materials. Of these, interviews, focus groups, policy documents, and visual materials or artefacts (in the form of screenshots and photographs) were chosen for this study.

4.3.1 Semi-structured interviews with teacher educators

Interview was the primary source of data in this study. Semi-structured interviews were conducted with 25 Nepalese TEs and three policymakers.

An interview is a common yet an important source of data in a case study research. It "attempts to understand the world from the subjects' points of view, to unfold the meaning of peoples' experiences" (Kvale, 2007, p. 14).

Research interviews are systematic conversations (Merriam & Tisdell, 2016) that have a certain purpose and sequence (Kvale, 2007). Their purpose is to collect a certain type of information from participants (Merriam, 2009), and structurally they can be identified as unstructured, semi-structured, or highly structured in terms of the flexibility, scope, coverage and the questions asked (Kvale, 2007). Interviews are useful in collecting information pertaining to research participants' unobservable feelings, emotions, ideas, and interpretations of phenomena (Merriam & Tisdell, 2016; Patton, 2002). Despite interviews being time consuming, scholars argue that they are useful tools for studying the worldviews of the participants (Bryman, 2012).

One possible pitfall of the interview data is that self-reports carry a risk of representing a distorted view of reality. Therefore, it was decided to collect data from different sources to verify information (as will be discussed in the ensuing sections). Such data were used to assess the validity and reliability of teacher educators' descriptions of how they used digital tools; data were also collected from their PST students.

Another concern about interviews is the issue of reflexivity and how interviewer's opinions might influence interviewees' responses and vice-versa (Maxwell, 2013; Miles et al., 2014; Richards, 2015). To avoid this, interview prompts were designed such that each interview had a set goal. Because the interviews were semi-structured, follow-up questions were asked based on the TEs' earlier responses to questions. These prompts were used to guide the attention back to the issues of concern. That way, the protocols helped to mitigate the possible issue of reflexivity.

The interview prompts were prepared prior to the fieldwork based on the review of the literature, the theoretical framework and policy documents. These were then pilot-tested on two scholars from Nepal. Because both were TEs and had interests in technology use, they were sent the interview prompts prior to Skype interviews with each of them in October/November 2016. The data they provided were helpful in confirming that the prompts aligned with the research questions and objectives.

After the interview prompts were finalised and the ethics approval for the study was obtained from the Human Research Ethics Committee of the University of Technology Sydney (Appendix A) and the two universities in Nepal (Appendix B), the researcher personally visited the study sites.

Potential participants were initially contacted by telephone to set up a time and venue for the interview. Informed consent was sought from the participants before their interview, and each was given research information sheets (Appendix C).

The interviews took place between December 2016 and March 2017. Each interview lasted between 45 minutes and one hour. All but four of the 25 interviews were conducted in English. After gaining consent from the interviewees, all the interviews were audio-recorded and later translated and transcribed. The researcher also made notes during the interviews, which were considered in conjunctions with the audio records and their transcriptions (when available) after each interview for reflection on the interview strategies and the questions. This helped researcher evaluate if right set of data was being captured during the interview and refine prompts for the subsequent interviews.

The semi-structured interviews solicited responses on five key areas of the study: TEs' general ICT practices; their attitudes, opinions and beliefs about ICT use in teaching and learning; their technology-related professional learning; the use of digital tools in their practice; and the changes they experienced from using the digital tools in teacher education practices. These focus areas informed the themes for the analysis. Samples of interview excerpts have been provided in Appendix D.

A methodological concern associated with qualitative research is that the findings and interpretations can be influenced by researchers' biases (Yin, 2014). One way of avoiding bias is through asking critical friends to critique the findings (Creswell, 2018). While all the findings and analysis were critically reviewed by the researcher's supervisors, reporting the findings back to the participants (known as member-checking) was deemed appropriate because they could confirm their agreement with the meanings interpreted from their data. Member-checking is considered to be a standard

practice in research to establish research rigour (Creswell, 2018). Seeking participants' opinions on interpretation enhances the credibility of the findings and interpretations (Bazeley, 2013).

Twelve TEs were emailed or sent messages through Facebook messenger or Twitter direct messaging services to ask if they would agree to be interviewed for a second time. Of these, five TEs agreed to be re-interviewed. These interviews were done on Skype (and audio-recorded) between the second week of May 2018 and the second week of June 2018 when the data analysis was underway. Each interview lasted between 20 and 25 minutes.

These five TEs were requested to provide their opinions on the themes and the findings. All were in consonance with the themes, and none disagreed or challenged what was concluded from the previous interviews. Their agreement added confidence in the analysis. Likewise, this iteration of data collection strengthened the analysis as additional information sought as results of the analysis of the data helped to bring more discussion and evidence to the study.

4.3.2 Semi-structured interviews with policymakers

Semi-structured interviews were also conducted with three policymakers (see Section 4.2.2 for more details) because national policies on ICT integration and university standards, procedures and rules were considered factors that influenced TEs' digital practices. Therefore, these focused on policy overview regarding ICT integration policies in teacher education programmes and the possible impact on TEs' digital practices as a result of efforts made by the MoEN and the institutes.

The interviews with the representative of MoEN lasted 75 minutes and the interviews with the heads of the TEIs lasted 40 to 45 minutes. These interviews were conducted in Nepali and audio recorded with their permission, before which the policymakers were advised that the local readers of this thesis may be able to identify them due to the positions they held. The interviews were translated and transcribed and imported on NVivo for analysis.

The interview with the representative of MoEN provided an overview of the works undertaken by the Ministry and its agencies regarding the integration of digital technologies in education. The data from the policymakers at TEIs were used to verify TEs' accounts on policies, and the policymakers' accounts were verified against the policy documents and TEs' and PSTs' interview data. Excerpts from these interviews are provided in Appendix E

4.3.3 Focus group discussions

A focus group discussion (FGD) is "an interview on a topic with a group of people who have knowledge on the topic" (Merriam & Tisdell, 2016, p. 114). Being a discussion amongst a group of people that share common interests, it is argued that the data are generated out of the interactive discussions between the members of the focus group (Merriam & Tisdell, 2016). Because the participants can interact with each other, they get the opportunity to listen to each other's views, probe into their own thoughts and refine their arguments, thus generating a rich and wide range of views on the topic of interest (Bryman, 2012; Merriam, 2009).

FGD was one of the four different data sources in this research. A decision was made to conduct FGDs with PSTs because students can give authentic accounts of teachers' practices. Because information on TEs' digital practices was collected using

interviews, which were self-reported in nature, thus carrying a risk of portraying a distorted picture of reality, four FGDs were conducted with students to verify TEs' accounts of how they use digital tools inside and outside the classroom to support teaching. The FGDs were conducted with the students studying in the first and second year of the MEd courses from four different kinds of TEIs (see Section 4.2.2 for further details).

Before conducting the FGDs, the students were provided with information sheets (Appendix F), and they were briefed that they could withdraw their participation at any time by informing the researcher. The focus group discussions, which were audio recorded, lasted between 60 and 90 minutes. The students used both Nepali and English language for the discussions. The minimum number of students in the focus group was six and the maximum was 10. The differences in these numbers is explained by two students withdrawing their participation in each of the first and the third FGDs. In the second FGD, however, two students who had not initially nominated arrived to participate. Because it was considered culturally inappropriate to ask them to leave, these two students were allowed to participate in the discussion.

An FGD guide was generated before the fieldwork, primarily based on the interview prompts but some changes were made to reflect the responses of TEs so that their accounts could be verified. The FGD prompts focused on the students' perceptions of technology use both during and outside their lessons: when, how and why ICT tools were used; their perceptions on the use of technologies; how they perceived their own and their lecturers' ICT skills and practices; contextual factors that influenced their technology practices; and their views on the influence of social and institutional factors in ICT use. The excerpt of the FGD is provided in Appendix G.

A methodological concern associated with FGDs is that certain members of the group may talk more than the others. In this study, when the researcher realised that a certain member of the FGD was doing most of the talking, other members of the groups were invited to speak.

There was an ethical consideration that affected the FGDs with PSTs. These FGDs probed the ICT practices of their lecturers, and because the students knew that their lecturers also participated in this study, they were assured that the information they provided would not be accessible and traceable to anyone other than the researcher, and their participation would not impact their academic performance in any way.

4.3.4 Artefacts

Artefacts provide additional sources of data in a qualitative research. They are defined as "data generated from audio or visual methods" (Creswell, 2018, p. 185). It is argued that artefacts can be important components in research if they are related to the issues and the case being studied (Yin, 2018). The artefacts collected in this research included photographs and screenshots of the digital platforms that the TEs used for different purposes.

The artefacts were used to validate TEs' accounts of how they used different digital tools and resources outside the classroom. It was important to collect such evidence because there was no classroom observation in this study because TEs' in-class use of digital tools was limited to the use of PowerPoint and multimedia projectors. In some cases, the TEs did not use any digital tools at all. Even so, it was evident from the interview data that their use of digital tools outside the classroom was rich and sophisticated. Therefore, to demonstrate those practices in visual form, the TEs were requested to provide screen captures.

While some TEs declined to share artefacts, citing the privacy concerns, six TEs (TE2, TE3, TE4, TE5, TE8 and TE19) shared photographs and screenshots. These screenshots were primarily from the social media or email platforms that the TEs used with their students for various purposes. They provided the data to the researcher on condition that complete anonymity would be maintained when presenting or analysing these data.

4.3.5 Documents

A key area of focus in this study was to explore the Nepalese policy documents on technology integration, the guidance they provided on technology integration in teacher education courses and their possible influences on TEs' digital practices. Pertinent policy documents were therefore reviewed as part of the study in Chapter 2. While some documents were available online, others were collected from the National Centre for Educational Development; the Curriculum Development Centre; the Department of Education; Educational Training Centres; and the Ministry of Education. Documents pertaining to ICT integration in mainstream education, teacher education and teacher training were of prime interest. The major Nepalese policy documents reviewed for the study were:

1. National ICT Policy, 2015
2. ICT in Education Master Plan, 2013-2017
3. School Section Development Plan (SSDP), 2016-2022
4. Higher Education Policy, 2016
5. EFL teacher education curriculum
6. Periodic Plan documents published between 2000 and 2018.

Please see Section 2.11 of the literature review for a detailed analysis of these documents.

4.4 Data Analysis

In this section, the focus of the discussion is on the procedures undertaken to analyse the data collected from different data sources. Because this is a collective case study that aims to uncover the digital practices of TEs, the data were analysed using a holistic approach, which was underpinned by the procedures and characteristic of qualitative research.

The data analysis was guided by the belief that "it is a systematic search for meaning" (Hatch, 2002, p. 148). The process included organisation and interpretation of data through the means of finding patterns, identifying themes, discovering relationships, developing explanations, and comparing and contrasting codes and categories (Patton, 2014). The analysis was iterative in nature as it involved moving back and forth between concrete bits of data and abstract concepts, between inductive and deductive reasoning, between description and interpretation (Merriam, 2009).

The data analysis drew on content analysis (Patton, 2002) and thematic analysis (Bryman, 2015). Content analysis is a strategy of searching for the underlying themes in the data sources, and it lies in the heart of coding approaches (Patton, 2014). Thematic analysis is based on themes developed by researcher or self-emergent from the data; the categories are built on the codes in the transcripts or other sources of data. A thematic analysis thus complements content analysis in that thematic analysis is an iterative process of analysing data to gain the understanding of what the data suggests theoretically (Bryman, 2012).

All forms of data were imported and analysed using a computer-assisted qualitative data analysis software (CAQDAS) NVivo11 for Mac (Bazeley, 2013; Leech & Onwuegbuzie, 2011). Leech and Onwuegbuzie (2011) argue that the use of an NVivo program "can take qualitative data analysis much further than is possible compared to conducting the analysis manually" (p. 71). That is because an NVivo program can assist a researcher to record, store, index, sort and code data, and efficiently compare and contrast codes and categories with high efficiency (Bazeley, 2013).

The codes used in identifying the themes for the analysis of the data were generated both *a piori* from the literature and from the data through the process of open coding and categorisation (Bazeley, 2013; Saldaña, 2015). Once the data were imported into the NVivo, they were read repeatedly and coded line-by-line to ensure that the data were categorised into correct themes. The codes and categorisations were then run through an axial process for consistency and improved categorisation of the data (Neuman, 2015). Analytical memos were kept and referred to during the process of analysis and writing.

4.5 Issues of Rigour

Rigour is an important aspect of any scientific study because only when a study considers the issues that can impact on the trustworthiness, can the usefulness of a study for its stated purpose be realised. Therefore, a qualitative researcher is required to have a thorough understating of those issues and demonstrate throughout the study that appropriate measures have been implemented to convince readers that the study followed a rigorous procedure.

It is argued that validity and reliability are the two main concerns to be approached carefully throughout a research (Creswell, 2018). However, Merriam and Tisdell (2016) also argue that because qualitative research is founded on different

philosophical assumptions than quantitative research, the concepts of validity and reliability need to be in concord with the underlying paradigm. Lincoln, Lynham, and Guba (2018) contend that qualitative studies need to establish trustworthiness. Drawing on Merriam and Tisdell (2016, p. 239) the following qualitative terms – which are equivalent to the associated quantitative terms for purposes of rigour – are considered in this study.

Quantitative Terms	Qualitative Equivalents
Internal validity	Credibility
External validity	Transferability/Generalisability
Reliability	Dependability/Consistencies
Objectivity	Confirmability

This study adopts the 'qualitative equivalents' of the rigor issues. Therefore, in the following sections, these aspects will be further discussed with reference to their implications for this study and how they were enacted.

4.5.1 Credibility

Credibility is a similar concept to internal validity: it refers to measuring what a study intends to measure (Shenton, 2004) and the congruency between the reality of the participants and the findings (Merriam, 2009). In other words, when the research findings reflect the reality, a study is said to have credibility. It is argued that ways of achieving credibility are through the use of multiple sources of data, multiple data collection methods, multiple investigators, or multiple theories (Dörnyei, 2007; Merriam & Tisdell, 2016; Yin, 2018). As discussed in Section 4.3, in this research

multiple kinds of data were collected from various groups to compare, contrast and confirm the evidence obtained. Information collected from TEs was verified and confidence was achieved in the analysis and findings.

Furthermore, it is also argued that "a researcher's adequate engagement in data collection is important" to credibility (Merriam, 2009, p. 219). As all the data was collected following a consistent interview/focus-group protocols, the researcher had adequate engagement. Therefore, a confidence was achieved that the findings of this is study is credible.

Engagement of the same researcher with data collection is argued to create methodological consistency and add to the rigour of the study (Ottenbreit-Leftwich, Liao, Sadik, & Ertmer, 2018). As all the data were collected following consistent interview/focus-group protocols, this researcher had adequate engagement.

A benefit of adequate engagement was that it was useful in noticing the saturation of information in the data, which helped to make an educated decision about when to stop data collection. When it was noticed that the findings from the interviews, for example, the interviews with TE24 and TE25, which were the final two in the data collection process, did not lead to any new understanding related to the teacher educators' digital competencies and practices, no further interviews were conducted. Additionally, the second round of interviews with five TEs, which was conducted primarily to confirm the findings, provided more confidence in the analysis of the data.

Furthermore, once the data transcription was complete, the data were anonymised and sent for an accuracy check. A professional Nepali-English-Nepali translator was requested to read five randomly selected interviews and check for consistencies, linguistic accuracy and verbatim transcription. This review for accuracy

did not result in any serious concerns other than minor typos. This also added to the confidence that the data truly represented the participants' views.

4.5.2 Transferability/Generalisability

It is argued that like other aspects of rigour in a qualitative research, transferability is a notion borrowed from a positivist research (Merriam & Tisdell, 2016). Hence, transferability in a purely quantitative sense cannot occur in a naturalistic study because "in qualitative research, a single case or a small, non-random, purposeful sample is selected precisely because the researcher wishes to understand a particular [issue] in depth, not to find out what is generally true of the many" (Merriam & Tisdell, 2016, p. 254). This is considered as a constraint of case study research because the findings are uncovered from a limited number of cases (Babbie, 2014).

Whilst collecting data from multiple cases (25 different individuals from different TEIs) may have helped to mitigate this concern, the following quote by Yin (2014) addresses the critique against case studies:

> "Generalizations in science are rarely based on single experiments; they are usually based on a multiple set of experiments that have replicated the same phenomenon under different conditions … like experiments, case studies are generalisable to theoretical propositions and not to populations or universes. In this sense, the case study, like the experiment, does not represent a "sample," and in doing case study research, your goal will be to expand and generalize theories (analytic generalizations) and to extrapolate probabilities." (p. 54)

To help a reader make an educated decision about extrapolating the application of the findings to their context, it is advised that sufficient detail about research methods is provided (Merriam & Tisdell, 2016; Patton, 2014). In line with this suggestion,

detailed descriptions have been provided pertaining to the study context, settings, research design, sampling and data analysis throughout this chapter so that those descriptions will help readers use their discretion when trying to relate the findings to their contexts.

Furthermore, regarding the generalisability of the findings of a case study, Maxwell (2013) argues:

> "The value of a qualitative study may depend on its lack of external generalizability in the sense of being representative of a larger population [as] it provides an account of a setting or population that is illuminating as an extreme case or ideal case." (p. 348)

From this perspective, the value of the present study is that it provides an account of Nepalese teacher educators who are early adopters of digital technologies in an educational setting where ICT integration is in its infancy. The findings of this study are expected to be useful in understanding the practices of such practitioners based in a similar context.

4.5.3 Consistency/Dependability

Consistency is a qualitative term for reliability, which refers to the extent to which the findings are likely to be replicated when a study is carried out following the exact conditions of a given study. Because human behaviour and social realities are not static, it is very unlikely that the findings of a natural study will be replicated (Merriam, 2009). Whilst that being the contention of the scholars, it is argued that replication of results would not be possible even if the exact methodology were followed because "socially constructed understandings are always in process and necessarily partial, even

if the study were repeated, the context and participants would have necessarily transformed over time" (Tracy, 2013, p. 229).

As the findings of this study are based on the interpretation of Nepalese TEs' digital practices, it is uncertain that another person with different life experiences, theoretical dispositions and opinions would arrive at the same conclusions. Additionally, because digital technologies are ever evolving, practices and perspectives related to them cannot be static. To that end, if a similar methodology to this study were to be used to explore the similarities and differences in digital practices of other teacher educators, it would add to the knowledge of teacher educators' digital competencies and related theory.

Thus, the consistency of a qualitative study can be enhanced by providing detailed discussions such as how and why certain methodological decisions were made and how these contributed to building confidence in the analysis of the data and the interpretation of the findings (Richards, 2015). This is the intention of this methodology chapter. Therefore, detailed discussions have been provided as to why each methodological decision was made and what the methodological underpinnings were.

Similarly, the next three chapters attempt to demonstrate connections between the empirical data, and the analysis, findings and discussions. It is believed that such deliberations will help to confirm the dependability of the study.

4.5.4 Confirmability

Like all other issues of rigour, objectivity is a contentious issue. It is accepted that "completely objective and bias-free research is impossible for anyone" (Tracy, 2013, p. 229). Instead, the best strategy is to acknowledge the inevitability of research biases and discuss them explicitly (Maxwell, 2013; Miles et al., 2014).

Scholars have argued that a researcher's bias can threaten the credibility and transferability of their research (Maxwell, 2013; Merriam & Tisdell, 2016), and that a researcher's personal experiences, perspectives, background and identities should be made as explicit as possible because these influence the processes and outcomes of a study (Miles et al., 2014). Because a researcher has existing theories, goals and preconceptions, his/her subjectivity impacts the validity of a research. Therefore, in this section the researcher's biases are discussed.

The first of these biases is related to my personal background. I can be called an 'insider' to the research cases because I am Nepalese and have previous experience of studying (undergraduate degree at a TEI of the public university and graduate degree at the private university) and later working as a teacher educator at a TEI. I have background knowledge of the study sites, and the research context is familiar. Similarly, I am professionally acquainted with a few TEs. However, I do not know their teaching philosophies, their opinions and beliefs about technology use in teacher education, and the challenges they face in their digital practices.

This prior knowledge was helpful during the stage of participant enrolment as I drew on my previous connections when identifying participants for the survey. However, I also made sure that my previous assumptions did not affect the data collection and analysis by preparing the data tools and pilot testing prior to the field visits and strictly adhering to them during data collection.

Moreover, the data analysis followed a methodologically established approach, which I believe helped me to keep my personal biases in check. In Sections 4.1 and 4.4 I outline all the methodological decisions and related justifications that I believe help to maintain the confirmability of the study.

4.6 Ethical Considerations

The research was conducted as per the guidelines provided by the UTS Human Research Ethics policy, the Australian Code for the Responsible Conduct of Research (National Health and Medical Research Council, 2018) and the National Statement on Ethical Conduct in Human Research (National Health and Medical Research Council, 2007). As mentioned earlier, ethics approval was granted by the UTS Human Research Ethics Committee. The study followed the established guidelines and ethical standards during the entire process by treating all the research participants equally, safeguarding their privacy, providing them with the option to withdraw from the study, and respecting their personal opinions and privacy.

Before data collection began, the researcher contacted the two Nepalese universities to obtain approval for data collection from both universities. Therefore, the heads of the programme or chiefs of the TEI at both the universities were well informed of the objectives and procedures of the study before it began. Approval from the administrative authorities of both universities helped to mitigate the ethical concerns discussed next.

Because the TEs involved in this research taught in 11 TEIs, informing the campus chiefs or the head of the teacher education programmes was an important ethical gateway to accessing TEs and PSTs. However, it was not possible to meet all the campus heads because some TEs participated in the interviews outside their teaching hours. For instance, TE8 and TE21, who taught at regionally located TEIs, participated in the interviews when they were away from their institutes at another city.

Additionally, because the participants were based in two universities and their TEIs and local readers may be able to identify them, efforts have been made throughout this thesis to anonymise the data and conceal participants' identities.

4.7 Conclusion to the Chapter

In this chapter, the methodological and theoretical rationales that underpin this study have been discussed along with information about the methods, the study context, study sites, tools for data collection, data analysis strategies, and issues of rigour.

The next chapter (Chapter 5) marks the beginning of the presentation of findings and discussions. It focuses is on the factors that influenced the practices of TEs.

Chapter 5 – Influencing Factors

In Chapter 4, the research methodology that underpinned this study was presented. The discussion focused on research design and methods, participants, data collection tools and procedure, data analysis processes, issues of rigour, and ethical considerations. In this and the next two chapters, the data, findings and related discussions will be presented. The analysis of the findings and discussions are embedded together in each chapter.

The participating TEs were early adopters of ICT tools, and digital technologies were yet to become a regular feature of teacher education activities in Nepal. Therefore, it was believed that their digital practices were influenced by a multitude of factors in the society, and at institutional, classroom and personal levels. Therefore, a key focus of the study was to explore these factors. Analysis of the data revealed that TEs' digital practices were influenced by several factors. While some of these were external to the TEs, others were internal. As will be discussed in greater detail, many of the external factors manifested as barriers and negatively influenced the TEs' digital practices. In contrast, the internal factors were found to have underpinned their practices.

The ensuing sections discuss these factors, drawing on the relevant literature and theoretical tenets of Activity Theory and contradictions. The discussion first focuses on the external factors and then the internal factors and explores how they influenced the technology use practices of the participating TEs.

5.1 External Factors

It was clear from the data that several external factors influenced the digital practices of the TEs. These factors were the policies on technology use in teacher education courses, the institutional leadership, and the resources available. Each of these will now be discussed.

5.1.1 Policies on technology use in teacher education courses

Policies have a crucial role in facilitating/inhibiting educational change. It is said to impact all aspects of technology integration in education (Drent & Meelissen, 2008; Varvel, Montague, & Estabrook, 2007). In the present study, the analysis of the data indicates that policies had significant influences on technology use in teacher education courses. The issue of policy manifested at the macro level (national policy) and the meso level (institutional policy). The macro-level policies were found to have impacted the meso-level policies and programmes related to technology use in teacher education courses. These policies will now be discussed in detail.

5.1.1.1 National policy

Analysis of the data suggests that national policy, a macro-level factor (Porras-Hernández & Salinas-Amescua, 2013), was a barrier in TEs' technology use as the absence of a national policy on technology use negatively influenced TEs' digital practices. Whilst policy-making was an activity that took place outside the TEIs – therefore an external activity system to teacher education activities – its absence resulted in quaternary contradictions in the TEs' digital practices.

In this study, the process of designing and implementing national policies on ICT integration in education was considered to be a separate activity system, as they were done under the care of the Ministry of Education Nepal (MoEN). While the MoEN had taken many initiatives to integrate ICT into mainstream education (see Section 2.11 for the detailed review), most of those programmes focused on technology implementation in school education. The review of policy documents revealed that there was little policy discourse on the impact of the ICT-in-education policies and programmes in pre-service teacher education courses or their possible contribution to the uptake and implementation of digital technologies in school education.

An absence of communication or collaboration between the TEIs and the MoEN added to the lack of policy discourse in teacher education. This lack of collaboration was evident from the interviews with the policymakers. For example, when asked how the MoEN collaborated with the TEIs in ensuring that graduating teachers gain the technological skills that they identified to be a core competence area of all teachers, the MoEN representative replied, "There is no direct [communication and] collaboration between the Ministry and the universities. Ministry corresponds with the University Grants Commission (UGC)."

The Dean of the TEI at the private university similarly observed, "There is no coordination between the Ministry and the School of Education." Therefore, whilst the Deans at the TEIs were aware of the competency framework, the TEIs did not seem to be too concerned about the PSTs developing those skills through their programmes. For example, when asked how the TEI at the private university ensured that its graduates have the required technological skills as specified in the competency framework (Government of Nepal Ministry of Education, 2016a), the Dean stated:

> "I think, what you just did was not just ask questions but also made me aware that the University has to think from that perspectives as well… I feel, [they] have the know-how knowledge. However, as for the independent use of technology, how capable they are and what skills they have, we have never thought from that perspective."

These interview data show that the TEIs did not consider the technology-competency framework very seriously, and the MoEN did not consider how the TEIs could facilitate the process of technology integration in school education. Even when the MoEN envisioned all school teachers possessing digital competencies, it did not communicate with the TEIs about the digital competencies that PSTs were expected to

gain from the course. And the TEIs were not concerned about the digital competency framework and put limited effort into ascertaining whether all the TEs possessed digital competencies to develop the digital skills that the MoEN mandated all teachers to possess. This finding echoes the argument about the hidden professionals (Livingston, 2014) who do not receive sufficient support regarding technology integration (Tack et al., 2018).

Furthermore, the limited attention of these educational stakeholders (the MoEN and the TEI) to TEs' digital competencies meant that the TEs had no obligation to focus on PSTs' digital competencies. Adnan and Tondeur (2018) argue that a feeling of lack of obligation can result in the decline of teacher educators' interests in digital practices. This may be one of the reasons that not all TEs used digital technologies.

While the lack of a national mandate on technology use in educational activities in teacher education courses made the TEs' digital practices a matter of personal choice, it also caused quaternary contradictions in TEs' technology use activity system (discussed in Chapter 3). In Activity Theory, a quaternary contradiction is defined as the misfit between the new activity (activity system related to technology use by TEs) and the neighbouring activities (activity system related to policy designs at the level of MoEN) (Castro & Nyvang, 2018; Gedera, 2016). Because the MoEN is the highest educational authority, the policies they implement concerning digital practices influence Nepalese TEs' digital practices, despite the fact that policy-making is an independent activity.

Because there was no national policy, the MoEN neither allocated funding nor required the TEIs to ensure the ICT standards of their TEs and PSTs. This lack of direction meant that there was limited training or professional support for ICT integration through the MoEN or its partner agencies. This lack of policies also meant

that the TEs did not receive the required level of support at their TEIs to sustain their digital practices. As they did not facilitate TEs' digital practices, these have been identified as quaternary contradictions.

Resolving quaternary contradictions is argued to be a challenging task because it is caused by an activity system that occurs outside the primary one. Thus, when solving a quaternary contradiction, efforts should be put to align different elements in the two activity systems (Bingham, 2015). However, the analysis of the data shows that achieving alignment, especially between MoEN and TEIs regarding ICT integration, was found to be challenging as the MoEN considered universities autonomous and provided little support. This was reflected in the following comment from the MoEN representative:

> "The universities are autonomous. The Ministry does not control them so they can choose to decide the kinds of programs that they would like to run, so we provide little support on that."

While the universities were autonomous entities, the educational activities at the TEIs were related to the national educational policies and activities. Therefore, the lack of engagement by the MoEN in technology integration in teacher education activities influenced the participating TEs' digital practices. The TEIs did not devise plans, programmes and activities to promote technology use because they were not mandated by the MoEN or University Grants Commission (the higher education policy implementation body of the MoEN) to do so. As a result, the TEs were not supported in their digital practices.

Furthermore, by referring to Leontiev (1981) 'hierarchy of activities', which divides the activities in a top-down approach and argues that top-level activities are essential for actions at the lower levels, it can be argued that the national policies are the

object-oriented activities. This is because a national policy provides the direction for ICT integration in higher education institutes and teacher education activities. Because there was no national policy in Nepal, there was no shared vision between the MoEN, the TEIs and the TEs. A shared vision, in the form of national policy, is an essential condition for a seamless infusion of technology in education (Voogt & Knezek, 2012). When national policies on technologies are not formulated with due effort, technology integration efforts are deterred (Khan et al., 2012).

This finding suggests that the lack of a mandate from the highest educational authority in Nepal, which aimed to promote technology integration in the educational activities in schools, resulted in quaternary contradictions and impacted the TEs' actions.

5.1.1.2 University policy

The review of policy documents related to the TEIs and the data from the TEs and the policymakers suggests that there were limited policies on technology integration at the university level as well. As will be described in this section, the lack of policies at the TEIs was a barrier and resulted in secondary contradictions in the activity system related to the TEs' digital practices.

As mentioned in the previous section, there were limited policies on technology integration in the teacher education courses and almost none in subject-specific courses. For instance, the public university and its TEIs did not have any ICT integration guidelines or regulations on technology use in teacher education generally or EFL teacher education in particular, despite their policymakers arguing that they were making efforts to integrate digital tools in curricular activities. For example, the policy-maker from the public university noted during the interview, "the university is planning

to integrate ICT in all of its courses…and that [the university] is devising policies to integrate ICT in teaching and learning."

However, the TEs were not aware of any specific policies about the use of technologies in teacher education activities, despite the policy-maker's interview suggesting that they were devising policies to do so. For instance, regarding written policies, TE4 stated (during the second interview), "the department expects us to use digital tools, but if you talk about written policies and guidelines, there are none to my knowledge. I have never come across one and am not aware of any."

In suggesting that there was no policy, and the policymakers were yet to realise the value of technology, TE4 further averred, "When you have to communicate to the Dean's office from the department on various things, you go manual. You have to print and take the hard copy with you. There is no system of electronic communication." These data suggest that the university was a long way from making ICT an integral part of its operations and educational activities.

The observation made by TE4 regarding the availability of technology use policy and regulation reflected a common phenomenon at the public university's TEIs. None of these TEIs had clearly written and published policy documents about how and why technologies were expected to be used. Because the success of technology integration programme hinges on the role of the educational institutions (Wright, Dhanarajan, & Reju, 2009; Zhu, 2015), without any facilitation and mandate by the TEI, successful integration of technology remains questionable.

As there were no policies, the general environment at most TEIs was not facilitative of TEs' ICT use intentions and practices. Therefore, the lack of policies and directives at the TEIs resulted in secondary contradictions – which are defined as the misfits between the two components of the same activity system (Castro & Nyvang,

2018; Gedera, 2016). Just how the lack of policies and directives created secondary contradictions may be seen in the limited infrastructure that the TEIs made available for TEs to use in teacher education activities. Because there were no specific policies – and the university was mulling over ICT integration at the time of the interview – the affiliated campuses were not required by the university to ensure technological infrastructure.

Additionally, the constituent campuses had yet to receive directives and other resources to set ICT infrastructure for TEs' use. Therefore, the TEIs had minimal ICT facilities. Limitations in the facilities resulted in secondary contradictions and obstructed TEs' technology use. Thus, if TEs wished to use digital tools, they needed to rely on their own discretion.

Furthermore, because there was no university policy, any programmes related to ICT integration were few when compared to the number of teacher education campuses (more than 25 constituent campuses and 250 affiliated campuses), teacher educators and student enrolments. For example, a webpage related to the TEI in the public university stated that "[we provide] grants to purchase computers and to establish ICT labs so that campuses run ICT training for its teaching and non-teaching staffs." However, if this statement is considered as a policy related to technology integration at the public university, the TEIs did not have enough resources. For example, the constituent campuses where TE8, TE6, TE18 and TE17 taught did not even have a multimedia projector for regular use in the classrooms, and this deterred their use of digital tools in their lessons. Because the TEs' faced barriers related to technology infrastructure, which was related to policies, there were secondary contradictions in the TEs' digital practices. This is an important finding of this study.

This finding can be considered unique in the sense that it differs from the findings of other university-related studies in developing countries that report on initiatives to promote ICT integration. For example, studies conducted in Kenya (Tarus, Gichoya, & Muumbo, 2015), Iraq (Al-Azawei et al., 2016) and Saudi Arabia (Quadri, Muhammed, Sanober, Qureshi, & Shah, 2017) found that the respective universities or the higher education institutions had policies on using digital technologies in their courses. The findings of these studies suggested that policies provided reasons for educators to take up technologies in their activities in higher education, which agrees with the contention of Zhu (2015) and Phuong et al. (2018). Therefore, it may be argued that policies are not optional but rather an essential element in the seamless uptake of digital tools. Institutional directives and legislation on ICT use direct how and why technologies should be part of their educational activities.

The private university in this study had a general policy on ICT use in the teacher education programme. For example, it mandated the use of Moodle in teaching and learning. As TE7 noted, educators there were required to use the platform as "resources repository for students' access, to provide course timeline, assignment submission and retrieval, to provide feedback on students' assignments." Similarly, the other TEs from this university also noted that digital tools (primarily multimedia projectors) were used as teaching tools in almost all lessons.

Because the TEI at the private university had the policy to promote ICT use, they had set up the necessary physical facilities for the PSTs and TEs' use: a computer lab, back-up power system, an internet connection, and Wi-Fi. Likewise, there was a provision of technology use training for TEs and PSTs, with on-call ICT support available to the TEs.

However, the analysis of data shows that the university lacked other policies to make technology use in teacher education course effective. For instance, when asked if the TEI had any policy regarding the digital competencies they wanted their teacher graduates to possess, the Dean noted:

> "The University needs to think about ICT use from the student perspective. And, I will bring this issue in the future discussion [in meetings]. As well as developing the expertise of our teaching faculty members, we need to consider what students learn out of the programme, which we had not thought about [until this point of time]."

As there was limited (specific) policies about why technology should be used in teacher education courses, it was found that not all TEs used Moodle for the stated purpose (such as communication, exam administration and dissemination of lecture notes). For instance, the Dean noted, "it's already been more than five years that we have been using Moodle in an organized way, but we have not been able to use the Moodle in a successful and full scale." A plausible explanation for this could be that EFL teacher education policies were yet to be developed and implemented at the private university. Without such policies, TEs feel that there is no obligation to use ICT tools (Adnan & Tondeur, 2018). It is argued that a clearly formulated policy is a prerequisite to promote technology integration (Tondeur et al., 2017).

Well-planned written policies are necessary for ICT integration because ICT uptake means not only a change to classroom materials, it also challenges existing pedagogical process and beliefs (Lim & Pannen, 2012). The Dean at the private university suggested that Moodle was considered an add-on to the classroom materials to support communication regarding assessment and resources dissemination. This implies that the TEI at the private university had yet to discuss how the introduction of a

certain tool could challenge the existing teaching and learning activities because Moodle, for example, as a virtual learning platform, could support flipped learning (a more student-friendly teaching approach).

However, as there were no policies, the TEs at the private university used it either for basic purposes or, as the Dean noted, ineffectively. This finding establishes that for effective implementation of ICT in curricular activities, clear policies and directives are necessary. Absence of such guidance can be perceived as a lack of obligation, which is argued to wither TEs' enthusiasm in ICT integration (Adnan & Tondeur, 2018).

Drawing on the discussions above, it can be argued that the TEIs did not have sufficient directives and regulations regarding the use of digital technologies in teaching and learning. This suggests that the TEIs could not execute their part of the jobs in the activity system (i.e., division of labour). Because the division of labour is about allocating responsibilities between/amongst the community members (for example, TEs' roles, TEIs' duties), it shapes subjects' actions (Russell, 2002; Yamagata-Lynch, 2010). As the TEIs did not devise policies to specify whether or how a given technology should be used, this shows that TEIs and the TEs did not share the motive to enhance teacher education practice. As a shared motive keeps an activity system in progress (Kaptelinin & Nardi, 2006), a lack of one results in misfits. The TEIs' lack of engagement resulted in secondary contradictions (or, misfits), which manifested as the TEIs not doing enough to promote and sustain their TEs' technology practices.

The findings discussed in this section suggest that institutional policies are of significance. The TEIs' insufficient directives about how ICT should be used resulted in secondary contradictions regarding the support the TEs received and how they used digital tools in their practices.

5.1.2 Institutional leadership

The second factor that influenced the TEs' technology use was the institutional leadership's (campus chief or the dean) support for their digital practices. As shall be discussed below, while a proactive role played by the institutional leadership promoted the use of ICT in teaching and learning, insufficient support constrained technology use as they resulted in secondary contradictions in the technology use activity system of the TEs.

The data analysis revealed that the attitude that institutional leaders (for instance, the head of the TEIs) demonstrated towards TEs' digital practices was meaningful in promoting technology use. For example, TE9 said that the encouragement provided by the head of the campus facilitated his use of technology, "I use multimedia projectors and other resources to support my practice because the administration is very positive about technology use…they encourage us [for] the use of ICT and admire the teachers who use ICT tools."

As well as demonstrating a positive attitude and providing positive remarks on the TEs' practices, the role of the campus chief in making ICT facilities available in the campus was also found to have promoted ICT use in their practices. For example, TE20, who taught at the same campus as TE9, noted:

> "The campus chief is very positive about technology use – for example, they have provided facilities. It has provided projectors, [laptops]…and internet connection. So, we tend to use the PowerPoint and multimedia projector as often as we can in the lesson. I mean that [the campus chief's] attitude encourages you as a teacher."

Likewise, TE7, who taught at the private university, noted that the institutional leadership at his TEI was very positive about technology use and provided the necessary support, for example, power backup during the power-cut seasons. He noted, "the [institutional] leadership is very supportive of technology integration. Even during the long hours of power cut, they managed to keep the Moodle and the computer lab running for our use."

TE7 implied that the positive attitude of the administrative head of the TEI was one factor that encouraged him to use Moodle in his practice. This finding supports the contention of Instefjord and Munthe (2017) that institutional leadership support has a significant role in whether or not educators use technologies. When the leadership is positive about technology use and puts effort into providing/ensuring access to technology, the TEs were encouraged to use digital tools in their practice. Likewise, the encouragement provided by the institutional leaders was also found to have been a motivating factor in the TEs' uptake of technologies, as noted by TE9.

This finding suggests that supportive institutional leadership facilitates TEs' actions related to technology use (Becker et al., 2017; Phuong et al., 2018). Institutional leaders are one of the community members of the TEs' activity system, and as such, they played an important role by providing support to subjects (Engeström, 1999; Yamagata-Lynch, 2010). So, when they undertook and accomplished their role by ensuring the upkeep of the existing facilities or by providing positive feedback to the TEs, this encouraged the TEs to use digital tools in their practices. This suggests, therefore, that institutional leadership had an important role to play in the TEs' digital practices.

In contrast to the findings above, data analysis also reveals that a lack of support from institutional leadership was a barrier to TEs' digital practices. A common theme in

the data from at least seven TEs was that that the administrative heads (such as campus chiefs or the faculty head) at their TEIs were not proactive enough to promote TEI-based ICT practices. For instance, TE6 stated:

> "I teach translation studies… and ELT methods and academic writing. I have got the multimedia materials for all the lessons, but I cannot [use] that in the classroom. I have requested the campus administration for the projector and internet connection so that I could deliver better lessons, but they've turned dead ears to my requests."

One reason behind the campus chiefs' or the administration heads' lack of initiative may be that they did not understand the educational value of technology use. Thus, they did not put enough effort into installing, expanding or maintaining the existing facilities. This was reflected in the following statement from TE4:

> To give you [an example, our TEI] has a wireless system but they are not functioning all the time. There are facilities, but they are not accessible…and there is no mechanism to ensure that the available facilities are working properly…I think it is more of willingness and commitment more than lack of resources…They do not have the correct attitude and understanding of the values of technology.

These data demonstrate that TEs' ICT use was negatively impacted by the leadership's lack of support and actions to promote and support TEs' digital practices. While the TEs believed they could enhance their practices by using digital tools, they were not able to do so because there were no facilities and the administrative staff did not provide support for technology use in their lessons. This illustrates that the administrative heads did not do enough because they lacked an understanding of the

value of digital tools in teaching and learning, and this created a barrier to TEs' digital practices.

The data analysis also reveals that as well as limiting TEs' practices inside the classroom, the lack of support from the institutional leadership made some TEs feel that technology use was solely their responsibility, which frustrated them. For instance, TE3 noted:

> "The campus [leadership] does not take [any] responsibility about the facilities for the teachers' use...The institution does not really care whether I use digital tools or not – so there is nothing institutional. Discussing about [ICT use in] institution, there is no conducive condition to promote and sustain technology use. Nor do they encourage [us] - the institution says that they have ICT, but it does not ever work - inside or outside the classroom. There is nothing to promote [ICT] use…. Sometimes, I feel we have to take our own responsibilities…this is frustrating."

Similar concerns were also expressed by other TEs teaching at the constituent campuses. For instance, TE18 stated, "nobody really cares…whether I used any technology. Nobody questions or encourage or say the words like 'you're doing well – keep it up' to the teachers who use ICT tools." This finding elucidates that the leadership at certain institutes left it up to the TEs' discretion when it came to using digital tools in their practices. As a result, TEs (for instance, TE3) felt frustrated and did not feel a need to use digital tools in all of their lessons (will be discussed in greater detail in Chapter 6).

From the Activity Theory perspective, the institutional leadership (for example, the administrative heads, Deans or the chiefs of the campuses) were community members in the TEs' technology use activity system. As mentioned earlier, they had a

responsibility (as community members) to support TEs in their digital practices in the hierarchical division of duty. By neither supporting TEs, ensuring the upkeep of the existing facilities, nor providing access to the existing resources for TEs, they did not do their part of the job and were oblivious to the TEs' ICT practices. Such lack of engagement of the institutional leadership with the TEs' practices resulted in the contradictions between the division of labour and the TEs' objectives (i.e., technology use to support their practice). An effect of the contradiction was seen on the TEs' ICT use; it was limited to the minimal number of tools, such as PowerPoint, or there was no use at all (as in the case of TE6, who reported that there was no support from his TEI).

The lack of support from the campus heads is similar to what Tømte et al.[2] (2013, as cited in Instefjord & Munthe, 2017) found in their review of the support that a teacher education institute management provided to its educators. Tømte et al. (2013, as cited in Instefjord & Munthe, 2017) found that leaders they observed in higher education institutes in the Nordic region provided minimal support to promote their teacher educators' technology use, which is similar to what was found from the interviews with the Nepalese TEs who participated in this study.

Two contrasting findings (viz. support and encouragement from the campus chief facilitating technology use, and a lack of that obstructing TEs' ICT integration) in this section illustrate that the support of the management has a significant role to play in the uptake of ICT tools in teacher education courses (Lim & Pannen, 2012). Furthermore, it implies that campus chiefs or the Deans that understand the value of technology and encourage teacher educators to use technology play a significant role in

[2] This citation is based in a secondary source because the original text is not available in the English language.

technology uptake (Park & Jo, 2017). Whilst the encouragement and initiation of institutional leadership may facilitate teacher educators' actions in a technology use activity system, the lack of such support results in secondary contradictions that limit ICT practices at the institutions.

5.1.3 Resources

The third external factor influencing the digital practices of the TEs was resources. Resources comprise not only hardware and software, but also access to the available infrastructure, the nature and suitability of the available ICT tools, time, and technical support (Hew & Brush, 2007). It is argued that resources are one of the most common barriers to technology integration efforts (Ertmer et al., 2012). The account of the participating TEs, PSTs and policymakers suggested that resources, such as finance, infrastructure, internet connectivity and technical support, impacted how, when and why the TEs used technology. In the ensuing sections, these issues will be discussed.

5.1.3.1 Infrastructure and financial resources

Lack of infrastructure was a common theme in the interviews with the TEs and the policymakers. The data shows that a lack of financial resources affected the ICT infrastructures available at the TEIs and, in turn, obstructed TEs' digital practices. As will be discussed in this section, this lack of infrastructure gave rise to secondary contradictions that influenced the TEs' choices about which digital technologies to use and how and when to use them.

Analysis of the data shows that the lack of infrastructure was related to economic resources. It was seen that due to lack of funding, the TEIs, regardless of their types and locations, could not invest in ICT infrastructure or expand existing technological facilities. The effect of financial constraints was aptly summed by TE15,

who had more than 22 years' experience of teaching EFL at different constituent campuses across the country. He noted:

> "Because of lack of economic resources, we have not been able to set up digital [infrastructure] and enhance computer facilities for students and teachers. It's a common problem across all the community colleges and [the constituent] campuses in the country."

Another example was evident in the following comment from TE17, who worked part-time at a community-owned campus located in an urban area:

> "In the…college where I teach [part-time], they have financial constraints as they have no other financial sources other than the student fees. So, even if they wish, they cannot buy ICT tools. That is because they even struggle to pay the salary to the teachers and the staff."

As argued by TE15 and TE17, during the fieldwork it was observed that most campuses did not have enough ICT infrastructure to support and sustain ICT uptake and integration in their teacher education courses. This is exemplified in Figure 5.1, a photograph of an MEd classroom taken during the fieldwork.

Figure 5.1: An MEd in EFL classroom in a constituent campus. (Photo date 05.12.2016; Source: fieldwork)

The classroom in Figure 5.1 is typical of most of the teacher education campuses that were visited for the interviews. Most TEs at the affiliated and constituent campuses substantiated that there were not enough digital resources; only a few TEIs had technologies in classrooms. In most cases, the classrooms were traditionally set up for lectures, as in this photograph, with parallel rows of desks and benches facing a raised platform in the front. Because these classrooms did not have any technology, the TEs' ICT integration efforts were deterred. This finding concurs with those of Albugarni and Ahmed (2015) and Cunningham (2015), who found that the uptake of blended learning in Saudi Arabia and Kenya, respectively, was influenced by the lack of infrastructure and access to ICT resources.

In this study, it was found that the lack of the infrastructure gave rise to secondary contradictions when the TEs' wished to use digital tools to support their

lessons. A secondary contradiction, which is a misfit that occurs between or amongst the elements within an activity system (Engeström & Sannino, 2010), influenced whether and how often the TEs' used technologies in their lessons. For instance, TE17, who taught full-time at a constituent campus in a regional city, regretted that he was not able to use the technology in his classes, despite having the interest and skills to do so. He said, "it's impossible to use [digital technologies] here because of the infrastructure. Only a few classes have the wiring; other classes do not have [ICT related physical facilities]. There is no power plug, no internet, no connection."

Similarly, TE6, TE8, and TE18 noted that they could not project their class notes onto screens for their PSTs because their campuses did not have enough multimedia projectors to use regularly in their lessons. For example, TE8 noted that he could not use the device even if he wished to do so. He said, *"*we have only one device (multimedia projector) at our campus, and it is used only in special programmes."

Furthermore, the limited infrastructure also meant that not all classes had technologies available, as a result of which some TEs were not able to use digital tools as frequently as they wished to do so. This was another secondary contradiction. For instance, TE11, who taught at a regional campus, stated, "we only have six projectors and four laptops. The number of classes is more than [twice] that."

Evident in these data is that the lack of ICT infrastructure deterred TEs' technology use at their TEIs. In other words, the lack of digital resources gave rise to secondary contradictions in the TEs' actions in their activity system. The lack of ICT infrastructure and the scarce economic resources required to invest in digital technologies were institutional realities, so these were part of the rules in TEs' activity system (as demonstrated in Figure 3.4). These rules did not align with the TEs' digital practices because the TEs were not able to use digital tools in their lessons as often as

they would have liked. This misalignment was a misfit in their activity system because it impacted on whether and how the TEs used digital tools in curricular practices.

A further example of this can be seen in the case of TE2, who taught in a community-owned affiliated campus in a semi-urban area. He stated, "financial [constraints] have influenced ICT enhancement and use at our campus." He further noted, "…because there are not many computer and projector, what I do is, I use my laptop if I need to show any audio/visual materials."

When asked how many students he had in his class, he said he had more than 40 students. Because he did not have a projector for his use all the time, he had to manage by using his own device, which was not large enough for all students to see. This finding establishes that the lack of ICT infrastructure was a barrier that impacted the technologies TEs used. The lack of required technologies impacted TEs' practices by creating misfits in the activity system related to technology use in teacher education activities.

While no studies have looked into the barriers obstructing technology use in higher education institutes in Nepal, the findings here relate to those of Koirala et al. (2016), who studied technology use in Nepalese high schools. They concluded that the lack of infrastructure posed a major challenge to ICT use in schools. The findings in this section, therefore, resonate the fact that lack of infrastructure is clearly a major challenge in ICT use in education in Nepal, both in schools and higher education.

The discussion in this section also alluded to the link between infrastructure and the availability of economic resources. The financial constraints of the TEIs can be explained by the fact that Nepal is one of the least developed countries in the world (The World Bank, 2018), and ICT infrastructure in Nepal is one of the most expensive (Regmi, 2017). Therefore, the lack of financial resources poses substantial issues in

investment in ICT. As a result, limited technological resources are available in TEIs, which is a barrier to TEs' use of ICT in their teaching.

However, looking at the TEs' use of the technologies in teaching and learning (as will be discussed in Chapter 6 and Chapter 7), it may be seen that they were required to break the barriers associated with infrastructure by creatively seeking the use of zero cost alternatives in their activity system. This points to the fact that while contradictions create misfit, they can also make the subject proactive and lead to creative solutions.

5.1.3.2 Internet speed

Other than infrastructure, the other issue most commonly reported by TEs as a barrier was internet speed. At least eight TEs, teaching in TEIs located in both urban and regional areas, stated that a slow and unstable internet connection at the TEI impacted their on-campus use of technology. As shall be discussed here, internet speed resulted in secondary contradictions because they impacted the digital tools and platforms that the TEs used.

It was found in the data from one TE that the internet speed and connectivity deterred the use of a virtual learning platform (i.e., Moodle). TE13 told that he experienced challenges in getting students to use Moodle due to internet connectivity. In that regard, he said, "one [challenge] is related to bandwidth…like, you ask students to submit the assignment on Moodle, but the Moodle does not work. Due to limited bandwidth problem, the Moodle does not function on their computer…and they cannot submit their work."

The quote above implies that due to internet speed, TE13 could not pursue all of his pedagogical activities (such as assessment) online. Because the internet bandwidth did not support the use of Moodle, he had to plan instead for alternatives that did not

require technology use, such as paper-based assessment activities. This finding above concurs with those reported by Al-Azawei et al. (2016) and Sobaih and Moustafa (2016), who argued that implementation of e-learning systems in Iraq and Egypt were deterred by internet speed.

The problem of slow internet connectivity and its impact on technology use in education was also reported in a study commissioned by the Department of Education, Nepal (Koirala et al., 2016). That study asserted that internet connection was a major challenge across its study sites, which included high schools from urban, semi-urban and regional areas. As also found by Koirala et al. (2016) in the context of high schools, internet speed was found to have seriously impacted ICT integration efforts in teacher education activities. An example of this was presented by TE2, who taught at a TEI in a regional area. He affirmed that the internet speed was a concerning issue for him because it was slow and the connection was not easily available.

For instance, TE2 said, "I should also highlight that the Internet bandwidth is very poor…the internet connection is not easily available, and even when it was available the internet bandwidth is very poor." As a result, TE2 had to spend more time even to access the simplest website because it took a long time to load the webpage.

Similarly, TE5, who taught at a TEI located in the capital city, Kathmandu, noted that the connection was not good, so the TE had to send the links of audio/video materials to students' emails, instead of discussing them in the class. TE5 said, "the speed even does not browse YouTube video – it is very slow and unstable." However, she said that if she needed to demonstrate audio/visual material in the class, "I download those videos prior to the lessons…if I plan to use them in the [lessons]." Likewise, due to slow connectivity, TEs required to spend time on activities, such as downloading multimedia materials during their personal time.

The analysis of the data also demonstrates that internet bandwidth also influenced the in-class use of digital tools and resources. At least five TEs noted that they had to avoid doing activities that required stable and fast internet connectivity. For instance, TE20 stated, "internet connection is a [serious issue]. If I want to use the internet to browse and use multimedia files in the class [during the lesson], due to internet speed, I cannot do that." This finding suggests that a slow internet speed made TEs avoid activities that required the use of the internet during the lessons because the speed did not support such use.

Avoidance of activities requiring internet speed meant the internet bandwidth created secondary contradictions in TEs' technology use activity system demonstrated in Section 3.3.6. Because it was not an issue that the TEs could resolve on their own – as it is a responsibility of a TEI to procure and provide functioning internet connection – the lack of good internet connections meant that there were misfits between the institutional reality (rules) and the object of activity (i.e., to use technology in curricular activities). As a result of the misfit, TEs could not do the activities that needed ICT technologies. They were therefore required to think of alternatives (as did TE13 and TE5). Furthermore, having to spend time in downloading the content to show in the class meant that the secondary contradiction made them spend their personal time on activities that could have been avoided with a good internet connection.

The findings in this section suggest that internet bandwidth was a barrier to technology use in educational activities. A lack of effort to solve this issue meant that a sluggish connection impacted the TEs' technology use by creating secondary contradictions. Because the issue of slow connectivity cannot be solved by individual TEs, TEIs or universities needed to address this issue.

5.1.3.3 Time

Time was another issue commonly found to have influenced TEs' digital practices. The data shows that the TEs had limited time for planning and preparing lessons, and this resulted in secondary contradictions in their technology use activity system.

At least 11 TEs noted during their interviews that their use of ICT in teacher education was influenced by lack of time. Data analysis reveals that all TEs at the affiliated colleges, three from the public university's main campus, and one from the private university were casual teachers. Therefore, they were provided little time by the university or the TEIs to prepare their lessons using technology. As a result, many of them were required to use their personal time when preparing their lessons. For example, TE21 noted, "I have a…workload as I teach multiple classes each day, so I have little time left."

Likewise, TE17, who worked part-time at a community college, noted "you have to have plenty of time to explore resources required to use ICT in the classroom…and most TEs are busy." He implied that because they were busy, and the institutions did not provide any support for lesson preparation, the TEs felt time pressure when they planned to use technology in their lessons.

A teacher can feel lack of time when planning to use digital tools when deciding to use technology in a lesson (Vasinda et al., 2017) as she/he is required to spend a considerable amount of time previewing the sources and preparing digital materials and content to use in the lesson (Hew & Brush, 2007; Quadri et al., 2017). Without institutional support, for example, provision of time for lessons preparation, TEs can feel the pressure of time (Kosnik & Dharamshi, 2016).

The issue of lack of time – resulting from the lack of institutional support and requiring to spend considerable time previewing different sources – was further compounded by the fact that the TEs could not access the required resources through the library at the TEIs. While it was the TEs' responsibility to locate resources online, they would have preferred their TEIs to mediate the access so that basic resources (such as journal articles, e-books or chapters) required to prepare lessons could be obtained with ease. Because the TEIs did not support the TEs this way, the TEs were required to spend additional time locating resources and accessing them. Added to this was the need, as noted earlier, for TEs to do much of their preparation at home due to slow internet speeds at the TEIs, for example, downloading YouTube videos.

Most of the online interactions the TEs had with their PSTs were also asynchronous (see Chapter 7). Whilst these helped them communicate with students, they put a strain on the TEs because online asynchronous interactions on digital platforms require a lot of time (Deng & Tavares, 2013) and, in most cases, the TEIs could not support the TEs with this.

Having to spend personal time because the TEs were not supported by their TEIs had secondary contradictions (misfits) in the TEs' digital practices. One such misfit may be seen in how they managed their personal and professional time. Some TEs believed that the use of online tools blurred the line between their professional and personal time. Because most TEs noted that their ICT use was home-based, they were required to use technology during their personal time. For example, TE3 said, "[because the] university does not have proper internet access... my internet use is home-based. [As a result], I have challenges between managing my personal time and doing university work." It was found that such challenges resulted in the feeling of burnout in TEs, which TE13 succinctly referred to below:

> "Sometimes teachers feel like something that I am doing is too much, it's extra, it's taking my private time at home. Normally, when you start working online, you stop having a demarcation between office work and [personal] work. There might be a sort of saturation that after some time they might not want to do it or they might want to skip that."

A teacher educator who spends hours preparing their lessons or setting up a learning management system pays a personal price for reviewing web-based sources and preparing the lessons. Such experiences, as argued by Hew and Brush (2007), can result in the feelings of 'burnout' in teachers. Whilst this was not discussed by the TEs in this study, the feeling of burnout can result in contradictions that manifest as avoidance of technology; a contradiction in their practice (Blundell et al., 2016) such as lack of innovative use of technologies (Karasavvidis, 2009); teacher-centred lessons with technologies (Lim & Pannen, 2012; Tondeur et al., 2017); or declining efforts to use technology (Skues & Cunningham, 2013).

The findings suggest that the participating TEs had limited time at the TEIs to prepare for lessons that used digital tools. Because they were not well supported by TEIs with time to explore resources and plan the lessons, the TEs had challenges when managing their personal and professional lives, which resulted in contradictions in the technology use activity system.

5.1.3.4 Technical support

Technical support at the TEIs was identified as another resource-related factor that influenced TEs' technology practice. As will be discussed at greater length later, while the absence of the technical support resulted in contradictions in the technology use activity system, its provision was found to be facilitative of TEs' technological practices.

The interview data of four TEs from the public university and its campuses show that not having a provision of technical support discouraged their use of technology. For example, TE1 said, "there are people who are willing to use such tools [digital technologies] but there is no proper mechanism and support system at the campus – so, they do not use ICTs." A possible reason behind that not having technical support hindered technology use was provided by TE6. He argued, "[TEs] lack experience of using technology in [teaching and learning] hence, they are less-skilled in handling the technical issues."

Whilst some TEs lacked the required skills, what added to the issue was the uncertainty about whom to approach in case of problems while using digital tools. For instance, TE4 noted, "I do not [know] who I talk if I face a problem, and I am not able to troubleshoot [the problem]." This suggests, therefore, that digital tools were new to many TEs, and not having confidence about whether they could get the required support resulted in technology use anxiety.

Not having a provision of technical support was an institutional reality in all but the private university. Institutional realities are implicit norms that influence the TEs' practices. Any explicit and implicit norms that govern a subject's actions in an activity system are rules (Castro & Nyvang, 2018; Gedera, 2016), and rules influence whether subjects engage in actions and mediate their relationship with the community in the activity system (Kuutti, 1996). From this perspective, not having technical support meant that the TEs had a misfit between their digital practices and whether the institution could support them by providing technical assistance. Because the TEIs did not provide such support, according to the TEs themselves, some TEs, as discussed above, were hesitant in using technologies.

These findings demonstrate that uncertainty about the technical support provision negatively influenced the digital practices at the TEIs. This finding concurs with that of Al-Azawei et al. (2016), Lim and Pannen (2012) and Ssekakubo, Suleman, and Marsden (2011), who found that technology integration efforts and the uptake of e-learning were influenced by the availability of technical support at higher education institutes. A further example of how the lack of skills and provision of technical support at the TEIs influenced technology was given by TE24:

> "A barrier is - I do not have this problem, but my colleagues lack the required skills to use technology. They are not habituated and because they are not habituated, and have not used digital tools, they have technology-phobia. They think, without [technical support], it's an unscalable mountain."

Therefore, it is necessary for the TEIs to provide ICT support systems. This would both promote technology use and address TEs' fears associated with it. In a context where TEs lacked experience of technological use in their own education, TEIs' support in the form of ICT use would be meaningful.

In line with this contention, the data from all three TEs from the private university indicates that having an ICT manager and support staff was helpful because they assisted in technical matters. For example, TE7 said: "we have an ICT manager here. If you need help with software programs on your computer, he manages those kinds of things…we have supporting staff as well. They provide help whenever necessary."

TE13 further illustrated how the provision of technical support helped him learn technical skills. He stated, "I did not know how to split PDF file, so I asked with the technological person at the university, and he demonstrated how I could do it using tools freely available online. Now, I can do that."

These data suggest that the provision of technical support at the other TEIs involved in this study would have a meaningful impact on their TEs' practices. Based on these findings and the evidence from the literature, what can be argued is that having a provision of technological assistance at the TEIs can make a meaningful difference because the successful implementation of technology also depends on the availability of the technical support at the institute (Al-Azawei et al., 2016). This was illustrated in the case of the private university, where, in comparison to the public university, technology was used to a greater extent, one reason for this being the availability of an ICT manager at the campus. In other words, while the lack of ICT support can discourage TEs and result in secondary contradictions, a provision of it can facilitate technology use amongst TEs.

5.1.4 Assessment system and syllabus

A top-down approach to assessment and syllabus design was found to be another barrier that influenced the ways TEs used technologies in their practices. As will be discussed in this section, the policies surrounding the design and administration of assessment resulted in secondary contradictions in the TEs' technology use-related activity system and influenced how and when they used technologies in the lessons.

It was observed during the fieldwork that in the public university and its constituent and affiliated campuses, the summative assessments, that is, exam-based testing upon which final judgements are made on students' performances (Harlen & James, 1997; Taras, 2005), were conducted annually. According to TE14, those exams were traditionally designed to test the knowledge of content. While the PSTs' performances in final tests were considered a benchmark of the TEs' academic performances, most TEs had no control over the design and administration of the assessment; they could not decide what questions to ask and how to evaluate their

students. Even when the TEIs conducted internal examinations, which were set and marked by the TEs themselves, student performances on those tests were not counted in the final examinations conducted by the university.

This top-down approach to examinations was observed to be one of the reasons for the secondary contradictions in TEs' technology use activity system. The contradiction was that the TEs and their PSTs seemed concerned about the examination when discussing the technology use during the interviews. The TEs were concerned about completing the course to help their students prepare for the tests. This, in turn, influenced when and how the TEs used digital tools in their lessons. For example, TE2 noted that he was unable to do project-based teaching as frequently as he would have liked to do. When asked for the reasons, he maintained, "the exam and the content coverage made it impossible to engage students in ICT-based project work."

TE2 was required to conform to the syllabus, academic calendar and exam schedules prescribed by the public university. This meant he was required to complete the syllabus and help students prepare for the examination. Thus, he could engage students in ICT-based project works for only a few weeks in a teaching year. TE2 said:

> "As the course load is very heavy, and students need to prepare for exams, the project that I discussed goes only for a certain number of weeks in an academic year. If I made my entire classes project-based, then I won't be able to cover the content in the curriculum."

A similar observation was made by TE3 regarding the impact of the top-down approach to exams and syllabus design and how this influenced the technology use in teacher education activities. He noted, "Because we have content load and limited time… we have had a little discussion on [other issues] …our focus is on the course."

He suggested that his and his colleagues' focus remained on completing the course and that the ICT was also used to support this.

Evident in these data is that the examination and the syllabus that the TEs needed to teach to prepare PSTs for the exams did not align with the teaching strategies that the TEs would have preferred to follow when using digital tools. Such misalignment was identified as a secondary contradiction because the TEIs could not ensure the academic freedom that the TEs required to become innovative in their classroom such as evaluation process and methods, syllabus design, and the content to be taught, and this influenced how digital tools were used during lessons.

An effect of the contradiction was that some TEs' in-class use of technology was found to be teacher-centric. For example, TE9 stated, "in my experience, as the [focus is on] content - so if you do a class with PowerPoint presentation, the content coverage can be made more intense." This suggests that the TEs used the multimedia projector as a means to cover a large portion of content during the lessons because they believed that their students wanted them to complete the course for the exam. In this regard, TE1 noted, "The other [issue] is students have time pressure to prepare for the exams. For example, students say they prefer exam focused content rather than discussing things that are not in the syllabus."

This data suggests that a content-loaded syllabus and a requirement to complete a course for examination made some TEs use ICT to support the transmission mode of teaching and focus on content coverage. This finding is in congruence with those of Blundell et al. (2016), Fu (2013) and Orlando (2013) which argue that time required to cover the course content prescribed in the curriculum for assessments can be barriers when they do not align with ICT practice. Blundell et al. (2016) further argues that lack

of flexibility in curriculum, high-stake exams manifest as external barrier and create secondary contradiction in digital learning activity systems.

A ripple effect of the top-down approach to exams and syllabus was that a few TEs used PowerPoint and multimedia projectors to teach large amounts of content in their lessons, which resulted in teacher-centred use of digital tools, as observed in the data from the PSTs. They noted during the focus group discussions that some of their TEs used projectors to cover large portions of a course. For example, PST15, who was from the central campus of the public university, noted, "some TEs used multimedia projectors as a tool to complete the course. It's the best means to do that. [Teacher educators] try to cover a large portion of the course in a single lesson sometimes." PST16 agreed with this, adding, "some of our lecturers' lessons are very teacher-centred when they use multimedia projectors."

It was found from the data analyses that the top-down approach to exams and the content-loaded syllabuses created a misfit in technology use activity system and made the TEs' practices teacher-centred. The PSTs noted that a factor contributing to such practices was the university did not engage the TEs when setting exams and designing the syllabus. For instance, PST10, from the central campus of the public university stated:

> "The…problem is that the [teacher educators] do not design the syllabus. Somebody designs the course – also teacher [educators] are not involved in the examination. Somebody in the university sets questions for exams, and the papers are marked by another person - they have no idea how much content can be covered in [the given] teaching hours…to be [ready for exams]."

As a result of that, the TEs' practices were teacher-centred even when they used digital tools because they believed that it was their duty to complete the given course to

help students prepare for the exams. Because the universities did not engage TEs in the syllabus design and the assessment process, the TEs did not have the academic liberty to discuss how much content could be covered and what assessment tools and evaluation processes would fit their needs; they were required to comply with the policies of the university. As results there were contradictions in their practice as demonstrated in the figure below.

Such policies comprised the 'rule' in the technology use activity system of the TEs. In an activity system, the rules refer to explicit and implicit regulations, norms, policies and expectations (Castro & Nyvang, 2018; Murphy & Rodríguez-Manzanares, 2014) and influence subjects' actions (Gedera, 2016). In this case, the rules (having to conform to externally set exams and syllabus) did not align with how the TEs could use digital tools because they were more concerned about teaching the prescribed course so that their students could do well in their exams, which were considered a performance measurement indicator. As also argued by Butzin (2004) and Hew and Brush (2007) content-focused exams and a requirement to complete the curriculum limited TEs' technology use. Because the policies related to exams and syllabus did not facilitate and support innovative uses of technologies, some TEs used multimedia projectors to merely support their traditional practices.

The findings and discussions in this section suggest that the TEs had no influence on the assessment processes and the content they taught, and they were required to follow the exam and syllabus guidelines set by their universities. As a result, they were more concerned about preparing students for the exams than using digital tools more creatively to promote student-centred pedagogies in the classroom. This illustrates that the process of technology use is limited when teacher educators are made to follow externally set curriculums and the assessment methods.

5.2 Internal Factors

The preceding discussions established that external factors influenced the TEs' technology use in different ways. Whilst some factors (for example, support by the institutional leadership and provision of ICT manager at the private university TEI) facilitated TEs' actions in their technology use activity system, others constrained digital practices as they resulted in quaternary or secondary contradictions in their activity system.

In addition to the external factors, the data show that factors internal to TEs also influenced their technology use. Two internal factors, the TEs' knowledge and skills, and their ICT-related beliefs will be discussed in the next section because these were found to impact the continuation of the TEs' learning and ICT practices.

5.2.1 Technology use knowledge and skills

As will be discussed in Chapter 6, the TEs learned about digital tools and their use in EFL teacher education practices through various sources. However, during the interviews, three older TEs mentioned that they lacked sufficient knowledge, which restricted their use or made them unable to expand their existing ICT practices. For example, TE14, a veteran teacher educator with more than 25 years' experience, said that his lack of skills was a challenge that impacted his practice. He noted, "the first challenge is having limited digital skills…If we are not confident about something, we do not want to practise that thing. That's the reality."

Similarly, TE11, an older TE who believed that he had limited skills, stated that he used the multimedia projector to support his practice for approximately 90% of his classes. Whilst he used tools such as PowerPoint and a multimedia projector in the most common ways, he could not expand his technology practice. He said, "I am not

confident about my technical expertise. I have only learnt how basic PowerPoint slides can be made. For example, I find it very challenging to do other things." To illustrate this further, he shared the following anecdote:

> "In a recent class, I wanted to show the "Three Circles of English", relating to world Englishes, but I could not insert three circles on a PowerPoint slide. So, what I did in the class was that I [switched off] the projector and drew the circles on the board."

These examples suggest that the older TEs were not able to expand their practices beyond the use of PowerPoint and multimedia because they lacked the competencies required for seamless use of digital technologies. Whilst these TEs did not discuss it, the discussions in Section 5.1 suggest their TEIs did not have plans and programs to support these TEs' digital competencies.

Teacher educators' lack of ICT skills can result in primary contradictions in their technology use activity system. A primary contradiction occurs within the same element of the activity system (e.g., the subject), these are called primary contradictions (Marwan & Sweeney, 2019; Yamagata-Lynch, 2010). The contradiction, in this case, is that their skills contradicted with their desire to use digital technologies, creating a misfit between what they can actually do and wish to do. As a result of such misfits, they were not able to expand their practice. Also, as may be seen in TE11's comment, such primary contradictions can result in the avoidance of digital tools when they are not able to figure out how to use them.

Analysis of the data from the third older teacher, TE13, demonstrates that the protean nature of ICT also contributed to their lack of skills, which resulted in primary contradiction. It was noted in his interview data that the lack of knowledge of new

feature in an existing technology resulted in the avoidance of technology use. For example, TE13 stated:

> "The other challenge I have faced is the technology usually gives you something new every next week or every next month; even the Moodle offers something new. You don't know it. So, what I try to do and what others try to do is skip that and still manage. So, this avoidance and trying to manage with what we already know is one challenge."

The data here show that the ever-evolving nature of technology contributed to older TEs' beliefs that they did not have enough knowledge to use a given technology and, therefore, the strategy they adopted was avoidance. Protean nature of ICT tools can therefore result in lack of digital practice by making TEs feel that they lack skills (Ramanair, 2016; Vasinda et al., 2017).

Educators may avoid technologies because their ICT use is underpinned by their knowledge and skills (Hughes, 2005). A belief that they do not have the required knowledge and skills can limit their practices, as in the cases of TE13 and TE11. Therefore, as Adnan and Tondeur (2018) argue, teacher educators need to possess the knowledge required to use a new feature or a new technology so that they continue using digital tools in teacher education activities. It maybe for this reason that the three older TEs stated that they had put efforts into learning about technology. This will be discussed in Chapter 6.

The analysis of the data from three younger TEs suggests that they also wished to learn new skills to expand their practices. For example, TE7 stated:

> "I want to know about other digital tools that I can use in teaching research, the subject that I teach to MEd students… for example, I would like to know how I could NVivo so that I can help my students in their research."

Similarly, TE5 suggested that she wanted to learn about new digital tools and resources that she could draw on to enhance her practices. This finding shows that digital skills were important to them. As Ertmer (1999) argues, unless teachers have the knowledge and skills of ICT, classroom use of those tools cannot follow. Because these TEs believed they needed to enhance their skills, they engaged in ICT-related professional learning activities.

Uerz et al. (2018) contend that it is important for educators to engage in professional learning activities that allow them to gain metacognitive competencies such as awareness of the emerging technologies in the field and develop the aptitude to become digitally competent. This supports Krumsvik's (2014) argument that a core competency of teacher educators' digital competencies is awareness of different ICT and how those could be used in teaching and learning. As shall be discussed in the next two chapters, the TEs in this study were able to gain awareness and metacognitive competencies related to technology use through their learning, and this helped their ICT uptake.

In summary, this section has demonstrated that three older TEs sometimes avoided technology use when they lacked the skills. However, they and the younger TEs expressed their desire to continue learning about digital tools.

5.2.2 Technology use beliefs

The participating TEs' 'technology-related beliefs' was the second internal factor found to be important in their digital practices. As will be discussed here, the

analysis of the data demonstrates that the TEs' technology-related beliefs and attitudes about technology use underpinned and sustained their digital practices. The data also show that it was their technology-related beliefs that underpinned their digital practices. Their technology-related beliefs were underpinned by the perceived usefulness of digital tools and their 'positive experiences' (Li, 2016) of using technologies.

5.2.2.1 Beliefs related to perceived usefulness

The data illustrate that the TEs were of the opinion that digital tools afforded them opportunities for professional growth and learning; therefore, they believed that they should use digital tools. For example, TE12, a highly experienced veteran teacher educator, stated, "if I did not use the internet [and internet-based technologies] I would never gain the professional [growth] that I have achieved throughout my career."

In discussing how the use of digital tools helped him in his professional learning, TE21 stated that he was encouraged to use technology. He said, "digital skills are inevitable; ICT has opened many doors in my professional learning. Therefore, he noted that he was encouraged to use technology. He further noted, "my intention of updating myself with best teaching practices of the world motivates me to use technology in the classroom." He suggested that through the use of digital tools, he was able to access resources required for his professional learning, which helped him remain competent in the profession. TE5 similarly noted,

> "I use email, internet for information access, to keep myself organized; in all those things, ICTs [have] played a significant role. Say, if I miss training, I may not miss a lot of things, but if I lose my access, I will have to bear a huge loss. For self-learning, to access materials, to get an answer to the things that you are not aware of - you use email and the internet. It keeps your learning ongoing, which is more valuable than one-day or two-day training."

The data here demonstrate that these TEs perceived digital tools to be important because they mediated their learning, afforded access to resources, and helped them remain up-to-date in the field. Similar opinions were also expressed by other TEs. For instance, TE24 said:

> "Use of digital tools in our traditional classroom is very difficult as there are many constraints. Despite this reality, I am motivated to using them because they help me to make my class effective; they reduce my labour in class, and students feel delighted with the use of those tools."

Likewise, when TE2 was asked to discuss the reasons he used technologies in his practice in teacher education, he said:

> "Although institutional support and technical aspects are not available as I have expected in my institution… I use ICT because ICT is one of the survival tools in this century. Learning and implementing these tools are vital skills to be successful in virtually every field, not limited to language teaching and learning… I am particularity motivated to use ICT because of its ubiquity, richness, timely (updated) and global connectivity and free access… ICT [helps] to provide a rich learning environment by exploring and sharing digital…resources."

Evident in the data is that the TEs perceived ICT tools to be useful, and they used these tools despite lacking conducive environment and support from their institutions. The TEs found digital tools helpful because they reduced their efforts or sustained them professionally. Likewise, as argued by TE2, ICTs helped by providing other affordances.

Instefjord and Munthe (2017) argue that educators' attitudes towards technology are related to the perceived usefulness of the technologies. When they are convinced that using digital tools can help them with information access, dissemination and professional enhancement, they will use digital tools (Petko, 2012; Wozney, Venkatesh, & Abrami, 2006). By contrast, if teachers are unconvinced that digital tools can help them enhance instructional productivity, they are less likely to use ICTs in their practices, despite having access to those tools (Kim et al., 2013).

As the participating TEs perceived that digital tools were advantageous to them in their profession, they believed that they should use technologies. This suggests the relative advantage of digital tools (Rogers, 2003) helped the TEs to use technology in teaching and learning, and sustain such practices.

5.2.2.2 Beliefs related to positive emotional experiences

As well as believing that digital technologies were of benefit to them, some TEs elucidated that they gained 'positive emotions' – which Li (2016) defines as feelings of confidence, self-empowerment and satisfaction – from using technologies and this sustained their digital practices. As mentioned earlier, emotions are intrinsic factors that influence technology use (Belland, 2009). The positive emotions observed in the TEs' narrations were feelings of empowerment, self-satisfaction and confidence.

The data show that having access to digital technology and being able to use them made TEs feel empowered. For instance, TE5 noted that she felt empowered when she had access to digital tools, and thus, she was motivated to use them in her practice:

> I use ICT to improve my professional, pedagogical, as well as personal skills. Using ICT helps me to update myself, to learn new skills, and to widen and deepen my knowledge. For example, most of the time, many of my questions

> can be answered when I browse the Internet. Use of ICT makes me feel empowered, and this sense of empowerment keeps on motivating me to use ICT further.

As well as feeling empowered, the TEs also gained self-satisfaction from being able to use digital tools, and this motivated them to keep their digital practices ongoing. For example, TE5 stated, "When you feel satisfied that motivates you to take further challenges and that also raises the [beliefs] related to technology use in teaching and learning."

Similarly, TE3 noted that he gained self-satisfaction from using technology because the use of technology in his practice left a good impression on his students. He said:

> "Using ICT helps you make a different identity among the students and in your institution. When you use ICT, [students] regard you differently. [They] think that you are smart and techno-friendly. You can create your own space [at the workplace], which is very important as it gives you satisfaction and sense of accomplishment.

TE2 also stated that he gained satisfaction when he used digital tools because this passed a positive message on his colleagues and students: He noted,

> Since I started using technology…my practice has sent a positive message to other educators throughout the campus…Students seem to perceive my practice positively. So, I have a higher self-satisfaction now. Also, I feel that I am doing something useful by using technologies in whatever way possible.

The data in this section demonstrate that some TEs felt satisfied in their practices when they used digital tools. Therefore, they used technologies despite the

challenges. For example, as discussed earlier, TE2 did not have the required resources at his TEI. Nonetheless, he was passionate about technology use. This finding supports the argument that people engage in activities that give them self-satisfaction (Bandura, 1997).

In addition to feeling empowered and satisfied, TEs also stated that the use of digital tools helped them to gain confidence in their practices. For example, TE17 said that he felt it was important to use digital tools in teaching and learning because "it builds confidence… and lowers anxiety [because] it helps a teacher to plan lessons [well] and lesson preparation becomes effective."

On a similar note, TE1 explained how he gained confidence from using digital tools:

> "[When] I was not using ICT, I would be under stress whenever I planned a lesson on a new subject matter. Now, because I use the internet, I have access to e-books, journal articles and other resources. Right now, I can look into multiple resources when I am preparing a lesson. Second, I have been able to widen my knowledge of content because of access to multiple resources. Also, I have updated my pedagogical knowledge. For example, I watch videos by renowned professors in my area. I watch videos on content and also on running the classes. These have made me more confident about what I say in the class and how I teach the class."

TE1 implied here that since he started using digital tools, he gained confidence. Thus, he believed that using ICT was important. This finding echoes a long-held contention that feeling of confidence is important in sustaining educators' ICT practices (Albion, 1999; Wozney et al., 2006). Ertmer and Ottenbreit-Leftwich (2010) argue that one of the ways teacher educators gain confidence is through their personal experiences.

Because the participating TEs' feelings of confidence were rooted in their personal experiences of using technologies, it can be argued that their ICT-associated beliefs sustained their digital practices.

Evident in the data above is that TEs gained positive emotions by using digital tools. In turn, these positive emotional experiences influenced their digital practices. To understand how positive experiences and emotions contributed to the TEs' digital practices, the following quotation by Mueller, Wood, Willoughby, Ross, and Specht (2008) can be considered.

> Although computer-related variables in general continue to impact on teachers' ability to integrate technology, it is positive experiences with computers in the classroom context that build a teacher's belief in [using] computer technology. (p. 1533)

Furthermore, it is argued that positive emotions, such as satisfaction, empowerment and confidence, promote internalisation - which is argued to be the development of individual consciousness (Yamagata-Lynch, 2010) - and the subsequent action (Li, 2016). Because TEs felt positive emotions after using digital technologies, that led them to believe that ICT tools were useful to them. Such positive feelings led to the internalisation of digital technologies. As results of this, TEs pursued digital practices by participating in learning activities and using ICT in teacher education practices.

5.3 Conclusion to the Chapter

The data, analysis and discussion in this chapter have elucidated the ways the TEs' digital practices were influenced by both external and internal factors. While some of those factors resulted in quaternary, secondary or primary contradictions, others

facilitated their use in their technology use activity system. This chapter has established that technology-related attitude and beliefs were pivotal in sustaining the TEs' practices, especially when the context lacked institutional support and required the TEs to be proactive in using digital tools.

At the time of data collection, external factors, such as national and university policies or professional ICT standards that could influence the kinds of support, resources and infrastructure available to TEs had not been developed. Thus, there were contradictions in the technology use activity system. Likewise, the financial resources that the TEIs had at their disposal impacted the availability of resources for the TEs' use. Internet speed, time and technical support at the TEI similarly resulted in secondary contradictions between rules or division of labour and the TEs' actions of technology use. Similarly, a top-down approach to assessment influenced how often, when and why TEs used digital tools. While institutional leadership also negatively influenced technology use, it was established that, in some cases, the role played by the leadership supported TEs' digital practices.

In regard to internal factors, there were two elements that influenced the TEs' digital practices. While the lack of knowledge and skills required to use digital tools resulted in the primary contradictions in some older TEs' technology use activity system, these TEs believed that they needed to continue learning about technology.

The other internal factor was TEs' technology-related beliefs. It was found that TEs' beliefs about digital tools were supportive of their practices. TEs believed that digital tools were useful to them and that the use of ICT tools empowered them and gave them satisfaction and confidence to sustain their digital practices. Because of such beliefs, they were able to overcome the barriers stemming from the external factors in their digital practices.

The next chapter will discuss the activities the TEs undertook to enhance their digital competencies.

Chapter 6 – Teacher Educators' Technology-Related Professional Learning

In the previous chapter, the factors that influenced the digital practices of TEs were explored and discussed. It was established that the TEs' digital practices were influenced by external and internal factors. Many of the external factors manifested as barriers and influenced the ICT tools they chose to use in the classroom, and how and when to use them. Some of those factors, however, facilitated ICT use as they encouraged and promoted TEs' digital practices. Similarly, internal factors, namely the TEs' technology-related beliefs, played pivotal roles in sustaining their digital practices.

This chapter looks into the ways TEs learnt about the educational use of digital technologies and enhanced their competencies to use digital tools and resources in their teaching and learning. The findings show that most of them were required to overcome the barriers stemming from the lack of opportunities to access ICT-related professional learning opportunities at their TEIs. Therefore, they engaged in different professional learning activities at their own discretion to enhance their digital competencies because their engagement in different ICT-related professional learning activities was underpinned by their choices and beliefs related to technology.

Based on the analysis of the interview data, the findings and the discussions are categorised into four sections: learning foundational skills; training at the university; learning from online courses; and learning with colleagues. While the first section teases out how TEs gained the foundational skills to use computers, the rest of the chapter examines the activities that they undertook to develop more advanced skills so as to be able to use digital tools and resources in their practices.

6.1 Learning Foundational Technological Skills

This section focuses on how, where and when the TEs gained foundational skills, such as operating a computer, typing, using basic programmes (e.g., Microsoft

Word, Excel and PowerPoint), and opening an email account. It was considered important to explore the TEs' experiences of learning the foundational skills because any activity system (i.e., use of technology in education) or the object of an activity system (i.e., gaining skills to use technology efficiently) can be understood better when the history of the activity system is explored (Engeström, 2001). When TEs' digital practices are considered as an activity system, the foundational skills are of significance because, without having the computer operational skills, TEs cannot participate in more advanced technology-related activities, such as using digital technologies for teaching and learning.

All the participating TEs were therefore asked to discuss how they came to know about computer use. The interview data suggest that most of them attended computer literacy training. Based on the activity system presented in Chapter 3 (Figure 3.4), the activity system related to the TEs' learning of basic computer skills is shown in Figure 6.1.

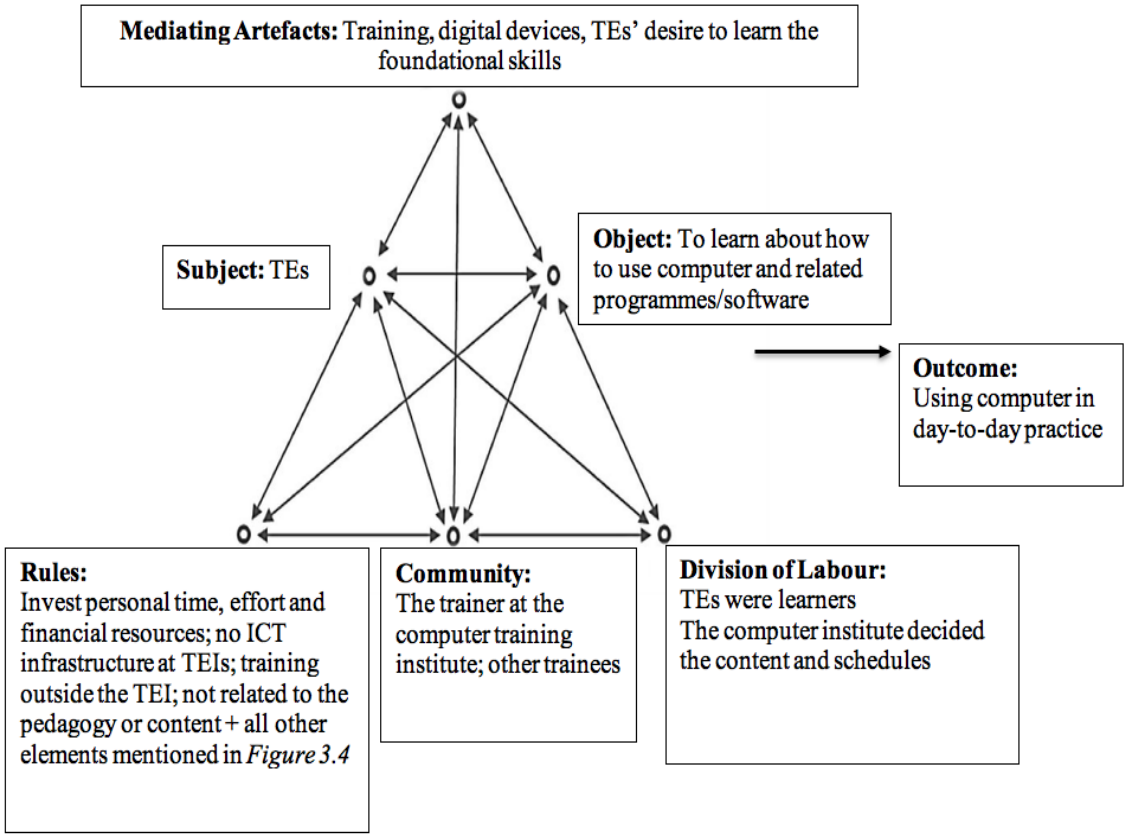

Figure 6.1: Activity system related to attending basic computer training

Figure 6.1 illustrates the activity system related to the basic computer training that the TEs attended. Because the training was self-managed by the TEs (in terms of time and funding), it was underpinned by their intentionality to attend the training. For instance, TE9, who attended a basic computer training, said, "For the basic knowledge, I attended a computer-training course. It was my personal decision to do so." Likewise, TE19 noted, "I took the training on office package." Nineteen other TEs also mentioned that they had attended computer training at different points in their careers as a personal choice.

One theme that emerged from the data is that the TEs (as the subject in the activity system) held the capacity to guide their own activities concerning learning about and using technologies. This is because at least 21 TEs undertook the foundational course without being asked to do so. They self-managed the time and

funding for the courses and undertook them without much support from the TEIs. This finding echoes the argument that when subjects engage in an activity system, they possess capabilities to regulate, shape and direct their actions to achieve the objects (Bannon, 1991; Su, Feng, Hsu, & Yang, 2013).

In the cases of these 21 TEs, the object of the training was to gain computer skills so that they could use computer technology in their day-to-day practices. In discussing whether they were able to achieve the object of the activity system, TE1, TE6 and TE8 noted that they gained basic technological skills from the training, such as typing and the use of basic software such as Microsoft Word and Excel:

> "I undertook a 3-month course on computer…at a private computer training centre, where I learnt typing and about Microsoft Word and Excel." (TE1)

> "I underwent a basic computer training on operating computer and how to use Office package in the early 2000s. The training was a few weeks long." (TE6)

> "I learnt the basic skills on operating computer when I was an undergraduate student [at a computer training institute.]" (TE8)

Evident from these data above is that the TEs learned the basic skills related to typing and operating basic programmes from attending foundational courses. The data also illustrates that the TEs' learning was mediated by the training they received and the digital devices they used during the training. Mediating artefacts play an important role by shaping the ways the subject interacts and engages in actions in an activity system (Kaptelinin & Nardi, 1997). Also apparent in the data is that the foundational skills did not have immediate relevance to TE activities because they were not necessarily usable in teaching and learning. Regarding the dissonance between the computer training and pre-service training course, TE5 noted:

> "I undertook training to learn basic computer operational skills when I was an undergraduate student. The training was a few weeks long, and it was run by a private computer training institute. However, the training was of no use as I did not have any computer, and I did not need those skills in my studies."

It was due to the rules in the activity system (as demonstrated in Figure 6.1) that the TEs' technological learning had no application in teacher education activities. The first was that the TEIs had limited technological resources and very little ICT integration in higher education activities when the TEs attended the training. Secondly, the training happened outside the TEIs, and its focus was more on computer operational skills than about embedding computers tools in pedagogical activities. This finding echoes Wilson's (2014) contention that rules in an activity system influence and control a subject's actions and the achievement of the object. Therefore, it can be argued that the rules associated with the computer training influenced its applicability in teacher education activities.

However, despite the dissonance between the skills learnt and their applicability in their activities at the time of training, the outcome of it was found to have impacted the TEs' practices at the time of data collection. This was evident in the data from the TEs who did not attend such training. For example, TE11, one of the four older TEs who had not participated in any computer operation training, reiterated several times during his interview that his ICT skills and usage were very basic. For example, he said, "to be honest, I [just] know how to design simple slides only as I have basic ICT skills." He further noted, "I base all my slides on the books which I have in my collection…I do not even [use] Google [for] information very often."

Likewise, TE15, who also had not attended any training, maintained that his skills were limited and he was not able to engage in activities that required advanced

skills without assistance. He said, "I have limited digital skills, so I take the help of my family members."

These data from TEs 11 and 15 indicate that their ICT use was fairly basic because they lacked the technological skills to expand their practices. This suggests that learning foundational skills would be important for teacher educators because technological skills are a cognitive tool that they can draw on to engage in digital practice. Also because such learning, in the cases of the 21 TEs, was mediated by the computer devices that the TEs used, not attending such training meant that they missed the opportunity to gain experience technology before attempting to use such tools in teaching.

Furthermore, the lack of foundational skills influencing the TEs' more recent practices demonstrates that the skills they gained from the computer operation training were not just the outcome of the activity system related to foundational skills learning; they also transformed into the knowledge base for TEs to engage in their professional learning/development activities. This finding demonstrates that the product of an earlier activity system influenced TEs' digital practices in teaching and learning. This is because during such training, their learning was mediated by the digital tools, which influenced not just learning, but also the mental functioning of the individuals (Kaptelinin & Nardi, 1997). Guided training in technology can help educators familiarise with the tools and overcome the stress that stems from the incorrect functioning of a new technology (Gikas & Grant, 2013). Thus, it can be argued that the TEs who did not attend the training lacked skills and familiarity with the tools, and therefore, they did not feel confident to use digital tools.

Likewise, it would be important for TEs to attend the basic technology operation training because foundational skills facilitate more advanced practices, such as

technology use, to support teaching and learning. Studies on digital competency framework and models (Ferrari, 2012; Koehler, Mishra, & Cain, 2013; Krumsvik, 2014; Redecker, 2017) have established that technology operation skills are a key aspect of teacher educators' digital competencies.

One way to develop foundational skills is through their use in educational activities, which, however, none of the participating TEs experienced as students. This shows that computer literacy cannot be taken for granted for those who engage in the teaching profession in Nepal. It is common for a teacher education campus in Nepal not to have any computer facilities for TEs' and students' use in teaching and learning. Therefore, it is necessary that they gain those skills, because only when TEs have the basic skills can they start combining technologies related to pedagogy and content.

The TEs' initial training was also essential because computers and the internet were not easily accessible until around 2010 in Nepal, and the TEs did not have personal access to technologies at home because it was a matter of privilege and luxury. Of the 25 TEs, only two TE12 and E13 had owned a personal computer before the mid-2000s. A reason for the lack of personal access to digital tools was their general unaffordability. For example, the number of mobile phone ownership in 2004/2005 in Nepal was around 88,000 (while the total population was more than 25 million), and a sim card cost NPR 25,000 ($250) (Kumar, 2014), when the per capita income of Nepal was $240 in 2004 (The World Bank, 2018). Whist this data is not related to computer or similar digital tools, it illustrates that technology was generally unaffordable until the mid-2000s.

The lack of affordability or personal access to technology is an example of a rule that influenced how, when and where the TEs learned the basic skills. Rules are of significance because they afford or constrain the activity in varying degrees (Yamagata-

Lynch, 2003, 2010). In this case, the societal phenomenon related to access and cost of technology constrained the TEs' technological practices in the sense that neither they nor their TEIs could afford ICT tools for their use. Therefore, the TEs were required to attend computer training institutes.

The lack of technology use and related resources in the TEIs (and in Nepal generally) was a misfit to the TEs' desire to learn about ICTs and using them in their practices. Such misfits are termed contradictions in Activity Theory. It is argued that for expansive learning to occur, contradictions need to be identified and addressed (Engeström, 2001, 2007; Engeström & Sannino, 2010). However, the TEIs did not put effort into resolving the misfits associated with learning about ICTs because the technologies were not affordable. Therefore, the contradictions were not solved. Hence, the TEs explored the workarounds to the contradictions by attending the training outside the TEIs. In doing so, their desire, proactiveness and intention to learn about technologies played a significant role.

An important finding from the data is that the TEs' desire to undertake the foundational training underpinned their activity system because the training was volitional and self-directed. They took the ownership of their learning and obtained the foundational computer operational skill on their own terms without the support of their TEIs. Despite the contradictions caused by the lack of access and affordability of technology, the TEs attended foundational training, and because they wanted to learn about digital tools, they sought the solution to the misfit outside the TEIs by participating in learning activities at the private computer training institutes.

While attending the training to gain the foundational skills was important, such learning activities had their own rules when seen from the activity system perspective demonstrated in Figure 6.1, which limited the pedagogical and content relevance of

TEs' learning. Nonetheless, such foundational training helped TEs gain technological skills, which are recognised as a prerequisite for TEs to engage in more advanced digital practices. While the computer literacy training helped the TEs gain the basic skills, they were required to undertake technology-related formal and informal learning activities to gain digital competencies required to use ICT tools in their practices. These will be discussed in the ensuing sections.

6.2. Training by the Universities

A common theme in the data related to professional development in the educational use of technology was the training opportunities at TEIs. This section examines the professional development opportunities that were available at the TEIs and their contribution to the TEs' digital competencies and practices. In doing this, the activity systems related to university training are drawn out, and the influences of different elements within these are discussed.

The findings are also analysed and discussed using the constructs of the hierarchy of activities (Leontiev, 1981), which explores the effect and relationship between activities taking place at different levels. Because teacher education institutes provide the context for teacher education and support for ICT integration in curricular undertakings (Lindqvist, 2019; Phuong et al., 2018), they are responsible for the highest-level activities, such as devising policies about technology use in teacher education activities and implementing them to sustain teacher educators' digital practices (Tondeur, 2018), which are the lower-level activities.

The highest-level activities are examples of object-oriented activities, which are defined as "mediational processes…to motivate individuals or group of individuals to participate in an activity" (Yamagata-Lynch, 2010, p. 17). Object-oriented activities are

argued to influence teacher educators' digital practices (i.e., the lower level activities) at their personal level and in the classroom (Barab, Schatz, & Scheckler, 2004).

Only seven TEs out of 25 had received ICT learning opportunities at their TEIs. The scopes, kinds and frequencies of their technology-related training differed based on the TEIs. Despite these differences, as will be discussed in the following sections, the training helped the TEs to expand their understandings of educational use of technologies in teacher education courses. The data also suggests that the role played by the TEI was pivotal.

The following analysis of the research findings is categorised according to the public and private natures of the universities in order to explore the professional development activities available at the TEIs, rather than TEs' personal endeavours.

6.2.1 Training at the public university

Of the 21 TEs interviewed from the public university and its constituent and affiliated campuses, only four noted that they had received opportunities to attend training through the institutions where they taught. They said that the training opportunities were provided once or twice between 2015 and 2017 through the Open and Distance Education Centre (ODEC), an independent department that administered distance education as equity programmes to teachers who are/were unable to attend teacher education courses at the university. The activity system of the training is shown in Figure 6.2.

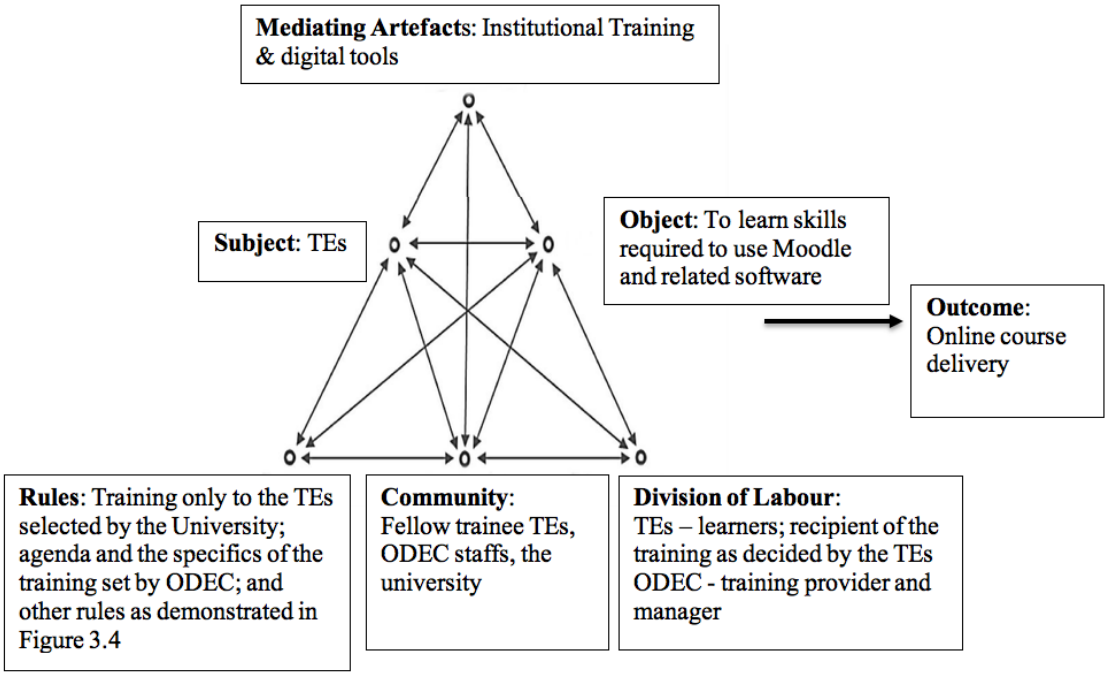

Figure 6.2: Diagrammatic representation of training at the public university

Figure 6.2 shows the TEs as the subject in the activity system, while the community consists of fellow TEs who had received training opportunities like them, along with ODEC staff and the university system.

As regards the rules, it was observed in the data that they had quite a strong influence on the training activities. For example, a rule was that the training was organised by ODEC to enable TEs to use virtual learning tools that their programme was based on, and the recipient of the training was selected by ODEC. As a result, the agenda and specifics of the training were decided by ODEC, not the TEs, and the training did not reflect the ICT learning requirement or the pedagogical requirement of the face-to-face courses that the TEs taught.

An effect of this rule was that the TEs had a minimal role in the division of labour in the activity system. They were the recipients of information that ODEC deemed necessary to disseminate. This is evident in the data from the policymakers and the TEs. For example, the director of the ODEC said:

> "the focus [of the training] was on the use of tools and related system for the delivery of distance education. Therefore, the training discussed the issues of syllabus design, lesson preparation, lesson delivery and handling student correspondence using Moodle [in the online course]"

The four TEs, who received the training through ODEC, affirmed that the professional development activities focused on the use of Moodle in the delivery of the distance education course. For example, TE3 stated, "I [attended] a training offered by ODEC…it focused on how to use Moodle…in distance education programme; how to design a course, upload materials; and, how do we set up assessment tools and mark assignments on Moodle."

Similar observations were made by TE1 and TE5 about the training that they had attended just a few months before data collection. For instance, TE1 said "I and three other teacher educators in the department were given a three-day training [by ODEC] …We were taught how to video-record our lectures using Camtasia [i.e., a software] while delivering our lesson and students' activities." Likewise, TE5 noted, "This July, I attended a training [through ODEC] on the use of PowerPoint and use of screen recorded video."

The evidence elucidates that ODEC undertook an active role in designing and delivering the training in that the training focused on the virtual learning platform that they used in the delivery of the distance education course. Therefore, the object in the activity system (i.e., goal/objective of the training) was to enhance teacher educators' understanding and skills required in the online education programme. This also implies that the training offered by ODEC differed from the face-to-face teacher education course in systemic terms.

Despite the differences between the object of the training and TEs' primary engagement, it was found that the skills were transferrable. For instance, TE5 noted that she already used some of the skills that she gained from the ODEC-delivered training in her practice:

> "The training was useful because the skills that I learnt from the training are very helpful. In the training, we learnt how to design interactive PowerPoint slides using animation, and I have used them in designing conceptual framework, diagrammatic presentation and in describing similar concepts in my regular teaching."

Likewise, TE1 stated that what he learnt from the ODEC training was useful and implementable in his regular classes:

> "We were taught in the [ODEC training] how we could record the video of lesson delivery and students' activities. After the training, I realised that [I] could record a video for the lessons that I would not be physically present... [I] can prepare the material at home and pass that to [my] students by email so that they can use that even when I am absent in the class…. After the training, I recorded my video twice for the lessons that I was unable to deliver."

Evident in the data here is that, despite having a different objective from face-to-face teacher education courses and being limited in frequency and coverage, the university training (which is an object-oriented activity) helped these TEs learn about the digital tools and their application in teaching and learning. A possible explanation for the TEs finding the training useful was that, as well as being practice-based, it happened in the TEs' context (i.e., the university). It also covered pedagogy and content because the training was about using digital tools in online education.

Because TEs used the skills that they learnt from the online training in their usual practices, it can be argued that the role played by the university supported the TEs' technology uptake. This finding accords with Macharia and Pelser (2014) and Yang's (2009) contentions that institutional support promotes the uptake of ICT by academics in higher education. Thus, this finding implies that object-oriented activities (i.e., the university training) influence the lower level activities in an activity system. (i.e., TEs' integrating digital tools in their practice).

Furthermore, while the skills that the TEs learned were identified as useful, it was observed in the data that the TEs' (as the subject in the activity system) agency was important as it influenced whether they expanded the object of the activity system in Figure 6.2 by using those skills in their primary activity – face-to-face teacher education activities. For example, following the training by ODEC, TE5 and TE4 decided to use Moodle, for which they had to write applications, get these endorsed and go to the ODEC office in person to submit their applications before finally getting approval for the use of Moodle in the face-to-face course.

However, TE1 and TE3 maintained that they could not use Moodle because they were not allowed. For instance, TE3 said, "As for [Moodle] use with the face-to-face cohort, I have not used that as the face-to-face cohort does not have access to the Moodle. The ODEC office does not permit us to use Moodle." While he used the platform for distance education, as did TE4 and TE5, he did not use the virtual learning platform for face-to-face courses. It was found that his reluctance was related to his volition. He noted:

> "I use technology 60% of the time, and 40% of the time I switch to traditional mode. This is what I do… I usually try to balance the use of technology with

> non-technology. As [all my students] might not have equal technological competence and technological facilities, I need to consider them as well."

While TE3 cited a lack of equal access as a reason for avoiding technology in 40% of his lessons, his counterparts used technologies regularly in the same context. This, therefore, demonstrates that the TEs' agency played a pivotal role in the uptake and appropriation of technology skills and tools in teaching and learning.

The TEs who were agentic appropriated into their face-to-face courses the knowledge, skills and tools that were introduced in a different context. Such appropriation shows a "sophisticated process of coordination between humans and cultural artefacts" (Saljo, 2006 as cited in Instefjord, 2015). Use of digital tools as mediating artefacts make it possible for such appropriation because the artefacts do not just mediate human actions but also influence the cognition of the actors/subject in action (Kaptelinin & Nardi, 1997).

However, when TEs were not agentic, they were reluctant to appropriate and integrate ICTs in teacher education activities. As in the cases of TE1 and TE3, when subjects lack volition, they do not engage in the technology use activities, despite having the knowledge and skills required to use digital tools. This can be explained well when considered against the rules in the face-to-face teacher education activity system (as in Figure 6.3) and the influence of policy (as discussed in Chapter 5).

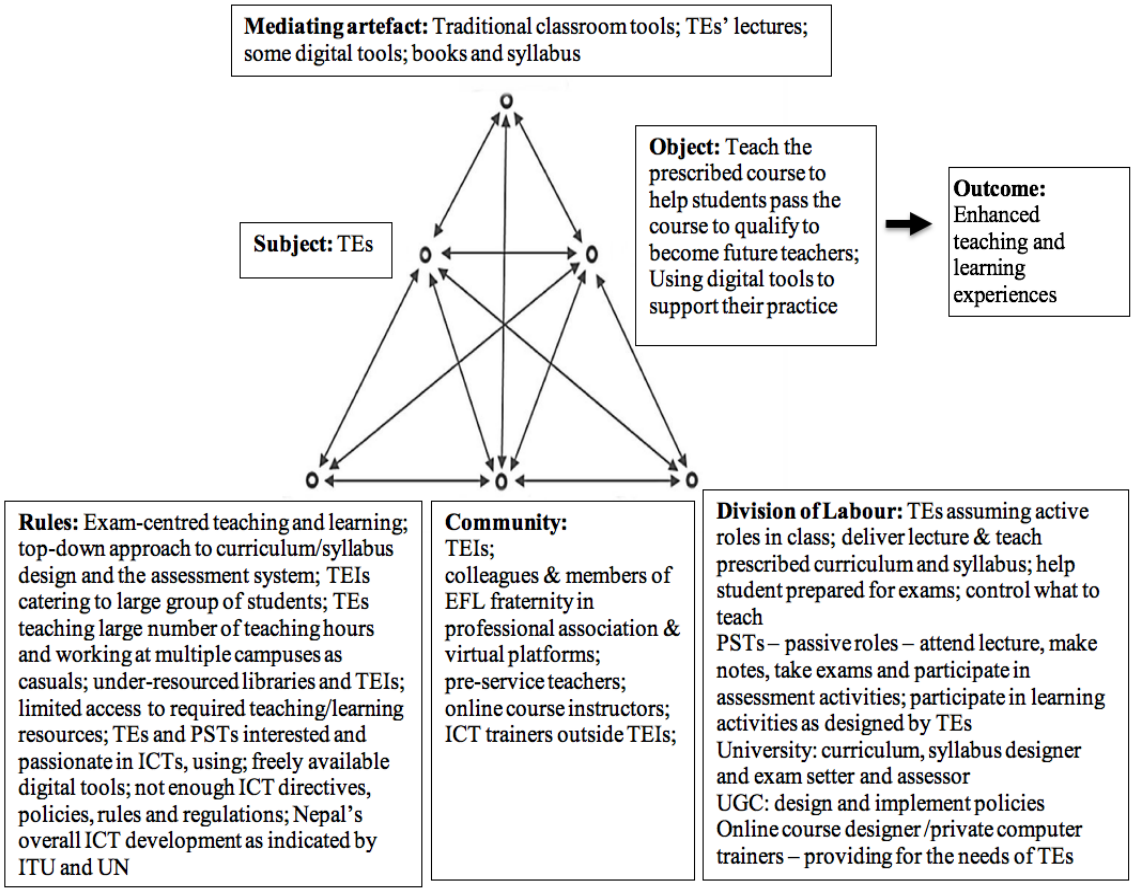

Figure 6.3: The basic activity system under consideration in this study.

A rule that influenced the technology use activity system was that the TEIs did not require their TEs to use digital tools in all of their lessons or provide enough support or other resources, as noted in Chapter 5 because the TEIs lacked the institutional readiness to promote and sustain the TEs' digital practices. A lack of mandate from the institution for technology use in educational activities can make teacher educators feel that they are not obligated to use ICTs (Adnan & Tondeur, 2018). Additionally, when there are no institutional requirements, TEs are not challenged or questioned when they do not use any digital tools in their lessons. This may have been the reason that two TEs, TE1 and TE3, did not appropriate digital tools even when they possessed the skills had access to the tools.

Furthermore, the rules (e.g., institutional readiness and lack of support) in the activity system in Figure 6.3 also explain why only four out of 21 TEs from the TEIs in the public university received professional development opportunities through the university. Because the institution had limited directives and regulations related to ICT use in teaching and learning, the TEIs did not realise a need for all TEs to be trained in technology use. This meant that the training was offered to the limited number of TEs that the university selected to deliver open education. Other TEs were unaware of such training. For example, TE18, who taught at a constituent campus located in the capital city, noted, "As for training [opportunities] at the college, I am not aware of any training on technology. I do not know if my [colleagues] have received any training either."

As there were limited opportunities for professional development at the TEIs, the TEs were required to explore alternative resources to enhance their digital competencies.

The reason behind the lack of digital training at the public university can also be related to the normalisation of technologies in publicly funded higher education institutes. TE12 and TE13, both veteran teacher educators with more than 20 years' experience in teaching and a rich knowledge of educational policies, noted during their interviews that technology use in education was still in its infancy in Nepal. For example, TE12 stated," …technology has come very lately in Nepal, so it has not become a usual part of our academic lives." The effect of this was noted by TE13 when he stated, "integration of digital technologies in the public university and its campuses…is minimal [therefore] the use of digital tools in the pre-service teacher education courses is very [little]."

These data suggest that technology use in Nepalese teacher education courses is in its infancy and that digital technologies are yet to be normalised there. It is argued that it requires a significant amount of time to adapt and adopt digital technologies and make their use a normal happenstance in the entire institutional community (Bax, 2011; Lee, 2014). A process of evolution is required for technologies to be normalised and used for the service of teaching and learning (Bax, 2003). This phenomenon echoes Engeström's (2001) argument that any activity system takes time to get shaped and transformed. An implication of technologies not being a normal part of teaching and learning in Nepal is that ICT-related training is not yet commonly available for teacher educators at teacher education institutes, despite the fact that such institutes have a pivotal role in setting the agendas for learning, brokering knowledge, creating learning opportunities and supporting educators to adopt digital technologies in their practices (Printy, 2008).

In summary, the findings and discussions in this section establish that there is evidence of ICT-related, object-oriented activities (i.e., ICT-related professional development opportunity) at the public university. The few TEs who benefitted from these activities were given limited choices as to what ICT skills they could learn and what their ICT learning needs were. Nonetheless, because the training happened in an educational context and concerned teaching and learning, the skills were transferrable. However, for TEs to be able to appropriate the tools in teaching and learning, they need to be agentic. A lack of agency resulted in the avoidance of technology by at least one of the TEs, despite attending the training. Similarly, the lack of institutional readiness and normalisation of digital tools contributed to the reluctance of some TEs to integrate technology.

6.2.2 Training at the private university

Unlike the cases of TEs teaching at the public university and its campuses, all three full-time EFL TEs at the private university noted that they received opportunities for training at their TEI. The interview data from the TEs and the Dean of the institute suggest that the TEI (i.e., community) brokered and determined what the TEs needed to learn to use Moodle in TE activities. The activity system of training at the private university looked is shown in Figure 6.4.

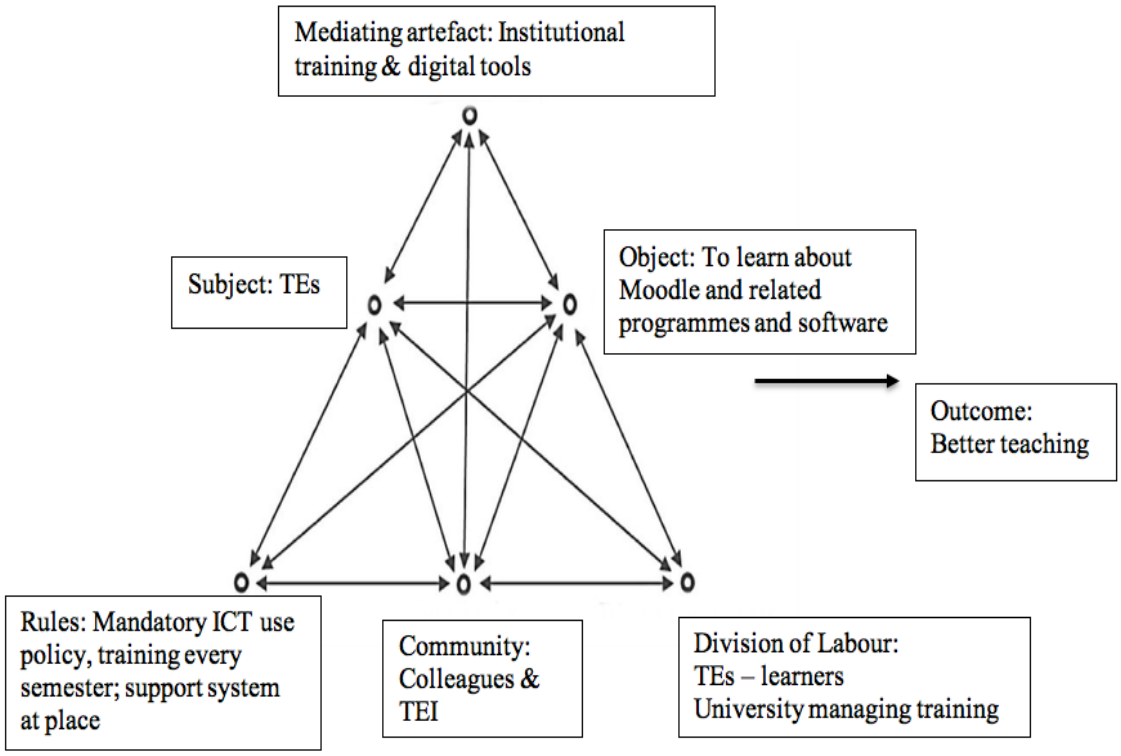

Figure 6.4: Diagrammatic representation of the training at the private university

As can be seen in Figure 6.4, the subject in the ICT use training activity system was the TEs because the analysis considered their professional learning. The policy on mandatory use of ICT tools and provision of support systems to promote technology use of the TEs facilitated the activities related to training. For example, the Dean of the TEI at the private university noted, "we aim to make Moodle our main platform for teaching [and] learning… [so] we run training for the teacher [educators]."

As the Dean implied, the objective of the training (i.e., the object of the activity) was to enhance TEs' digital skills. Therefore, the Dean affirmed that the TEI organised frequent training programmes for the TEs. For example, regarding the frequency of training, he said, "…we run one training at the beginning of the semester, and there is one more session during the semester. So, there is at least one-two training every semester." As a result, technologies such as multimedia projector, PowerPoint presentation and Moodle had become regular features in teaching and learning.

It was found that the institutional support (in the form of training) was important when technology penetration, in general, was very low (see Chapter 2 for a detailed discussion on this). This was evident in the data from three TEs (TE7, TE10, TE13), who noted that the training offered by the university was useful in enhancing their skills. In particular, TE7 credited his learning about digital technologies to the pedagogical practices initiated by the university. He stated:

> "When you discuss my learning… [the TEI's] initiation and support have been instrumental. My TEI provided a lot of learning opportunities, such as merging videos in PowerPoint slides, uploading resources on the Moodle, using Moodle more effectively, engaging students in interactions on Moodle. There were a lot of workshops on those...Though the personal preparedness has helped, because it is the University where I practice my skills, the institutional support has been instrumental."

TE7 further noted that he knew very little about technology use in pedagogical practices before attending the training events offered by the university. TE13 also observed "In 2014, there was a workshop on virtual learning environment here at the University… [which] helped me learn about Moodle." The data here shows that these TEs' horizontal movement from not having knowledge and skills required to use

Moodle (and associated digital tools) to being able to use them – which is evidence of expansive learning – was contributed to by the training offered by the university. This finding echoes Pettersson's (2017) contention that enhancing teachers' professional competence is not an isolated factor limited to them, but it is an organisational task. As institutional support influences teacher educators' ICT-related professional learning, the role played by the university or teacher education institute enhances and promotes their digital capabilities (Hökkä & Eteläpelto, 2014).

It was also found that the TEI at the private university took responsibility for providing professional development opportunities to encourage TEs to use the technologies; thus it provided in-house ICT-related professional development opportunities to TEs to help them enhance their digital competencies. This suggests that the university/TEI as the community and the higher-level authority (in their activity system), has an important role to play in teacher educators' professional learning about technologies (Laferrière et al., 2013; Tack et al., 2018; Trust, 2017). New digital technologies cannot be embedded and infused into pedagogical activities without enhancing teachers' competencies and understanding of the implications of technology use in teaching and learning (Infodev, 2010).

Furthermore, the university-organised workshops were helpful because, as suggested by TE7, attending the training events helped the TEs develop knowledge and skills that they required to use the various digital technologies and resources in their practices. This echoes King and Boyatt's (2015) argument that institutional support in teachers' development plays a pivotal role in promoting digital technologies in an educational institute. Both teachers and teacher educators need regular training because it is through regular learning that they will be able to understand the implications of technology (Infodev, 2010).

Whilst such training was helpful, it was found that not all TEs used ICTs effectively. For instance, the Dean said:

> It's already been more than five years that we have been using Moodle…but we have not been able to use the Moodle [effectively]. We have trained teachers time and again. They were supposed to communicate with the students, receive students' feedback, giving grades and feedback on the same platform. I mean, there are multiple ways we could use the platform. Regarding those, one/two teachers have used it effectively. But [some others] have not used it effectively…Only a few have used it in full scale.

Evident in the data is that despite the regular training and provisions for other support, some TEs did not use Moodle satisfactorily. This suggests that the training was not sufficient to ensure effective adoption of digital tools, perhaps because the TEs' learning needs were not addressed. The analysis of the activity system related to the training found that the TEs were assigned a passive role (in the division of labour) when designing the training activities. The TEI set the agenda for the training with limited consultations with the TEs. This may have been the reason that some TEs did not use the technology. If their learning needs were not discussed and met, they were probably not ready for Moodle use, despite the expectation from the university.

Additionally, as observed from the data, most of the TEs did not have technology use experience during their own education. When teacher educators lack past experience of learning with technologies or have no formal training, they struggle to implement digital technologies into their practices (Burden & Kearney, 2017; Cutri & Whiting, 2018). Therefore, as will be discussed later in this chapter, the TEs' participation in informal learning activities played an important role in compensating for what they lacked in experience.

In conclusion, this section has established that institutional leadership is pivotal in promoting, supporting and sustaining teacher educators' digital practices. It is evident that the university training (i.e., object-oriented activity) helped the participating TEs learn about different digital tools and how to apply them in teaching and learning. However, it is also apparent that the training offered by the university was insufficient for the effective uptake of digital tools. Therefore, the TEs drew on other informal sources of learning to upskill their digital competencies. Informal avenues that supported their learning were online courses; learning with colleagues; and self-guided learning using web-based tools. These will be discussed in the ensuing sections.

6.3 Online Courses

It was established in the previous section that there were limited opportunities for ICT-related professional learning at the TEIs, and these were insufficient for the effective adoption of technologies. The TEs, therefore, attended online courses to enhance their understanding and skills required to use digital technologies in their practices.

6.3.1 Online courses attended by the TEs

Fifteen TEs noted during their interviews that, independently of their TEIs, they had attended various sorts of online courses in the past few years to learn how to use technology in their practices. When asked what online courses they had undertaken or were doing, the TEs responded that they had completed a range of courses related to EFL content and pedagogy and ICT in EFL practice. Table 6.1 presents a comprehensive list of the online courses that these TEs said they had undertaken or were enrolled in at the time of their interviews, and the focus of each course.

Table 6.5: List of online courses and the webinars that the TEs attended

TEs	Online Course	Focus
TE1	Changing literacies and ICTs in EFL	About new innovations, their impacts in EFL teaching and learning, creating and joining e-learning communities and their importance on EFL teaching and learning
TE2	- Building Web Skills	To enhance teachers' ICT knowledge to embed ICT in EFL teaching; discuss the theoretical and pedagogical underpinning of using ICT to teach EFL student; explore different tools that could be used to teach EFL in high school.
TE3	- English for Career Development - EFL online courses	Developing English language skills for professional growth
TE4	- Practical Applications in Listening and Speaking	Teaching listening and speaking skills using various digital resources and tools
	- EVO [Electronic Village Online on Professional Development]	Contribution of professional network in professional development. It helped to build professional network
	- Assessment and Evaluation in EFL	
TE5	- TESOL Methodologies - Webinar	Theoretical discussion on EFL teaching; reflection on self-practice; practical ideas on TESOL methodologies EFL teaching
TE8	- TESOL Methodologies	Broad range of topic as stated above
TE9	- PULSE	EFL pedagogy and content
	- Teaching listening and speaking	

		Theoretical discussion of teaching listening and speaking in EFL classes; pedagogical ideas to improve related EFL practices
TE11	- Webinar	EFL teaching
TE13	- Teaching Online	General pedagogical and theoretical discussions of successful online teaching strategies
TE17	- Global English and Leadership	EFL pedagogy and content and technology
	- Building Web Skills	To enhance teachers' ICT knowledge to embed ICT in EFL teaching; discuss the theoretical and pedagogical underpinning of using ICT to teach EFL student; explore different tools that could be used to teach EFL in high school.
TE19	- Teaching English	EFL pedagogy
TE20	- MOOC	EFL content and pedagogy
TE21	- Related to ICT in EFL teaching;	Focused on the use of technology use in EFL teaching and learning -
TE23	- Registered for Webinar related to EFL teaching and learning	EFL pedagogy
TE25	- Shaping the Way We Teach English Webinar + online courses	EFL content and pedagogy

Table 6.5 shows that these 15 TEs had participated in one or more online courses that had various foci: EFL content and pedagogy, the use of digital technologies in EFL practices, and professional development.

It is worth noting that courses such as the ones completed by TE5, TE8 or TE2 (and six others) were funded by an international agency in Nepal that aimed to promote quality English language teaching in Nepalese education. I completed three similar courses between 2011 and 2013, and as an insider, I can report that the courses had a limited number of participants, usually less than 30 from different parts of the world, and their content was rich and very relevant to EFL. In these courses, we had weekly online asynchronous lectures and one-on-one tutorials, and we were required to be able to use the virtual learning platforms and other associated tools, such as Moodle, Blackboard and Padlet.

Because the locally based agency supported these courses, it followed up on the progress of the people it funded, which made it mandatory for attendees to complete the activities and assignments using digital tools. I benefitted from the experience of using technologies that were not available in the Nepalese educational context. These learning experiences encouraged me to use digital tools in my practices.

What can also be seen from Table 6.1, is that six of the 15 TEs had attended more than one course. As online courses are convenient (White, Davis, Dickens, León, & Sánchez-Vera, 2015; Zheng, Rosson, Shih, & Carroll, 2015) and afford anytime, anywhere learning opportunities (Malita, Tiru, & Grosseck, 2018) at no cost for participation (Milligan & Littlejohn, 2017), it can be argued that they are suitable for teacher educators' professional needs. These features can be defined as rules in the activity system related to online training (as demonstrated in Fig. 6.4) because rules are defined as explicit and implicit norms, regulations and conventions that govern activity system (Engeström, 2018; Engeström & Sannino, 2010; Yamagata-Lynch, 2003).

The rules related to online course participation (see Figure 6.6) discussed in the preceding paragraphs were facilitative to the TEs' professional needs. Thus, the TEs

were encouraged and motivated to complete the online courses. For example, because online courses could be completed wherever there was an internet connection, it was convenient for TEs who worked as casuals at more than one teacher education campus and had heavy teaching loads. For instance, TE4 stated:

> "At [our TEI], the teaching load is high. Part-time teacher [educators] teach as many as 24 periods per week… I [taught] 15 hours per week as a full-time faculty. [While] they pay for the work we do, that stops us from doing other activities. It is difficult to manage when you teach 250 students a [week] in 5 different cohorts."

In addition, more than half of 25 TEs also had other professional commitments (see Chapter 4). These rules in their activity system (see Figure 6.3) constrained their participation in professional development activities that required them to take leave from their workplaces. Therefore, the online courses were an appropriate means of ICT-related professional development. As the online courses offered learning opportunities that were convenient and aligned with their situations, some TEs participated in more than one online course. This suggests that professional learning activities that do not contradict with TEs' realities can promote TEs' engagement in such activities. From an Activity Theory perspective, it also demonstrates that when rules in an activity system are facilitative to the subjects' action, teacher educators are encouraged to participate in such activities to gain digital competencies.

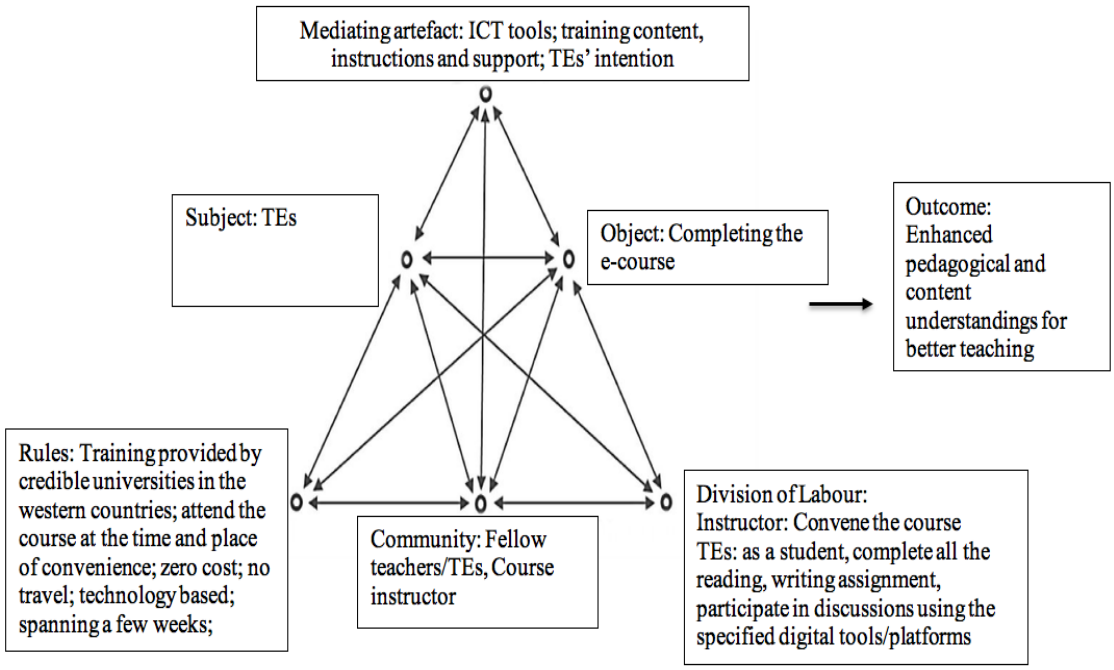

Figure 6.6: Activity system related to online course participation.

As regards the learning about technologies (i.e., object in the activity system in Figure 6.5), it was observed in the data that the online courses contributed to TEs' learning in different ways. The details of TEs' learning from the online courses will be discussed in the ensuing sections under three categories: learning through technology; learning about technology use in EFL courses; and mental preparedness.

6.3.2 Learning through technology

As Table 6.1 demonstrates, the online courses that most TEs attended were not about technology use in EFL teaching and learning. However, as the TEs were required to use digital tools, such as a computer, the internet, virtual learning environments, and related programmes, to participate and complete the courses, they used these as opportunities to learn about the tools and their possible use in teaching and learning contexts.

It was noted that the e-courses provided the TEs with unique opportunities to experience different technologies and enhance related skills. For instance, when asked how online courses not directly related to technology use had helped enhance his digital skills and knowledge, TE3 stated, "when you are doing the course, you have to use the technology to participate in the learning activities. You can learn about [different ICT] tools that you can use if you take note of things proactively."

Similarly, TE9 affirmed, "In such courses…ICT use is embedded thoroughly as the whole course is online in nature, and you can learn about different ICT tools that you can use in your [practice] if you wish." In discussing how he developed his knowledge and awareness about technology use, TE9 continued:

> "Those courses provided me [with] opportunities to experience how ICT could be embedded into EFL teaching and learning. In one of the courses that I completed, I was required to shoot my real lesson and upload the video onto YouTube and share the link in the discussion forum for the feedback from the others on my teaching approach. The fellow classmates watched my videos, and I watched theirs, and we had [a] discussion."

Evident in the data is that the TEs received opportunities to experience technologies that they had never used in teaching and learning. While digital platforms such as YouTube were familiar to most TEs, they had little experience of using them as a tool to upload a recorded lesson and share it with a bigger group of practitioners. Therefore, although the use of tools was a requirement of their assignment, it provided them with an opportunity to gain skills related to how those technologies worked. Such experiences enhanced their skills and awareness of different digital tools. This finding suggests that online courses provided them with opportunities to use technology and enhance their understanding of how different tools could be used in teaching and

learning. This finding supports Koukis and Jimoyiannis' (2017) argument that e-courses can help to enhance the related skills of the teachers.

Gaining skills related to technology use by using them in practice demonstrates that in the online course-related activity system (as demonstrated Fig. 6.5), digital tools mediated the learning of the subject. The outcome of such mediation was that the TEs (i.e., subjects in the activity learning activity system) had enhanced understanding and skills about different digital tools, which was the object of the activity. As also discussed towards the end of the preceding section, what supported the mediation process was the rule in the activity system (or the feature of online courses) that the course participants were required to use digital technologies in the courses.

The enhancement of technological skills through the educational use of those tools supports Engeström's (2001) proposition that learning happens when participating in an activity, which Becerra-Lubies and Varghese (2017) support in their research study of Chilean teachers. Likewise, these findings resonate with Albion, Tondeur, Forkosh-Baruch, & Peeraer's (2015) argument that technology-related professional development opportunities based on ICT can enhance teacher educators' technological skills. As demonstrated above, such opportunities provided these 15 TEs with occasions to experience how those tools were used in teaching and learning, regardless of the original objectives of the course.

It was important that the TEs leveraged the learning opportunities available with the e-courses because technology use in education was a new experience to many of them. For example, the use of virtual learning platforms such as Moodle or Blackboard, on which most e-courses were based, was an entirely new experience. No TEs had used digital tools in their own education, nor had any used them in teaching before

2014/2015. Therefore, by attending the online courses, they learned about tools that they were both familiar with (such as YouTube) and previously unaware of.

This finding is important when considered against the fact that the TEs had never used any tools in their own education and did not know about these new tools until they participated in the online courses. Therefore, it can be argued that the TEs had opportunities to learn through technologies when they attended online courses.

6.3.3 Learning about technology use in EFL courses

Table 6.1 shows that three TEs had participated in online courses about the use of technologies in EFL pedagogy and content. In these cases, unlike in the activity system related to general online courses, the object of the activity was to learn about technologies and their use in curricular activities.

The data show that the e-courses on technology helped these TEs enhance their 'didactic understanding' of technology use by involving them in discussions on different issues related to technology use in education and providing a platform to gain operational skills. For example, TE2 stated:

> "[I did] a 10-week long course. The main objective of the course was to enhance EFL teachers' ICT knowledge, discuss the theories…[behind] using ICT in teaching EFL students and provide opportunities to explore how ICT could be combined into pedagogy and content...The course taught me how I could take benefit of web-based tools to teach English. For example, [I have learnt] how to design a blog, how to add content, and how to use it for collaboration in an EFL class."

Likewise, TE17, who undertook an online course related to technology use, observed, "that course helped me learn how technology could be combined into EFL

pedagogy and content…for example, attending the course, I learnt how I could design a blog, how I could use that to present content…and for collaborative [activities]."

The data demonstrates that online courses on technology use in EFL practices enhanced TEs' digital competencies because their participation made them realise how they could use certain technologies in EFL teaching and learning. Those courses not only gave them opportunities to gain technological skills but also allowed them to engage in discussions about related areas of concerns that are crucial aspects of digital competence, such as how and why technologies should be used (Krumsvik, 2008).

Abilities to make conscious decisions on how and why using technologies are argued to be didactic aspects of using technologies. Krumsvik (2014) argues that a key component of teacher educators' digital competencies is that they need to be aware of the theoretical and pedagogical underpinnings of their digital practice. By participating in online courses, the participating TEs were able to gain valuable knowledge of how to use technologies in their practices.

Because these courses were designed to teach about ICT use in EFL teaching and learning and enhance the TEs' understandings of the theoretical and pedagogical underpinnings of digital technologies, they aligned with the TEs' intentions. As a result, the activity of learning from the courses supported the development of the TEs' digital competencies.

Furthermore, participation in e-courses was meaningful because it was related to the TEs' professional practices. This implies that the TEs were able to relate the outcome of their action (in the activity system) to their day-to-day practice. Being able to understand the potential of a given technology to enhance one's practice is essential for effective use of technologies (Krumsvik, 2014); otherwise, technology becomes an end in itself (Engestrom, 2007). Understanding that the essence of ICT is not about the

technologies as such but rather the ways they are infused into teaching and learning is an important aspect in digital technology training (Maher, 2018; Obonyo, Davis, & Fickel, 2018). With such knowledge, TEs are able to make didactically appropriate decisions related to technology.

6.3.4 Mental preparedness

Other than learning about and with technologies, data from one TE illustrated that their involvement in the e-courses was an opportunity for them to participate in an authentic learning environment as learners, and use that experience to compensate for the opportunities they had missed in their formal training/education as pre-service teachers. The benefit of such experience was that it helped them become mentally ready to use technologies in their practice.

As noted earlier, most TEs had limited experience of technology use as students, which meant that they had minimal opportunity to experience how ICT tools could be used in teaching, and how using digital tools could enhance their practices. This impacted their mental readiness to use technologies, despite receiving training, because a teachers' technology use is influenced by whether they had opportunities to see other teachers perform similar behaviours successfully (Albion, 1999; Bandura, 1997).

It was established in Chapter 6 that despite being offered training to use Moodle, the uptake of the ICT tool was not effective. A reason for this can be related to mental readiness. For instance, the interview with TE13 demonstrates that while the training helped him gain operational skills, he did not feel confident enough to use Moodle. He said:

> "To be honest, Moodle was supposed to be started in 2014, and I was one of those teachers who showed interest to use Moodle and uploaded power-point

> slides on the platform, but in the class, [I] continued teaching using power-point slides and normal things but Moodle. In 2015, I did some activities and tasks on the Moodle, but the Moodle tasks, resources and activities were never complete. The challenge…as I realize now that, it is not that I have more technical expertise now compared to then, but I was not mentally prepared to go that way…because I felt I did not know how I could use [Moodle]."

As TE13 noted, his use of Moodle was fragmented because he did not believe that he could use the tools as expected, despite having the operational skills. To overcome the issue of mental readiness, he said that he had enrolled in an e-course called 'Teaching Online' that was funded through an external agency because he wanted to experience how technologies were used in pedagogical activities. He noted

> "I can experience the use of a VLE as a [learner]…I would know when I make a mistake [as such] I can now give [my students] good orientation in the beginning; I can tell them 'this might happen, make sure you do that...I can explore what I like or dislike as a student when studying in an online environment that knowledge is useful…in relation to teaching [using Moodle]."

By attending an e-course, TE13 was able to overcome the mental barrier that prevented him from using Moodle in his practice. E-courses helped him gain a lived experience of technology use as a learner. As a practical and lived experience of technology use can help practitioners overcome issues internal to them (Salajan, Schönwetter, & Cleghorn, 2010), it can be argued that by attending the e-course, the TE gained readiness to use technology in his practice.

That a teacher educator might withdraw from technology practices due to a lack of belief that he was ready to use them suggests that there was a primary contradiction in the activity system related to technology use in teaching and learning. Primary

contradictions occur within an element of the activity system (Gedera, 2016). As in T13's case, it is a misfit occurring due to the differences in the value system (Guzman, 2016), such as the persistence of a belief that they are not ready. As a result of such a misfit, TE13 did not engage in technology use, despite the training and support provisions (i.e., object-oriented activities in the hierarchy of activity) at his teacher education institute. Through their engagement in the e-courses – which can be said to be an alternate activity system to the teacher-education practices because it existed independently of the TEs and the TEs participated voluntarily – the TEs were able to overcome the barriers. Their participation in the e-learning activity system helped them gain confidence and the beliefs that they could use technologies.

While the TEs' engagement in the alternative activity system helped them gain readiness, it demonstrated that being mentally ready to use technology is as essential as possessing technological knowledge and skills in an activity system.

In concluding section 6.3, what can be argued is that online courses played an important role in the TEs' professional learning about digital tools. By attending the e-courses at their convenience, the TEs gained skills required to use different technologies, and knowledge about how to integrate them in education. Equally important was that the online courses compensated them for their lack of experience with technology use, which helped them overcome their mental barriers and made them believe that they could use technology. Also discussed were the different features of online courses and the fact that these courses were based on digital platforms that supported learning.

6.4 Learning with Colleagues

While online courses played pivotal roles in the TEs' pursuit of becoming digitally competent, informal interactions with colleagues at the workplace and in

professional or virtual networks also helped them learn about ICT. The data show that TEs were able to make informed decisions about what tools to use and how. Through those interactions, they were able to learn more about ICT use in EFL and the different digital tools and find solutions to their problems related to using ICT in their practices. As will be discussed at a greater length in this section, these findings demonstrate that interactions with colleagues at the workplace and in professional or virtual networks were important in helping TEs enhance their digital competencies and break the barriers to the use of ICT in their practice.

6.4.1 Learning about ICT in EFL teacher education

Data analysis reveals that the interactions that the TEs had with their colleagues, both face-to-face and virtually, were important informal sources of ICT-related professional learning. By interacting with other EFL practitioners, they were able to build their knowledge of teaching EFL using ICT tools.

It was found that four TEs were able to learn about different ICT tools and how they could use those tools in EFL teaching and learning when they interacted with their colleagues at the workplace in a face-to-face situation. Through these interactions, they received instructions on the operation of the tools and had opportunities to listen to the lived experiences of their colleagues. For instance, TE6 stated that a colleague helped him learn how he could use two digital tools in his practice:

> "I asked for the help of a colleague who teaches ICT in [an] education course [and] used the tool. He [told] me how I could open a private group page [on Facebook] and about its mechanics, and how I could use the tool in my class. Likewise, he also provided me with a software to record my slide while presenting it in my class…and use [them] for [different] purposes later."

Similarly, TE3 affirmed that by interacting with his colleagues at his workplace, he was able to explore various tools and their possible use in EFL teaching and learning. For instance, he noted, "I talk to them, who share what they felt about [different] tools if they have tried… [these interactions] have helped me learn about the new [tools] and their use in what I do."

These findings support Adnan and Tondeur's (2018) argument that informal discussions with colleagues can raise educators' awareness about new digital tools and their use. By listening to the first-hand, lived experiences of those who have already used the technologies, the TEs were not only able to locate new knowledge about the ICT tools (Trust, Krutka, & Carpenter, 2016), they also gained organic social learning (Trust, Carpenter, & Krutka, 2017). They learned organically because their colleagues shared their experiences of using those tools in their practice, and how they could be used in EFL teacher education courses. Therefore, the knowledge that the TEs gained was authentic because it was based on TEs real-life experiences and relatable to their context.

From the Activity Theory perspective, organic learning was possible because the TEs and their colleagues were co-learners and there were no power differences in the division of labour (in the activity system shown in Figure 6.6). Absence of power differences meant that there was less hesitation and fewer formalities when sharing the lived experience of using digital tools in the classroom. Such sharing makes learning authentic and organic (Trust et al., 2017). What also contributed to the learning was that there were no set rules regarding when, where and how the interactions should happen. Instead, they were needs-based and incidental, thus more impactful.

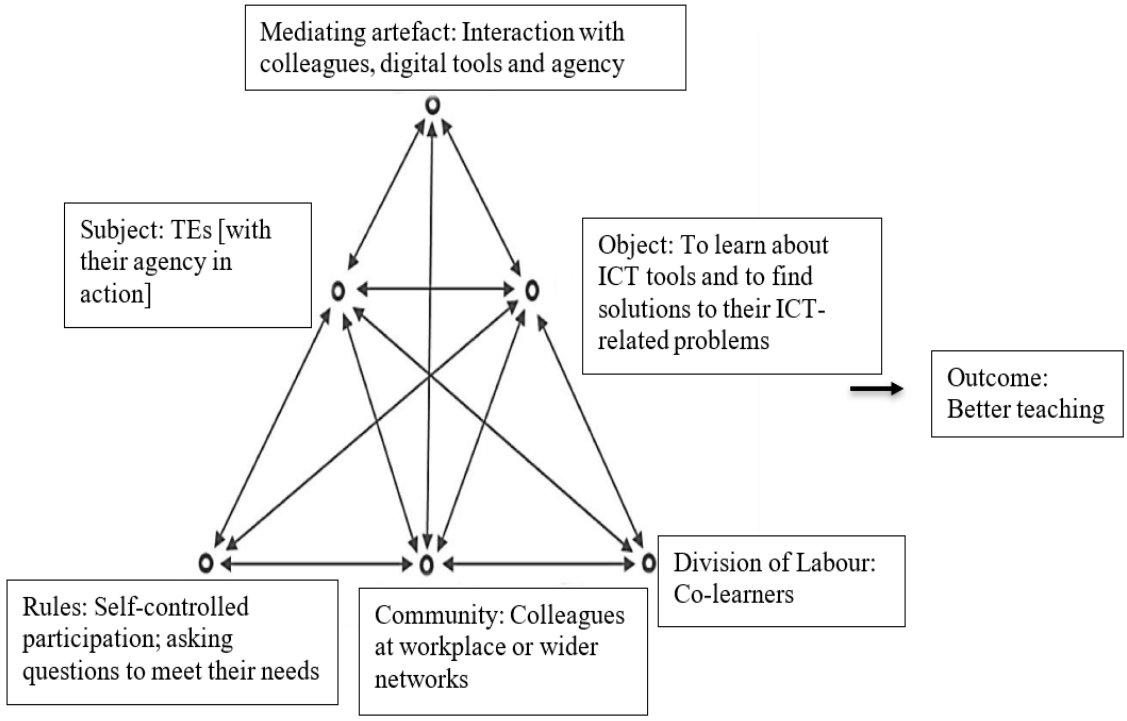

Figure 6.7: Activity system related to learning with colleagues.

However, expertise was not always available in face-to-face situations at the TEIs. With minimal informal learning support available in their various contexts, the TEs used digital tools to connect with the professional groups on the web and learn about digital tools. As demonstrated by the quotations to follow, TEs connected to a broader network in the absence of expertise at their TEIs. While these TEs' volition played an important role in their reaching out to their virtual network communities, such connection was meaningful because they were able to learn about digital tools that were being used globally. For instance, TE18 noted:

> During the CELTA (Certificate in English Language Teaching to Adults) training…I linked with the professional group of EFL teachers on the web [through Social Media] …which have introduced me to platforms that we could use to design activities to hold competitions in the EFL teaching. For example,

> Kahoot, I now know that you can use it very effectively in the [EFL] class. I have tried it in [my lessons].

TE2 also achieved valuable lessons around the tools that could be used in EFL teaching and learning. He worked at a regional campus and thus had difficulty with infrastructure and resources. In addition, many of his colleagues did not use digital tools when teaching. Therefore, he drew upon the knowledge of the colleagues and fellow ELT/EFL practitioners that he was connected to on a virtual network. He noted:

> "I learnt about [different] Web 2.0 tools that could be used in teaching English. For example, I came to learn about NiceNet and Padlet and their use in EFL [teaching and learning] when I interacted with colleagues… from an e-course that I did."

These data elucidate that the mediation of social media tools was of significance because they contributed to TEs' informal learning by helping them overcome spatial and geographical constraints (Trust et al., 2017; Wenger, White, & Smith, 2009) to achieve their individual learning needs (Macià & García, 2016). In doing so, the mediation of social media and email expanded the sphere of the community and afforded opportunities to learn from professionals who were beyond physical proximity. This finding demonstrates that interaction with professional community – which Lautenbach (2010) and Yamagata-Lynch (2010) define as the social group that professionals associate with when participating in an activity – can support teacher educators' learning about technology use by sharing practices that have proven effective in different contexts (Kirkwood & Price, 2014; Tack et al., 2018).

Professional communities that are accessible through web tools are also called professional learning networks (PLNs), which are defined as personalised networks of people, tools and spaces that promote or sustain professional growth (Krutka, Carpenter,

& Trust, 2017). PLNs not only support ongoing professional learning of teacher educators but also, as found by Kearney and Maher (2019) with a group of pre-service teachers, they supplement face-to-face expertise. A benefit of using social media and email technologies to connect with PLNs is that they allow teacher educators to "enter affinity spaces for learning around common interests" (Macia & Garcia, 2018, p. 2). In doing so, teacher educators receive opportunities to learn from the years of experience and the expertise of other practitioners who share on those platforms.

In this study, the PLNs provided an alternative to what the TEs lacked. By joining PLNs, TE2 and TE8 were able to learn about the tools that they had never used in their curricula contexts. Despite lacking technological environments, they were able to learn about contemporary digital tools used in teaching and learning. Because those tools had been tested and used in different contexts, TE2 and TE8 were able to learn about them and try them in their practices.

This was an important finding from the contextual perspective as well. ICT implementation efforts in Nepal are reported to have been constrained by lack of resources and lack of skills in teachers (Koirala et al., 2016; Maski Rana, 2018). Therefore, TE2's and TE8's technology-related professional learning practices suggest that leveraging PLNs through digital tools can provide opportunities to learn about other tools that are not just contemporary but also freely available.

6.4.2. Learning about digital tools

The data analysis shows that the interactions with colleagues helped teacher educators become aware of general technologies that they could appropriate in teaching and learning. At least 14 TEs noted during their interviews that they came to learn about potential digital tools when they interacted with their colleagues. They used such

knowledge to further explore the use of these tools. For example, in discussing how the interactions with colleagues increased awareness about ICTs, TE5 said:

> Coming together in itself is learning, and it is even more so when we talk about ICT. One of the prerequisites of learning is the knowledge and awareness of the existence of [ICT]. [Professional] networks [of like-minded colleagues] help us in finding out 'what exists' out there. …[therefore] contributes a lot in learning about ICTs…When you are with other people, you hear them talking about the new app, new video, new sources…and, you feel inspired to explore them…[and] you may find them useful.

Similarly, TE4 noted that his learning about digital technologies could be attributed to what he gained from interacting with his colleagues:

> Mostly, I learnt these [digital' skills through colleagues [at the workplace] … [and in] professional networks. When I am talking to other people, they talk about something else or when I am attending a webinar they talk about something…I noted that and later explored those [digital tools] on my own.

When giving examples of how interactions helped him learn about new digital tools, TE25 stated:

> I learnt about private groups [on Facebook] from my colleagues… When I first heard about it from them [in informal discussion], I asked for more information. They told me how a group could be formed and used [in teaching]. Then, I looked for more information on Google, which provided with stepwise instruction to form such groups.

These data demonstrate that the interactions with colleagues who are members in teacher education activity system (see Figure 6.3) can help teachers achieve the

object in the activity system (i.e., to enhance their digital competencies). Interactions with community members can help subjects (i.e., TEs) find crucial information about the technologies that they might use in their practices. Such learning would be possible because the community collectively brings wide experience and knowledge rooted in practice (Trust, 2017).

In this study, such knowledge afforded learning opportunities (Reading & Doyle, 2013; Wetzel et al., 2014) and made the TEs aware of digital tools, such as websites, applications and software programmes that were new to them (Trust et al., 2017). This finding, therefore, demonstrates that the community members in a professional learning activity system can support teacher educators in goal-oriented action – to learn about digital tools. This is because the interactions they shared were related to their professional backgrounds and interests.

Given the potent and ever-evolving nature of digital tools, without continuous learning support, teacher educators face challenges in infusing digital technologies effectively into their practices (Ramanair, 2016). While such provision was missing at the TEIs in this study, the TEs compensated by participating in interactions with colleagues at their workplaces and in wider PLNs. Such networks and interactions are significant in that the learning from such groups can be more authentic because members share expertise, ideas and knowledge built on years of experience.

Furthermore, these findings demonstrate that in the case of Nepalese TEs who have limited formal learning opportunities at their universities, community members can provide support to enhance each other's professional development. One outcome of such learning is that teacher educators can take ownership of their learning about different digital tools and their possible use in the teaching/learning activities. A second outcome is that they do not need to rely on teacher education institutes to learn about

technologies and how to use them in educational activities. They can do this by leveraging the experiences and expertise of their colleagues.

6.4.3 Finding solutions to their problems related to ICT use in teaching and learning

Other than enhancing their practice and knowledge of ICT tools from interactions with colleagues, TE17, TE8, TE3 and TE15 maintained that they were able to find solutions to their problems related to technology use by communicating with colleagues. A common observation made by these TEs was that they leveraged the expertise of their PLNs to be able to find just-in-time help when using digital tools.

A finding that emerged from the data is that the TEs used digital technologies to contact their colleagues when they had problems that they could not resolve themselves. For instance, TE17 said that he had contacted colleagues in his professional/virtual network when challenged by ICT. He observed:

> "If I face difficulties or issues, then I ask with friends who have better skills. I call them on the phone or send them emails and ask for information and help related to ICTs. For example, I have asked a lot of questions to [de-identified], as he has [a] very good knowledge in ICT, and he has helped me on numerous occasions. That way, I have learnt."

TE8 mentioned that he worked at a constituent campus where he was the only teacher educator to use digital technologies. Therefore, when he needed help to solve issues related to using ICTs in teaching and learning, he did so through email or messaging services to colleagues in his professional network. He said, "I send emails mostly to [my colleague] asking for help. They have sent me documents or links that answered my queries."

TE3 also noted that he reaches out to his colleagues when he has problems/issues. He said, "I also work with my alumni group from the training that I attended… when I get problems, I ask for their help." Similarly, TE15 stated, "if I have difficulties, I usually seek help from my colleagues." .

Evident in the data here is that digital tools played an important role in the TEs' seeking the support of their colleagues as contact with the PLNs was made possible by these tools. TE17, TE8, TE3 and TE15 also noted in their interviews that the colleagues they contacted were in geographically different locations. Therefore, they used emails, social media or messaging apps to gain the knowledge they required. Reaching out to their PLNs meant the TEs could move past the spatial and temporal boundaries and overcome institutional constraints. As a consequence, they were able to break the silos and overcome their difficulties and issues related to technology use (Krutka et al., 2017). This demonstrates that in the activity system related to learning from colleagues, through the mediation of digital tools that the TEs used in their personal lives they were able to find solutions to their problems when using or planning to use technologies.

Further, this data demonstrates that PLNs provided a sanctuary to the TEs by allowing them to seek out help when using technologies in teaching and learning. By contacting the right person in their network, they could draw upon the knowledge of their colleagues to find solutions to their issues. This finding supports the argument that interactions with fellow teachers/teacher educators on a virtual network can support TEs' technology-related professional learning (Kearney & Maher, 2019; Wetzel et al., 2014).

From TE17's, TE8's and TE15's interviews, it is also clear that by consulting and interacting with colleagues to troubleshoot their issues, these TEs found workarounds to the systemic contradictions in the activity system. The systemic

contradictions were the lack of ICT support at the TEIs that the TEs required when they wished to use different digital tools in their practices (Chapter 5 for a detailed discussion). For instance, none of TE8, TE17 or TE15 had technical support at their TEIs when they needed it. Additionally, not many EFL TEs used digital tools of any kind to interact and seek help face-to-face at their respective TEIs. Therefore, rather than being held back due to the absence of a support system and facilities, they found alternative ways to solve their problems by drawing on the informal learning resources at their disposal.

It was also found that the interactions the TEs had with their colleagues provided them with learning opportunities related to technology use in education. These findings demonstrate that colleagues at the workplace and in PLNs are important sources of professional learning (Kosnik et al., 2015).

As noted earlier, the TEs' communications with colleagues were not just limited to their workplaces. Rather, as shown by the cases of TE5, TE17, TE25, TE8 and TE18, for example, they interacted with their PLNs. This finding echoes the contention of Wenger et al. (2009) that technology can extend the boundaries of the communities to which practitioners relate.

What can be concluded from this discussion is that regardless of the nature of the communities and the medium of interactions, informal learning with colleagues holds considerable promise for capacity building and the enhancement of digital practices in educational activities (Avalos, 2011; Boyd & Harris, 2010; Smith, 2017). It did not matter whether the TEs in this study communicated with their colleagues face-to-face or online, the outcomes were similar (Terpstra, 2015). This is because the interactions helped the TEs gain informal and incidental learning and build the

knowledge and skills required to use ICT in EFL teaching and learning, thus providing the impetus for further exploration.

6.6 Conclusion to the Chapter

In concluding this chapter, it can be argued that the participating TEs' learning of technology use in education was not an outcome of a single learning activity; rather, it was the result of the collective activities they engaged in. While formal training organised by the TEIs helped enhance some TEs' digital skills, other TEs leveraged the sources of learning available outside their TEIs. The sources of learning that the TEs drew on included online courses, interaction with colleagues, and self-guided learning using the information from the web.

Each of the learning sources that the TEs used for their learning had unique affordances. Whilst online courses helped them learn about/with technologies and compensated their lack of experience, the interactions with colleagues helped them find out about different tools and their practical applications and solve problems. They were then able to listen to the lived experiences of other TEs and build their own knowledge and skills.

An observation regarding how the TEs enhanced their digital competencies is that most of the learning activities they participated in were informal, and their participation was a personal choice. This shows that their agency – volition and intention to enhance digital competencies underpinned their technology-related professional learning. It can be concluded from the data, therefore, that teacher educators' professional learning is for teacher educators by teacher educators.

Chapter 7 explores how what TEs learnt from different resources that supported their use of digital technologies in teacher education practices.

Chapter 7 – Technology Use by Teacher Educators in Teacher Education Activities: Overcoming Barriers

Deciding to use technology in their practices was not easy for the Nepalese TEs participating in this study. As established in Chapter 5, the institutional environments in 10 out of the 11 cases were not conducive to technology use. All TEIs suffered from lack of access and infrastructure for regular and effective use of technologies. Likewise, the TEs did not always have the required support and time for technology use. Nonetheless, they had a belief in the importance of technology. Therefore, as will be discussed in this chapter, they were ready to break the barriers related to the various external factors inhibiting its use.

The discussion in Chapter 6 illustrated how, by engaging in different learning activities, despite busy schedules and the absence of tangible incentives, the TEs continued learning about ICT tools for their practice. By gaining digital competencies required for technology use, they overcame the barriers associated with the lack of experience of technology use in their own education. Building their digital knowledge and skills by leveraging the different learning means at their disposal, the TEs were able to use digital tools in teacher education activities.

This chapter examines the kinds of digital tools that the TEs used in their practice and the purposes behind such use. It was clear through the data that the TEs leveraged different commonplace ICT tools for sharing resources, for communication and for enhancing their lessons. The analysis of the data demonstrates that through these relatively ordinary uses of commonplace technology, the TEs were able to initiate transformations in teacher education practices.

7.1 Digital Technologies Used by Teacher Educators

A key area of focus of this study is an exploration of the digital tools the TEs used in their practice. Therefore, all the interviewees were asked to discuss the digital tools that they used inside or outside the classroom to support their practice. The TEs noted that they leveraged different kinds of ICT tools and resources – most of which were freely available internet-based tools – at different stages of teaching. Table 7.1 presents a comprehensive list of tools that the TEs said they used in their lesson preparation and teaching.

Table 7.1: List of digital tools and resources used by teacher educators.

TEs	Campus Type and Location	What technology do they use
TE1	Public University, Central Campus, Urban	Multimedia projector, PowerPoint, Camtasia, webpages and blogs
TE2	Affiliated Campus, Regional	Google, Google Sites, multimedia projector, email, PowerPoint, Facebook messenger, Twitter direct messaging, NiceNet
TE3	Public University, Central Campus, Urban	Google, Google sites, Google Groups, multimedia projector, PowerPoint, Facebook, email
TE4	Public University, Urban	Google, multimedia projector, Facebook, Google Groups
TE5	Public University, Urban	Google, multimedia projector, Moodle, PowerPoint, email, Google Groups, Camtasia, videos
TE6	Constituent Campus, Urban	Google, Blogs, Facebook, email, *no in-class use of technology*
TE7	Private University, Urban	Google, Moodle, Word, PowerPoint, multimedia projector
TE8	Constituent Campus, Regional	Google, Email, *no in-class use of technology*
TE9	Affiliated Campus, Regional	Google, YouTube, book-share websites, multimedia projector & PowerPoint

TE10	Private University, Urban	Google, Email, Facebook, multimedia projector, PowerPoint, YouTube, Moodle
TE11	Affiliated Campus, Regional	Google, multimedia projector and PowerPoint
TE12	Constituent campus, Urban	Google, Email, multimedia projector, PowerPoint, webpages, book-share websites
TE13	Private University, Urban	Google, blog, Moodle, multimedia projector, PowerPoint, Facebook, email
TE14	Constituent Campus, Urban	Google, blog, multimedia projector, PowerPoint, email
TE15	Constituent Campus, Urban	Google, frequent use of multimedia projector and PowerPoint
TE16	Affiliated Campus, Regional	Google, Word, Excel, *infrequent use* of PowerPoint and multimedia projector
TE17	Constituent Campus, Regional	Google, Facebook, *infrequent use* of PowerPoint and multimedia projector
TE18	Constituent Campus, Urban	Google, Facebook, YouTube, multimedia projector, occasional use of PowerPoint, Kahoot
TE19	Regional Campus, Semi-Urban	Google, Facebook, PowerPoint, multimedia projector, YouTube
TE20	Affiliated Campus, Regional	Google, YouTube, infrequent use of technology in lessons
TE21	Affiliated campus, Regional	*Infrequent use* of multimedia projector and PowerPoint, frequent use of mobile phone applications related to English language teaching (dictionary, grammar and word games), Facebook group, Google
TE22	Affiliated and constituent campus, Urban	*No regular use* of technology in class, Google, Facebook
TE23	Private University, Urban	Google, multimedia projector, PowerPoint, Moodle,
TE24	Affiliated Campus, Semi-urban	*Infrequent use of technology in lessons*, Google, Email
TE25	Affiliated Campus, Semi-urban	*Infrequent use of technology* in lessons, Google, Google Groups, Facebook, Email

Evident from Table 7.1 is that the hardware mostly available for TEs in-class use was limited to multimedia projector, which they used to project class notes and lecture using PowerPoint software and multimedia content to support the delivery of lessons. In contrast, the digital platforms that the TEs used outside their lessons were of different nature. For example, they used Google search engine for information searching. Similarly, they used YouTube, Facebook and Messaging services, Google Groups, blogs and Google sites for various purposes (these will be discussed in the remaining sections of this chapter).

A common feature of these tools and platforms is that they were freely available and web-based, although they were not necessarily designed for educational purposes. Therefore, the TEs had to repurpose those tools to meet their curricular needs. Such repurposing of technologies shows that the TEs had gained an understanding of the affordances of technologies in their contexts, which Hammond (2010) and Krumsvik (2014) argue is very important for the meaningful use of digital tools.

While it was beyond the TEs' abilities to enforce systemic change at their TEIs, by drawing on informal tools and resources, they demonstrated a problem-solving attitude when it came to using digital tools in their practice. The changes they were able to achieve will now be discussed.

7.2. Transformations in Teacher Education Practices

It emerged from the data that the use of technologies enabled important changes in teacher education practices. The following sections discuss how the participating TEs used technologies in teaching to change the ways EFL teacher education was delivered. These changes were related to enhancing students' access to resources, thus providing PSTs with greater control over information; increasing teacher-to-student and student-to-student interactions; the empowerment of students to express their opinions and

thoughts; and the enhancement of lesson presentations. Based on the themes that emerged out of the data, the following discussions are presented in three sections: sharing resources, communication, and enhancing lessons.

7.2.1 Sharing resources

One of the primary reasons the participating TEs used social networking sites (SNS) and email technologies was to share resources with their PSTs in order to help them in their learning. When the TEs shared different kinds of resources by using technologies, this enabled changes in who owned and controlled the knowledge, information and related resources in their teacher education practices. This section discusses how, as a result of the use of digital tools for sharing resources, there were changes in the division of roles and rules in the activity system.

During the interviews, 13 teacher educators said they used technologies to share book chapters, e-books, weblinks, and links to multimedia content so that their students could access the required learning materials and use them at their discretion and convenience independently of the TEs and the TEIs. For example, TE3 and TE4 said they collected electronic copies of books and journal articles related to the courses that they taught, and they shared the pertinent ones with their students through Google Groups. TE3 noted:

> "I send electronic copies of books to my student. I teach applied linguistics and research in EFL and have told my student not to buy books on those subject because the books are not easily available and are costly. During my visits to different parts of Nepal and abroad, I have tried to collect materials related to my subject. I send those to them through the [Google] Group page."

Similar practices were also reported by 11 other TEs. For example, TE19, TE13 and TE9 said they informed their students about useful weblinks and video-lectures on YouTube and shared with them books and book-chapters using social media features, email or related digital tools.

In a similar vein, TE1 explained, "if I have used any information from web sources, I tell students about the websites that I visited…and urge them to [explore] those for more information [when doing] assignments, project work and [exams]." An example of this can be seen in Figure 7.2, a screenshot shared by TE19.

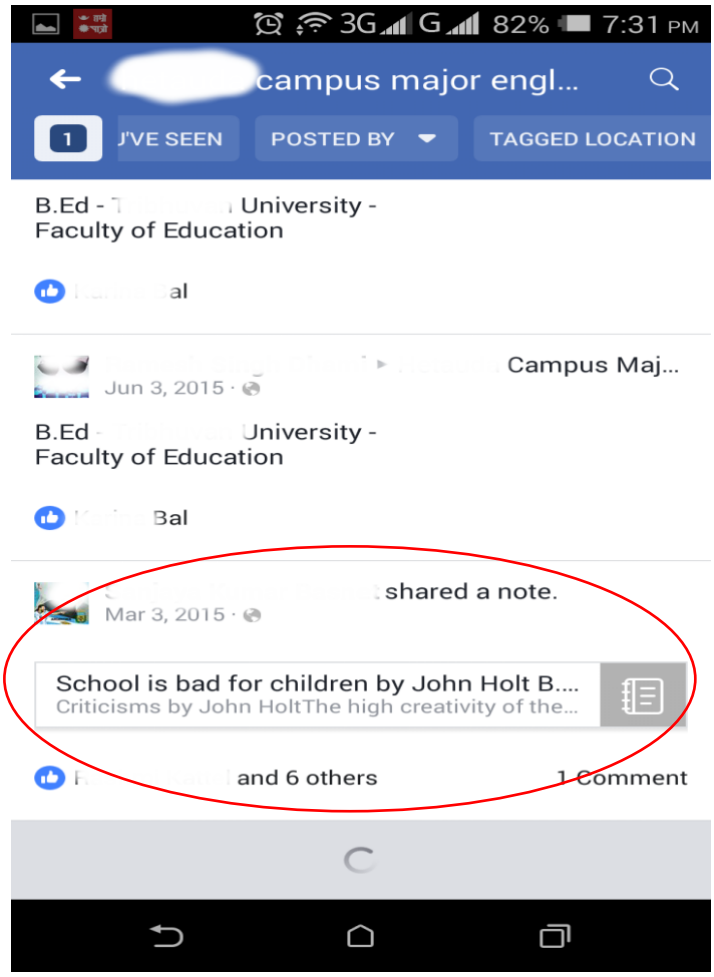

Figure 7.2: TE19 sharing a link to the original essay 'School is bad for children."

Those TEs who shared resources believed that it was a helpful practice because such materials enhanced students' access to information they could use when needed.

This has two important implications. Firstly, the TEs' sharing of web-links or other information from the web made the PSTs aware of how they could explore the required information on their own. Having an awareness of where to find information is important because it is an important aspect of digital competencies (Ferrari, 2012; Redecker, 2017). Redecker (2017) argues that a trait of a digitally competent teacher is possessing the skills to find the required information.

Secondly, with enhanced knowledge and access to resources, the PSTs' reliance on TEs for information and resources diminished. These findings suggest that by using the features of SNS and email technologies, the TEs enabled changes in the traditional roles that they and their PSTs assumed, especially in the knowledge-building process through enhanced access to required materials and resources. When these changes are mapped using the activity system, it is seen that there were changes in the rules (the lack of required teaching and learning resources) and the division of labour (students' engagement in accessing resources), as demonstrated in Figure 7.3.

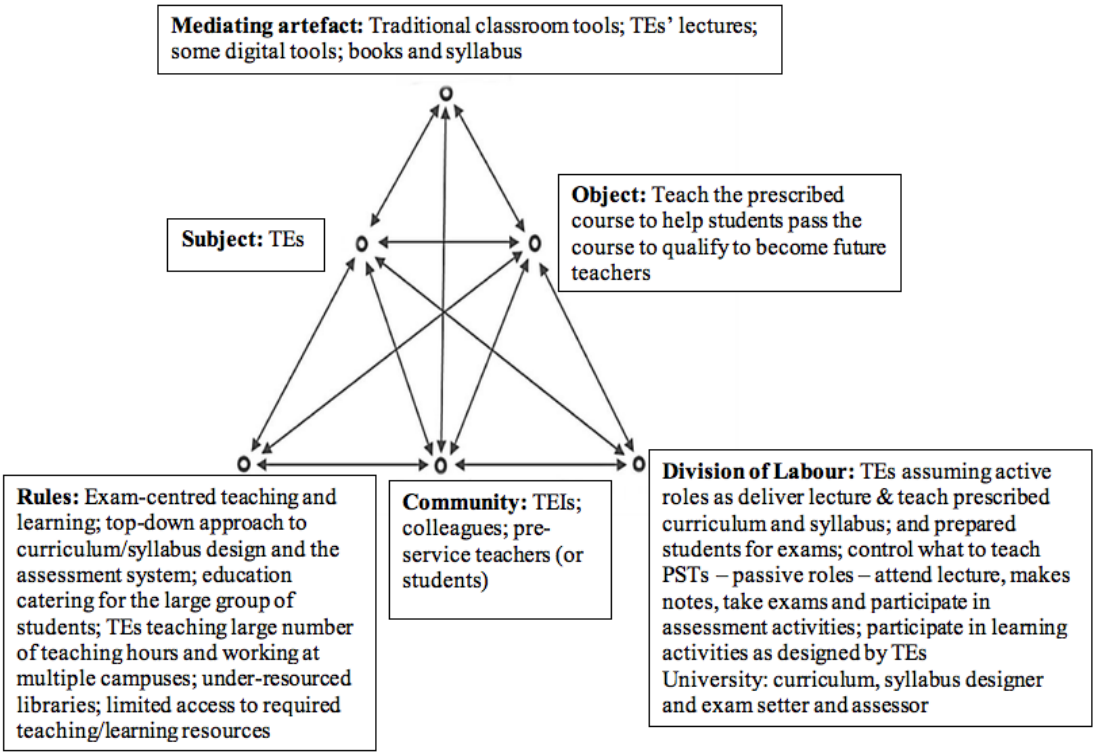

Figure 7.3 Teacher education practice without technology use in an activity system

The changes pertaining to the rules were related to access to resources. When the TEs shared different resources (such as e-books, chapters from required readings, journal articles or video lectures) using digital technologies, the PSTs could access a wide range of resources. This was important because the EFL teacher education curriculum in Nepal prescribed internationally published books as the required readings. However, most PSTs could not purchase the required books and journal articles due to high costs and the limited availability of such materials in the libraries because they were under-resourced and did not always have subscriptions to journals or e-books.

Therefore, the PSTs either depended on locally published secondary materials (some of which lacked scholarly rigour) or their lecture notes, which according to some TEs were the sole resources for some students. This was evident in the following quote by TE19:

> "We do not get original books because they are not available [easily] – and, the books by foreign writers are very expensive even if they were available. So, the students purchase books written by Nepali authors. Those books are mostly incomplete. So, they do not get enough content."

However, using digital tools and with their knowledge of where to find related resources, the TEs were able to access the books and other supporting resources, which they disseminated using digital technologies. As a result, PSTs dependence on substandard resources or TEs' lecture notes diminished. This was evident in the data collected from the PSTs as well.

Analysis of data from PSTs demonstrated that they followed the TEs' cues to explore and access the required resources, and they shared those resources with their peers. For example, PST19, who studied at the private university, said, "[about] those sites and links, they were told to us by our tutor. Some I found myself when Googling randomly for information." When asked if he shared the resources with the peers in the class, he noted,

> "Definitely I share the resources and the links with my friends…via emails or messages... They help me lots. They [make] it easy to search for the information I need and the most [useful] thing was the information we get from there were authentic and trustworthy."

On a similar note, PST5, who was from a regional teacher education campus, maintained,

> "I think there has been a huge impact. Prior to using technology, our learning was based on printed books. Now our teachers send us electronic versions of resources, which we use. Our teachers tell us where we could find information on the web. When we know where the resources are available, we…download them by ourselves and use them. [I] also spend time exploring information…[which] I share…with my classmates."

Evident in the data is that the PSTs were actively involved in exploring the resources they would need as future teachers. As well as exploring resources, they also distributed these amongst themselves. This enabled a change in the rules in the activity system shown in Figure 7.3 because being able to access required materials meant that they did not need to depend on resources or information that were not as authentic as the original ones (as implied by PST19), and they were able to find a resolution to the issue of under-resourced libraries.

The change pertaining to division of labour was enabled by the TEs' and the PSTs' practices related to access to required resources. Students' involvement in exploring and sharing the required information with peers meant that the PSTs had greater control over the information that they needed. As they did not need to depend on TEs' lectures to get the required information, they were no longer passive recipients of resources and information from TEs. Instead, they constantly explored the web for information that they needed and shared this with colleagues. This meant that the PSTs could independently participate in the process of knowledge building as they explored content when it was needed.

Thus, the students were more actively participating in the knowledge building process, and their role as passive recipients changed, as did the TEs' role as the custodians of information. The digital tools helped the TEs decentre themselves from the role of the knowledge proprietor.

An important observation made regarding the transformation discussed in the preceding paragraphs is that digital tools also played important roles in TEs' and PSTs' practices. The ICT tools were not just mediums of information dissemination, but also mediating tools that helped TEs and students find solutions to the problems related to lack of required teaching/learning resources.

Additionally, digital tools supported the PSTs' involvement in the searching and sharing of information amongst themselves. In this sense, digital tools mediated students' independence. This suggests digital tools could help to decentre the funds of knowledge in a teacher-centred higher education context (Francis, 2012) like that of Nepal.

It also emerged from the data that while the TEs and the PSTs were able to access the original resources and share them using the digital tools, their efforts were

limited by the fact that they could only access and share what was freely available on the web. Thus, there was a filter that was not based on scholarly grounds but on accessibility and the ease with which they could download and disseminate information. The implication of that is whilst the TEs, and the PSTs had access to a greater range of resources, their access was still restricted due to the activity system rule 'libraries not providing access to required resources'.

Whilst there is no data from which to gauge the impact of enhanced access to resources, what can be argued is that independent access to resources must have impacted the learning outcome of students. That is because access to varieties in the content suggest that students had possibilities of gaining richer and deeper understandings of the content. This is because, as Selwyn (2007) and Heo and Lee (2013) assert, web-based tools aid adult learners' learning processes when they are used to explore, share information and communicate with the people in their circle.

7.2.2 Communication

Other than using digital technologies for sharing resources and information, it emerged from the data that the TEs used different digital tools to interact with their PSTs about content beyond the classroom. As most TEIs did not have any learning management systems (such as Blackboard or Moodle), they repurposed Facebook private pages, Facebook and Twitter messenger services, email, and Google Groups as the platforms for interacting with their students. As a result, the TEs were able to introduce the following positive changes in their teacher education practices. These will now be explained.

7.2.2.1 Anytime-anywhere interactions

A significant change that the TEs were able to achieve through the use of digital media for communication was that these tools enabled 'anytime-anywhere interactions' between the TEs and their PSTs. Eight TEs, who taught at the public university and its constituent and affiliated campuses, stated that they drew on the convenient and accessible digital resources to provide platforms for PSTs to ask questions or start discussions on issues of interest. For example, TE1 noted:

> "Prior to using ICT tools, in most cases, students would get limited opportunities to ask questions, and that also only when I am in their class for the lecture. Now, they can ask me questions anytime through email, [and] social networking sites..."

TE3 also said that he created and administered private group pages on Facebook and chat groups on messaging applications to discuss with students from each cohort that he taught. One such chat group was for eight PSTs who were doing dissertations under his supervision in the final year of their master's degree. Because he had to supervise and support the students in their thesis writing, while also teaching his regular classes, he was unable to meet them frequently and offer his help. Therefore, he created a page which allowed him to interact with his students at the time of his convenience. He said:

> "So, I created this group so that they do not need to come to meet me in person every-time they have a question. If they have questions or problem, they can post that in the discussion forum. They usually ask me questions related to the literature review, analysis and discussion. While I try to answer their questions…when I am at home or not [teaching]."

Likewise, TE19, who taught at a regionally located campus, said that he used member-only pages and chat groups on Facebook messaging application to interact with his students because he could not interact with everyone during the lecture. He said:

> "So, I use Facebook to be able to [interact] with them - I ask them questions, and also help them by responding to queries related to the past or recently completed lessons. Because they do not get opportunities to ask questions in the class, I feel I can help them [in their] learning using Facebook…"

It is evident from the data above that these TEs used digital tools of different nature and kinds in their practice to enable interactions between themselves and their PSTs. This finding demonstrates that SNS and their different features can mediate interactions between TEs and students (Ciftci, 2016; Prescott, Wilson, & Becket, 2013) and continue course/content discussions outside the classroom (Prescott, Stodart, Becket, & Wilson, 2015). As TE3 and TE19 stated, the private group pages allowed them to ask questions, provide feedback and respond to students' queries. For TE3, the use of SNS features made it possible for him to interact with his students frequently, which otherwise was challenging due to his busy schedule. And for TE19, the use of a group page on Facebook supplemented his discussions in the class. Evidence of TE19's use of social media to add-to in-class interactions can be seen through the screenshots shown in Figure 7.4 below.

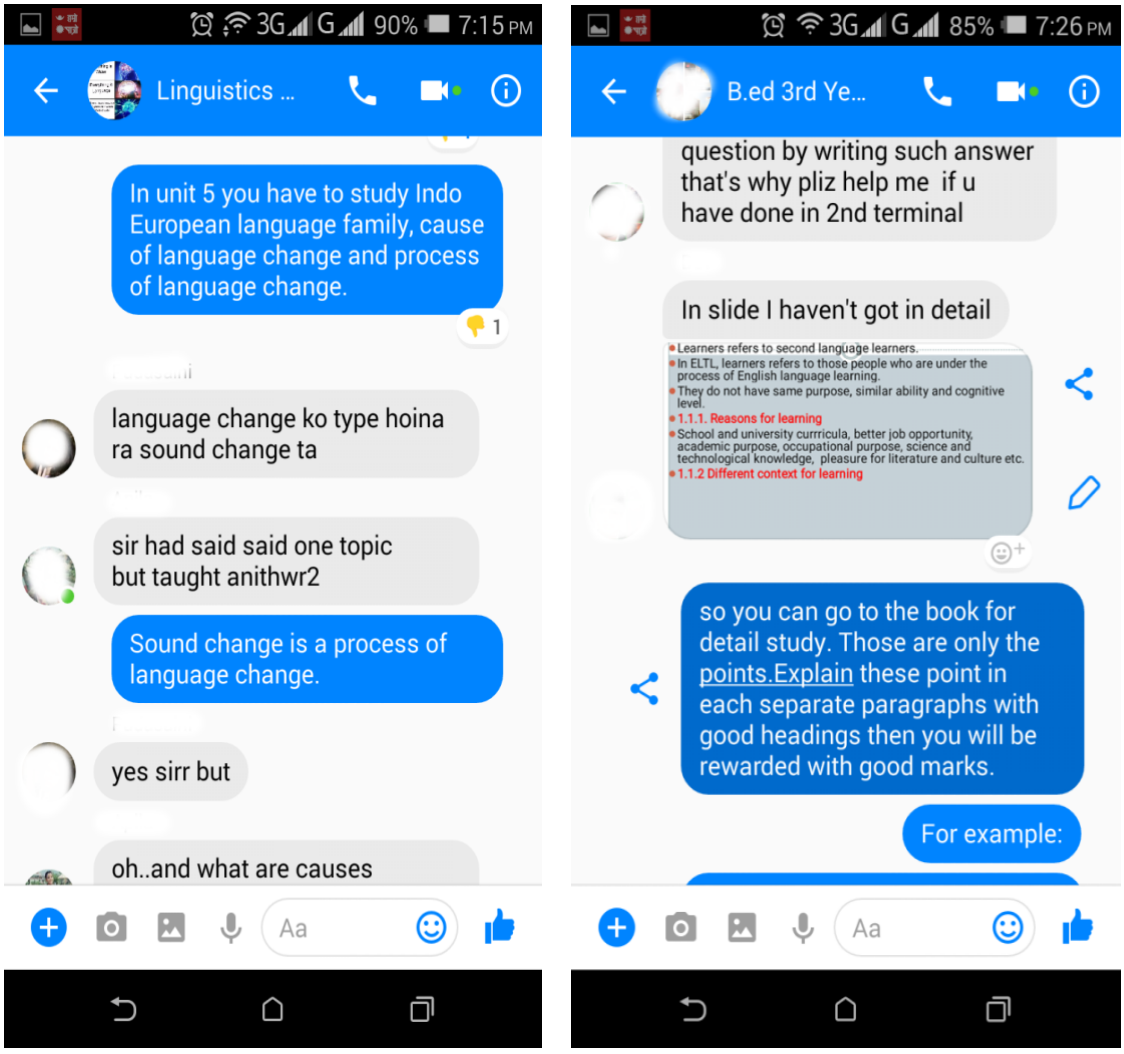

Figure 7.4: Screenshots of a Facebook group chat administered by TE19

These screen-captures relate to two cohorts of PSTs that TE19 taught. The texts in the darker background were written by the TE, and those with the lighter background are written by PSTs. For example, in the image on the left, which is a chat group for students studying linguistics, a student asked TE19 what they needed to read for the upcoming test. TE19 responded that they needed to study "the cause and process of language change and Indo-European language family." Another student then asked him, "Isn't sound change a part of language change?", and before he could respond to that, the next student noted that TE19 had not discussed the topic in detail, and one of his responses was confusing. As soon as TE19 answered the query on language change, two

more students asked him questions. Similarly, in the screenshot on the right, which is for the group of students studying academic writing, his PSTs asked for tips on exam preparation, and he advised what they needed to read. And, the discussion continued likewise.

These examples demonstrate that through the use of different features of SNS, the TEs were able to facilitate anytime-anywhere interactions with students outside the lessons. Because most of the communication shown in the screenshot was asynchronous and happened outside the classroom, it can be argued that the use of the SNS tools afforded the TEs and the PSTs with opportunities to engage in interactions at times and places of their convenience. This finding supports the argument that tools like Facebook facilitate quick and easy interactions between educators and their students and enhance students' learning experiences (Prescott et al., 2015).

Similarly, the findings show that anytime-anywhere interactions through SNS contribute to students' learning about the content of courses for two reasons. First, students can ask questions and have confidence they will be answered. Second, the interactions on the messaging applications are retrievable, which allow students to go through them as many times as they need. Such facilitations of SNS, therefore, support students' learning outside the lesson itself (Madge, Meek, Wellens, & Hooley, 2009; Prescott et al., 2013). Being able to retrieve the message at the time of the need means that they can review their interactions when they feel the need to refresh their memories of the content.

When the changes discussed here are mapped using the activity system demonstrated in Figure 7.3, it can be seen that the TEs were able to address the issues of lack of interaction resulting from the institutional realities such as large classes, limited available time, and heavy teaching hours. Because the TEs were required to teach

multiple classes every day, it was difficult for them to meet students individually and help them with their learning.

Likewise, there were changes in the division of role because when digital tools were used; the PSTs were more active in the learning process than in the usual module, which used ICT tools minimally. When the TEs did not use such tools, their interactions were limited to those activities that happened in the classroom, where the students would usually be busy writing their notes during a lecture, and they did not have much opportunities to ask questions. However, with the use of these tools, they could ask their questions anytime and anywhere. This meant that the students more actively involved in learning activities.

The use of digital tools, therefore, introduced significant changes in the way teacher education was delivered. In face-to-face situations in a classroom, there were minimal interactions between the TEs and the PSTs, with not all the PSTs having opportunities to ask questions. With the use of the digital tools, however, the PSTs were able to ask questions to their TEs. The increased frequencies of interactions also supported their learning because students could flag their lack of understanding and request more information from their TEs. The next section examines in further detail how social media tools and email allowed TEs to explore students' understandings of course content.

In conclusion, through the use of digital tools and platforms, the TEs were able to increase the instance of communication with their students. By promoting anytime-anywhere communication, the TEs were able to bring changes in the rules and the division of duties in the activity system related to teacher education. Likewise, they were able to overcome the barriers related to lack of face-to-face interactions through the use of the digital tools.

7.2.2.2 Collecting students' opinions on lessons during lesson planning

A prominent feature of the digitally facilitated teacher-student interactions was that the digital tools provided opportunities for teachers to explore PSTs' opinions, concerns and queries, which they then used to shape their lessons. It was observed that such practices enabled TEs to support students' content knowledge, which then enabled some important changes in their teacher education practice. TEs 5, 6 and 8 stated that they used features of SNS or email technologies to discuss ideas with their PSTs, and they used the points from the interactions on those platforms to inform their subsequent lessons. For example, TE6 noted;

> "What I do is I write about issues related to lesson [on the Facebook page] and ask for students' opinions on that. Then, they write what they feel about the post. The following lesson discusses that issue, and the next day, I update my post on Facebook page [based on the discussion] for all students to see. As such, the discussion continues."

Likewise, TE5 reported using Google Groups to interact with the PSTs and encouraging them to use the group to post and email their questions or concerns. These were used to plan the next lesson. TE5 said;

> "Email helped to enhance interactions and discussions with the students … For example, I was doing the last class before the semester end yesterday [on 20.12.2016], and my students sent me a few questions through email the night before, which helped me plan my [next] lesson. That's another form of interaction, I believe."

In a similar vein, TE8 noted:

> "I now use email for two-way communication with my students. They send their questions and concerns through their emails…very frequently. While I respond to some of those questions through email, I use those questions to plan for the next class."

Evidence of this is presented below in Figure 7.5, a screenshot of an email sent by one of T8's students about his ELT Methodology module.

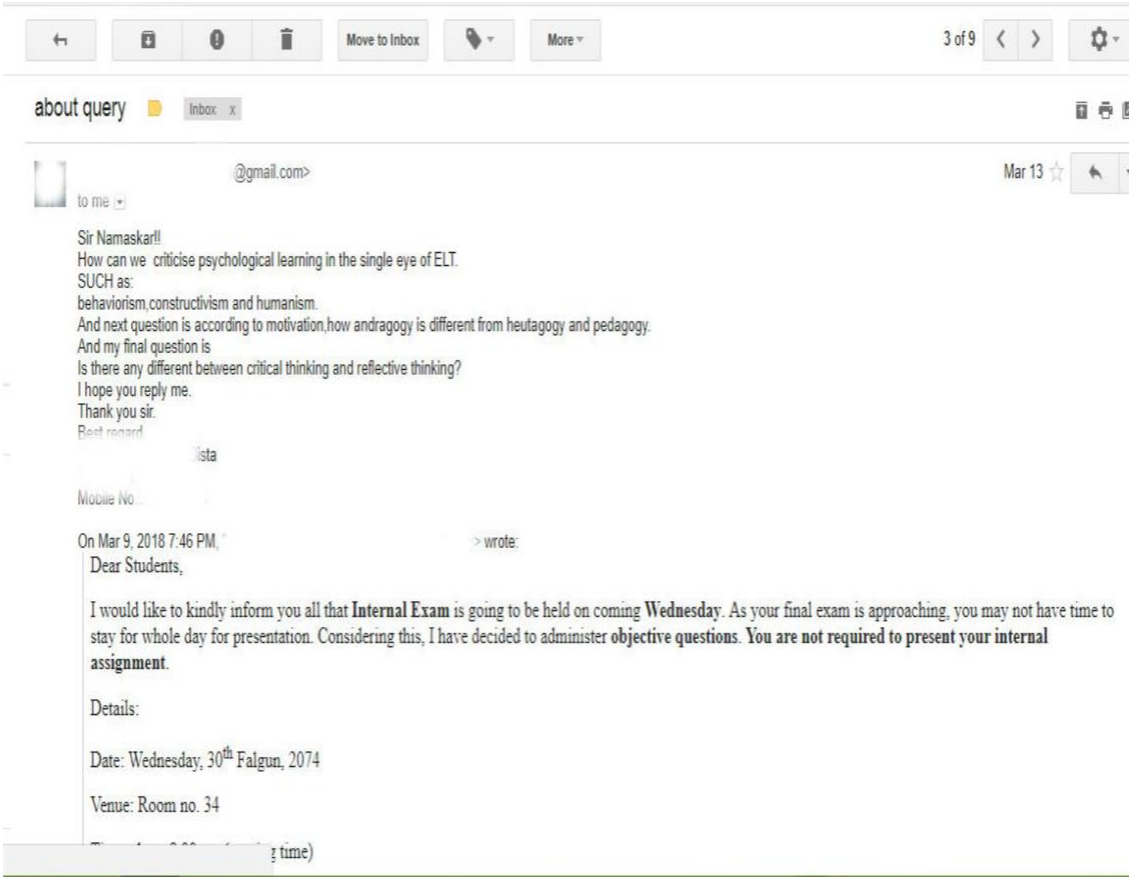

Figure 7.5: Email sent by TE8's student for discussion.

The student asked TE8 a question relating to the different learning theories and other concepts related to ELT. In his interview, TE8 said that he did not email a reply to the student but instead used the questions for discussion in his subsequent lessons.

These data demonstrate that the interactions that the TEs had with their PSTs on the digital platforms helped them explore and collect the students' questions, which they

answered in their next lessons. This finding also demonstrates that the use of those tools made students think about the content outside the class time. This finding is in congruence with that of Prestridge (2014), who found that the questions or comments that the teachers received via Twitter helped enhance students' thinking about the content. Such practices enhance students' learning experiences (Bosch, 2009).

The findings above suggest that through the mediation of the digital resources, the TEs were able to introduce changes in their teacher education practices. The usual teaching practice, as demonstrated in Figure 7.3, was very teacher-centred. Therefore, there was little communication between the PSTs and the TEs. The flow of communication was generally one way, from the tutor to students. Such practices reduced the opportunities to ask questions. However, with the use of the digital tools, as discussed by three TEs (viz. TEs 5, 6 and 8) they were able to explore the PSTs' concerns and questions using digital tools. This, therefore, brought a change in the rules that governed teaching practices.

The change discussed in the preceding paragraph is important because the mediation of digital tools enabled a two-way flow of communication between TEs and their PSTs. The students had opportunities to send their questions and concerns, and the TEs were able to explore students' concerns, and questions, which helped TEs gauge students' understanding (of content) and to pitch the content to fit their needs. For example, as demonstrated in Figure 7.4, when TE8 realised that the PSTs needed more information on the differences between andragogy, heutagogy and pedagogy, he could prepare his lesson to address this gap in understanding. This marked an important change in the rule (i.e., teacher-centred teaching) in the teacher education activity system because when TEs did not use technologies, lesson planning predominantly

depended on their own judgment, rather than their students' understandings, concerns and questions.

In conclusion, the use of SNS and email allowed TEs to explore students' understanding and concerns. Through such use, they were able to bring an important change in the rules in the activity system related to teacher education activities.

7.2.2.3 Egalitarian platform for communication

Another significant transformation that occurred in the teaching/learning practice as a result of the use of digital technologies was that the tools offered an egalitarian platform for communication between the TEs and the PSTs that allowed for PSTs to provide opinions in ways that were not generally possible in the classroom.

Whilst data relating to this theme was observed only in one narrative, this theme merits discussion. Due to cultural reasons and uneven power differences between Nepalese TEs and PSTs, students do not always challenge the TEs' opinions and arguments in face-to-face situations. However, with the use of the digital tools, the PSTs in this study were willing to differ with their TEs and express their opinions more openly. For example, TE4 administered private pages on Facebook for all the cohorts he taught and encouraged his students to read and comment on what he posted on social media. He said, "I encourage my students to give honest and critical opinions." Because TE4 advised his students to express their real opinions, including those that differed from his own, his students expressed their disagreement with his arguments. An example of this may be seen in the screenshots shown in Figures 7.6 and 7.7.

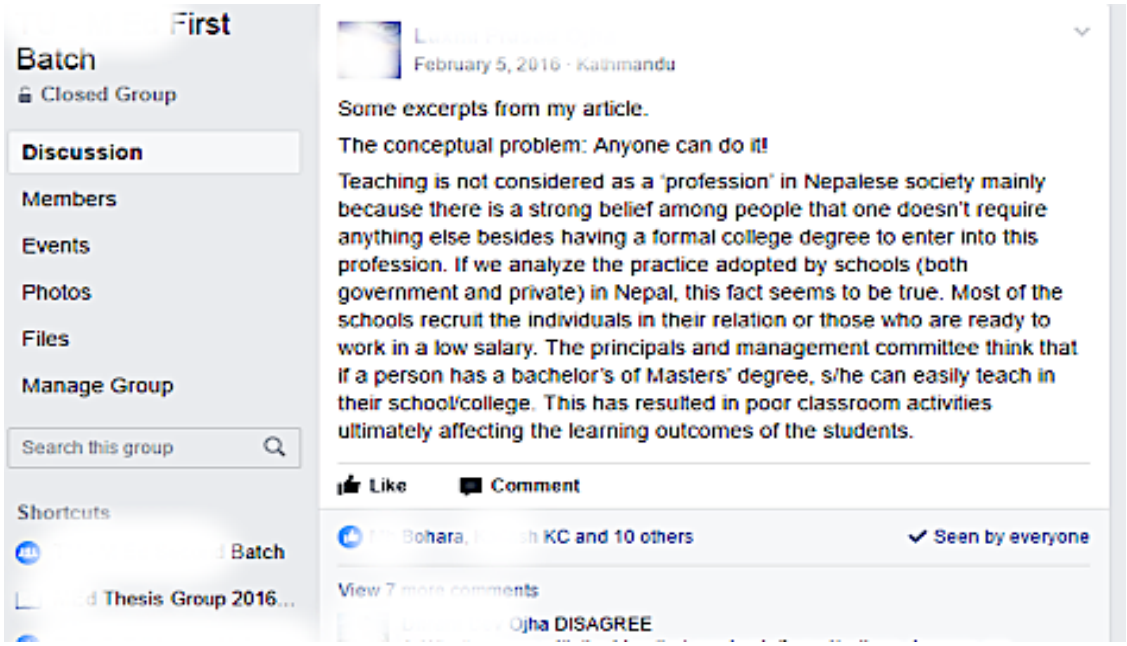

Figure 7.6: Facebook screenshots from the pages that the TE4 administered

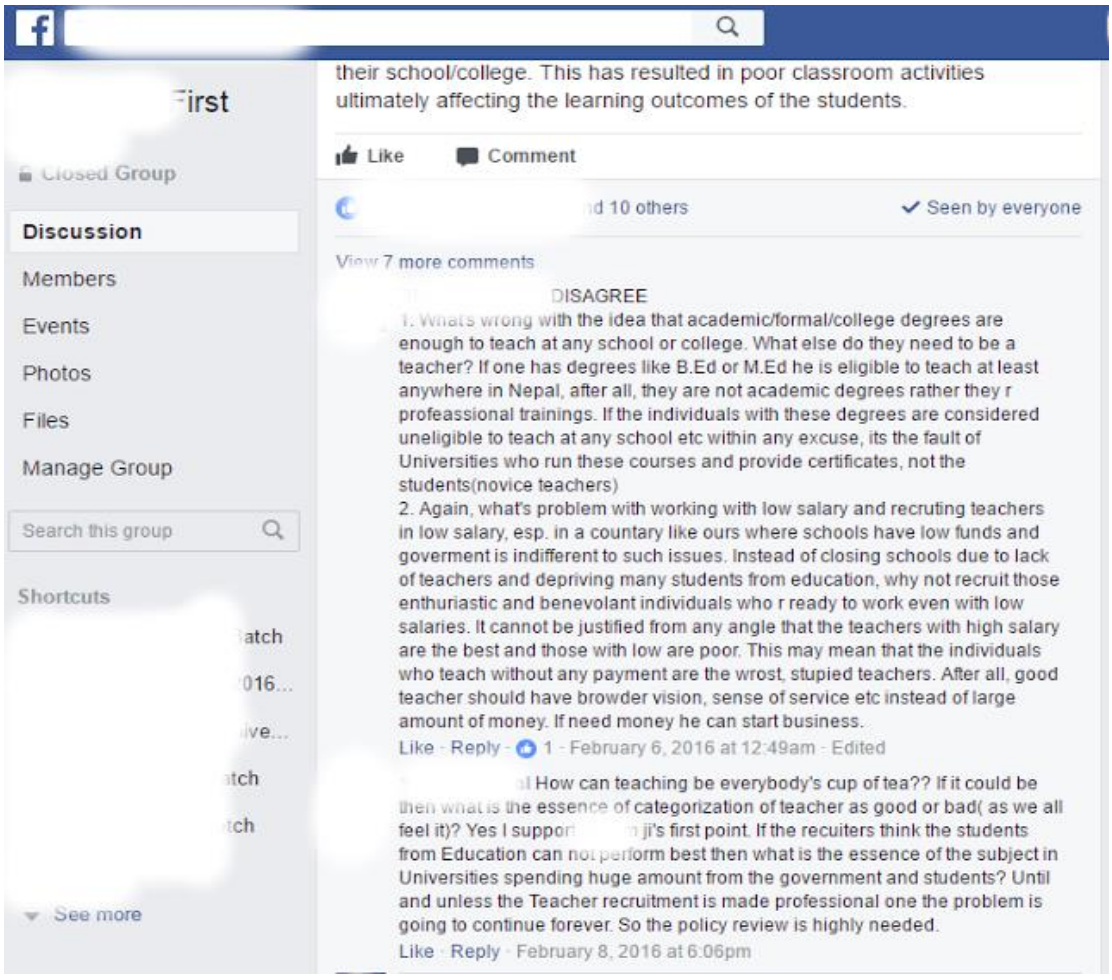

Figure 7.7: Facebook screenshots from the pages that the TE4 administered.

Figures 7.6 and 7.7 show that TE4 posted an excerpt from a recent piece that he wrote for an e-journal. The excerpt argued that there were inherent problems in the attitude of the stakeholders involved in teacher recruitment and these affected students' learning outcomes in high school. Several of his students commented on his post. In the two student comments that are visible in Figure 7.7, it can be seen that the students have opposed TE4s' views. The first disagrees because of the factors associated with existing teacher education courses and the socio-economic aspect. The second agrees with the previous post and then calls for a review of the teacher recruitment policy.

During the second interview with TE4, he discussed his experience of students' disagreeing with his arguments:

> "It was an empowering experience for the students as they got a platform outside the formal classroom setting to express freely - use of Facebook group [pages] enabled them to break the traditional protocol of the student-teacher relation and power [differences]."

This evidence suggests the use of technologies by the TEs enabled a critical change in the usual teacher education activity system, which was teacher-centred and very top-down (see Figure 7.3).

Whilst lecture-based lessons already minimise the amount of discussion taking place in a lesson, there are cultural expectations and norms associated with the teacher-student relationship that govern teaching/learning activities in a Nepalese classroom. In addition, TEs and PSTs in Nepal have a high power distance, which is "the degree of inequality in power between a less powerful individual and a more powerful other, in which individual and other belong to the same social system" (Hofstede, 2003, p. 83).

One factor that results in the power difference is that teachers are revered. As a result of this and the factors discussed in the preceding paragraph, teachers' arguments and opinions are not contested openly by the students; there are rare cases of students challenging their teachers' arguments in face-to-face situations. Students either subscribe to what the teachers say or do not present any counter-arguments, even when they disagree.

However, in this study, TE4 observed that with the use of digital tools for discussions, his students felt empowered and sufficiently safe to disagree with their TEs when their opinions differed. This is because the Facebook pages they used were less formal when compared to a classroom. And, because Facebook is a shared space which is not controlled by either the PSTs or the TEs, it is able to "break down the traditional power hierarchies between student and instructor" (Bosch, 2009, p. 195). Kiesler, Siegel, and McGuire (1984, p. 1125), in an often-cited work in understanding human-computer interaction, maintain that

> Software for electronic communication is blind with respect to the vertical hierarchy in social relationships and organizations. Once people have electronic access, their status, power, and prestige are communicated neither contextually (the way secretaries and meeting rooms and clothes communicate) nor dynamically (the way gaze, touch, and facial and paralinguistic behaviour communicate). Thus, charismatic and high-status people may have less influence, and group members may participate more equally in computer communication. (p. 1125)

As the quote above explains, the PSTs in this study were participating in the digital platforms as much as their TEs. As there were fewer formalities of the sort that govern face-to-face lessons, they may have felt less inhibited and more comfortable

with expressing their opinions when they did not always need to conform to the TEs' opinions if their own perspectives and experiences were different. Additionally, as noted by TE4, when they disagreed with their educators, they felt safe enough to say so.

The other factor that contributed to the PSTs' lack of inhibition was that the use of asynchronous digital tools (SNS, in this case) allowed space and time to frame and compose questions or responses and to reflect on them before posting (Kiesler et al., 1984), which meant that they could carefully plan for their arguments and more easily disagree with their TEs. In this sense, the use of digital tools afforded an egalitarian platform for interaction.

An implication of expressing opinions more openly than in a traditional classroom is that such habits can transfer into the classroom, thus allowing the students feel that their lecturers are more approachable after interacting online (Bosch, 2009). This makes the knowledge-making process more democratic, as opinions are respected, critiqued and challenged, thus resulting in more nuanced learning outcomes.

In summary, this section demonstrated that the TEs were able to introduce important change in the existing teacher education practice through the use of SNS for interactions and discussions with pre-service teachers.

7.2.2.4 Equal learning opportunity

It emerged from the data that the TEs were able to equalise learning opportunities for less-interactive students by using digital tools and platforms for communication. It was observed that students with shy personalities and low English language competencies were able to ask their TEs questions using Facebook, email and messaging applications. This created a change in the usual teacher education practices by providing a platform for everyone to communicate. For instance, TE19 said:

"through Facebook [chat] groups, I contact shy students…chat with them… ask them questions and answer their queries that they could not discuss in the lesson." Evidence of this can be seen in the screenshot in Figure 7.8.

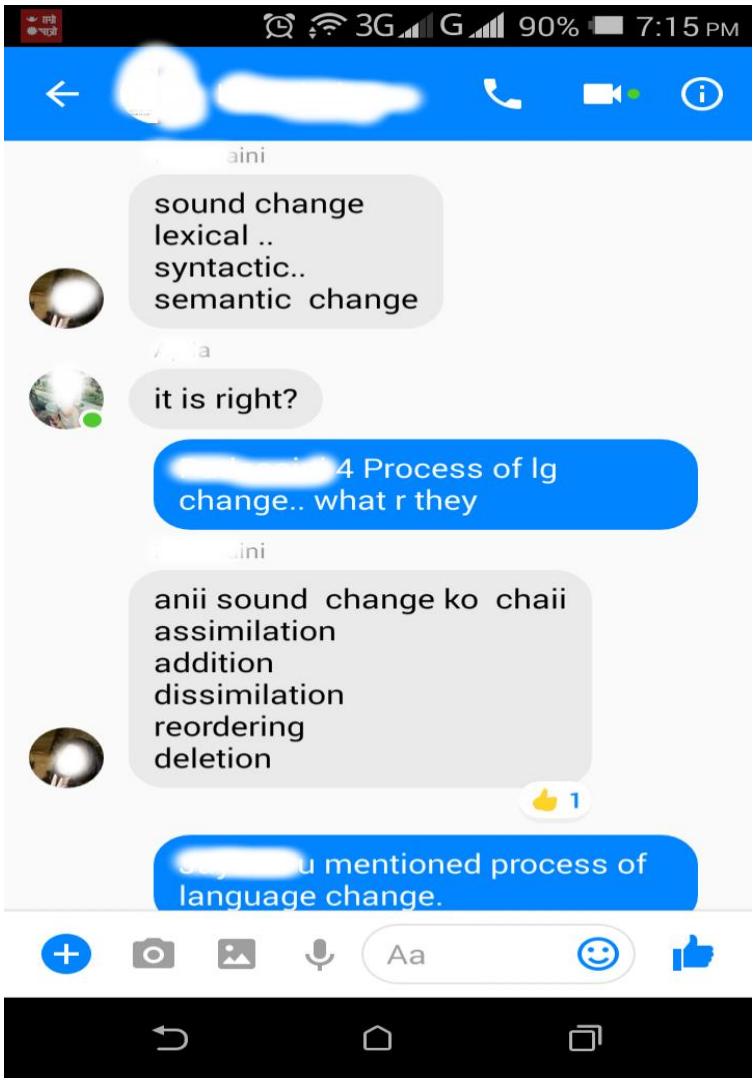

Figure 7.8: Screenshot of exchanges between teacher educators and PSTs

Figure 7.8 demonstrates an online chat between TE19 and his students. In the chat bubbles in the dark, he is seen asking questions to the students he has identified as being less participative in the lesson, and these students have answered his questions. An observation that can be made from this chat is the students have not used complete English sentences or English all the time, which illustrates that there were less formalities in such interactions, unlike in a face-to-face teacher education practice, and

the students did not necessarily feel a need to write in English because social media conversations are less formal than those in a classroom (Bosch, 2009).

This finding shows that Facebook and its messaging features not only mediated interactions between TEs and their PSTs, they also encouraged hesitant students to interact with the educators, which is congruent with the argument presented by Prescott et al. (2013) that digital tools can promote interaction between tutors and shyer students. This may have been due to the fact that the PSTs who were less extroverted and lacked the confidence to speak in face-to-face settings due to factors such as lack of language competencies, benefitted from the opportunities presented by social media (Carpenter & Krutka, 2015).

TE1 noted that some of his students, who were less likely to communicate with him in the face-to-face classroom due to lack of competencies in English, approached him after he started using digital tools. He stated:

> "They ask me questions on different things related to [contents], and we have increased interaction – [these are] students who have a lower English language competency, who are less likely to interact with me in the class. Because of Facebook member-only page, they can interact with me, and I believe they do not feel isolated and helpless. I ask them to ask me questions and I [do not] mind even if they…use [Nepali]."

These findings illustrate that by introducing digital technologies in the existing teacher education activity system, the TEs were able to create a platform which enabled them to provide opportunities to ask questions and address concerns of their PSTs who were hesitant or had less confidence to engage in discussion with their TEs. The mediation of digital technologies provided an equal learning opportunity. A possible argument about why digital mediation was able to effect such a change was that social

media platforms have fewer boundaries and formalities than those face-to-face classrooms do.

Another factor that seems to have minimised students' inhibition was related to the reduced risk of being exposed. The TEs promoted interactions without being too concerned about the language medium their PSTs chose to use, which may have encouraged more frequent participation in interactions. Likewise, because such interactions happened online without the presence of the whole class, there was no risk of losing face for speaking incorrect English or asking questions in Nepali. This argument is supported by Murphy and Manzanares' (2008) research on the impact of the implementation of e-schools in teaching and learning in rural schools in Canada. One of the benefits they reported was that shy students would text-message their queries to their teachers because they did not want to appear less competent to their friends by asking the questions orally.

In these ways, even when the face-to-face lecture conditions remained the same, by leveraging SNS and email technologies, the TEs were able to bring positive changes in the teacher education process by providing equal opportunities for learning. Through the use of digital tools, the TEs were able to encourage students with low English language competencies and shy personality to interact with them.

7.2.2.5 Student-student interactions

A finding of this study is that by introducing digital tools into their teacher education practices, the TEs were able to foster student-student interactions as well as promoting teacher-student communication. The PSTs used the platforms to discuss amongst themselves issues of interest, share resources, and answer queries related to logistics (such as class time and assignments details) and course content. Such use brought fundamental changes in the traditional roles assumed by students in the

conventional EFL teacher-education course because the use of digital media provided them with the autonomy to locate, acquire and distribute resources and information they needed without having to depend on their TEs or TEIs.

The data obtained from the focus group discussions demonstrate that the PSTs leveraged social media tools and email to obtain and share information and materials with their peers. For example, PST7 stated:

> "I have frequent correspondence between friends on Facebook and email…it is more frequent during exam time. For example, (deidentified) contacted me this morning [12.12.2019], and I share with him the resources that I have with me."

Likewise, PST19 stated, "I share the resources and the links with my friends." Evidence of students sharing resources can be seen in Figure 7.9, a screenshot shared by PST7.

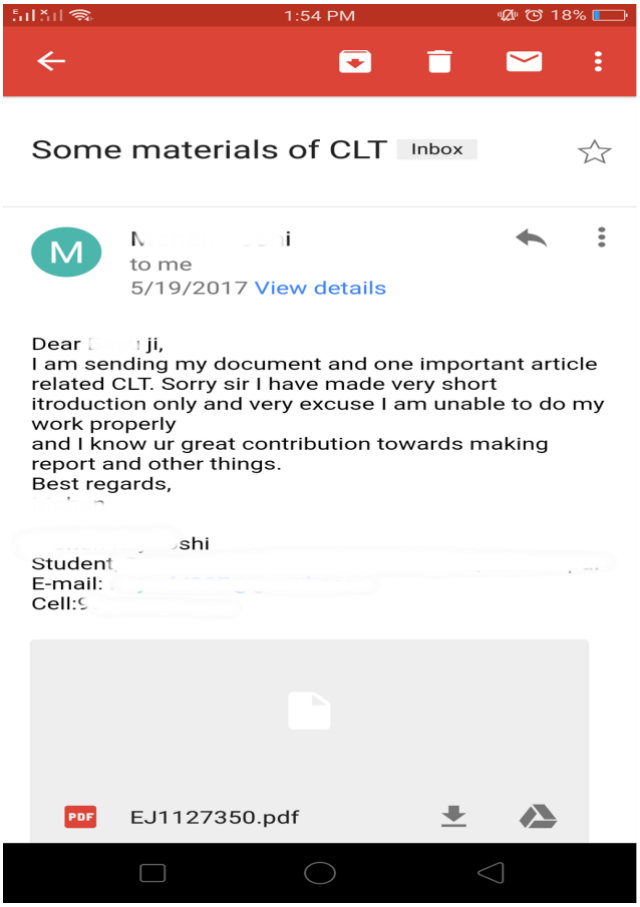

Figure 7.9: Screenshot of an email with an article that PST7 sent to his peer.

In the same vein, the TEs also noted that their PSTs used different technologies to communicate and to share resources between and amongst their peers. The TEs believed that such activities led to better learning experiences and outcomes. For example, TE17 observed that students shared, read and discussed information and resources through the Facebook private page that he created. He said:

> "The use of ICT has increased the interests and involvement of learners in English language learning and helped them…[achieve] better learning outcomes. They read, share and discuss with me and themselves on content related matters in groups…I asked them to make online discussion forums on the Facebook private page, and they have done that… Because they are more involved in sharing and discussions, that has lessened [my] load and increased their autonomy in learning."

TE4 also reported that some of his students initiated discussion on a Facebook private page to which other PSTs contributed by offering their opinions and giving answers. He said:

> "There are a few occasions when students initiated discussion by themselves. For example, I was doing Piaget's theory last week, and they asked questions on the Facebook page, 'could anybody answer this question?" There were a few students who answered those questions, and later, I posted a [helpful] resource."

Similarly, TE5 stated, "students share with their friends… where they can locate information regarding different ideas. I believe that will help them understand the content…if they read through the information."

Evidence of student-initiated interactions on a Facebook chat group that a TE administered can be seen in Figure 7.10. These screenshots were provided by TE19, who said that his students interacted and discussed with each other frequently using the group chat features.

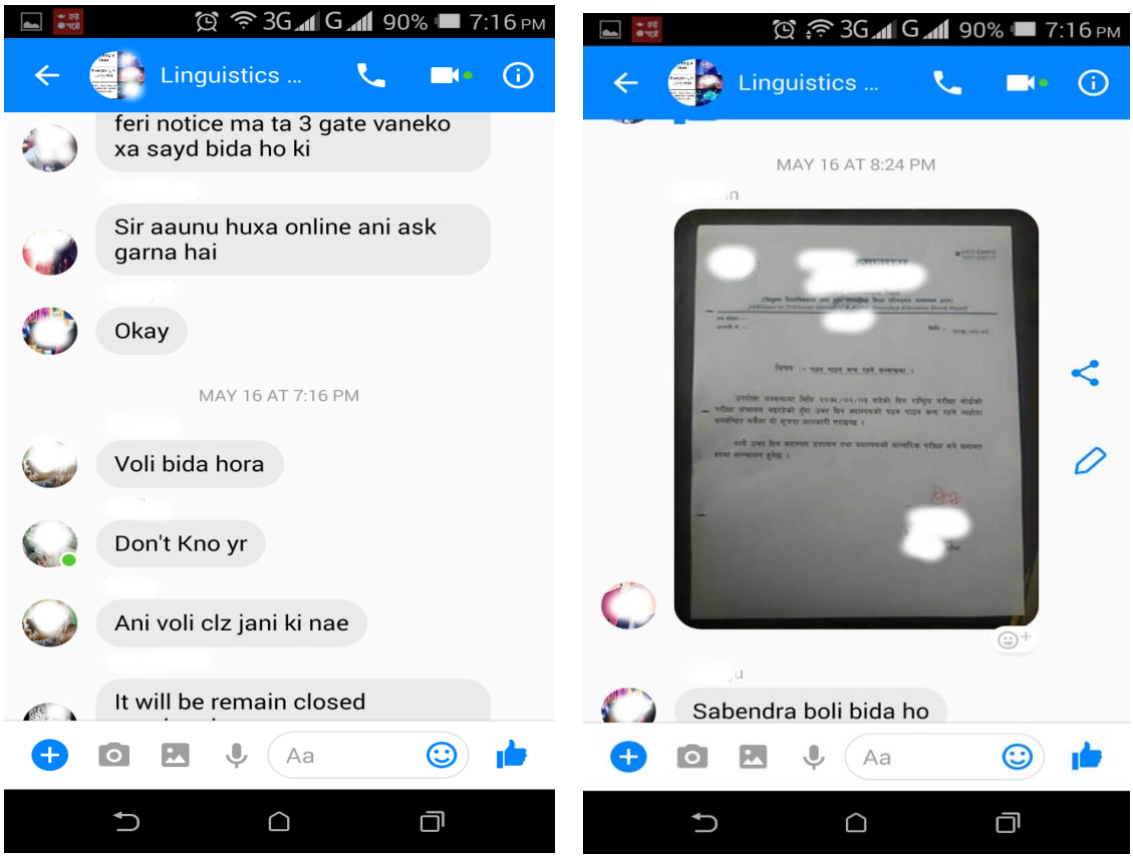

Figure 7.10: Interaction amongst students on a Facebook group chat feature administered by TE19.

As can be seen in Figure 7.10, at least eight different students interacted with each other to find an answer to a query related to a logistical matter (i.e., an exam schedule). The first comment on the left image shows that the student was confused about the date of the examination as she/he believed that the dates on the official notice and teachers' oral information were different. Then, in the following chat, she/he was advised by a peer to ask the teacher when he came online. The discussion continued

onto the lectures on the next day and the exams, until a student in the group posted the photo of the notice from the campus.

The practices of students interacting with each other suggest that there were prominent changes in the division of duties related to the passive roles that the PSTs are ascribed in the conventional setting of teacher education course, as demonstrated in Figure 7.3. However, changes were noticed in those roles when they used email and social media tools to discuss issues of concern, share resources, and ask questions. These findings are congruent with those of Akayir (2017) and Lim and Richardson (2016), who argue that students use social media sites to seek and disseminate educational resources and information about their interests; and of Deng and Tavares (2013) and Owens and Nussbaum (2016), who found that students use SNSs to interact with peers on different issues including content and logistics. Such interactions can be argued to facilitate the students' learning processes and enhance their experiences.

The PSTs initiating discussions and taking active roles in obtaining and sharing resources independent of TEs demonstrates that even in a teacher-centred educational activity system, students can take ownership of seeking knowledge through the use of digital technologies. In promoting student-student interactions by providing a platform for interactions, as demonstrated by the screenshot in Figure 7.10 where TE19 was inactive, and students found answer/s to their queries by themselves, the TEs relegated themselves to a position where they would contribute only if necessary. Whilst there is no data to measure the impact of this on learning outcomes, what can be argued from the literature is that tutors' practices like these impact the learning process because the sharing of information or the collaborative solving of problems can help students to co-construct their knowledge (Chiu, Hsu, & Wang, 2006; Eteokleous, Ktoridou, Stavrides, & Michaelidis, 2012; Von Wartburg, Rost, & Teichert, 2006).

Also evident in the screenshot shown in Figure 7.10 is that the students in this group were sufficiently uninhibited about communicating in Romanised Nepali. A possible explanation for this is that because the groups existed outside the formal context of a face-to-face classroom they were not governed by the same rules that applied to a classroom (such as the necessity to speak English). This implies that the use of digital tools helped these PSTs break away from the formality of the formal teacher education practice, and this resulted in more communication with peers, thus promoting student-student interactions.

In conclusion, the discussions here suggested that through the use of digital tools and platforms, the PSTs were able to take more active participation in the learning process. Not only did the use of those tools bring change in the division of labour in the activity system, but it also allowed them to break the barriers associated with the formality of the formal EFL teacher education practices.

7.2.3 Enhancing lessons

The previous sections discussed how participating TEs used digital technologies outside the classroom for resource sharing and communication. This section reviews how the TEs used digital tools and resources during lessons in the classroom, and the impact of such use on student learning. As shown in Table 7.1, more than half of the TEs used multimedia projectors, PowerPoint, images, and audio and video content regularly to support their teaching. As a result of the introduction of these new tools and resources, the TEs were able to introduce changes in teaching practice that will now be described. The changes relate to explaining lesson content better through the use of multimodal texts and cognitive freedom to ask questions.

It was observed in the data that the TEs used digital tools to better explain the lesson content through the use of multimedia content, PowerPoint presentations and multimedia projectors. For example, TE23 said:

> "The use of ICTs has made my teaching practices much easier. For example, video links or excerpts from research articles [on the PowerPoint] make it easier for me to explain or transmit the information that I cannot self-explain well... I feel resourceful and more confident when I present such resources to support what I discuss during the lesson."

TE23 believed that the use of digital tools and other supplementary resources helped him clarify ideas and present content better. Similar opinions were also expressed by TE2, who said that he would download useful multimedia content from various websites and show them to his students:

> "[I] downloaded videos and interactive PowerPoint slides related to academic writing – for example, I downloaded, recently, some videos from Walton University. Their writing centres have developed useful videos on academic writing, which discuss the techniques of paraphrasing, summarizing … I showed those videos in my class to teach them essay … They help to reinforce the message that I wanted to give to them."

Another example of using different resources to explain complex ideas in teaching was given by TE3, who said:

> "Recently, I [used] the resources from Macmillan English…they have a series of talks on Globalization and English, mostly talks by David Crystal. I used those [videos] in Applied Linguistics course while teaching 'World Englishes' course because the videos explained the ideas very well."

In a similar vein, TE13 noted that he used the talks by EFL scholars to discuss and explain complex issues related to EFL:

> "I use YouTube videos to demonstrate how communicative language teaching works, or to discuss other issues in English language teaching, I show the talks by EFL scholars, such as Scott Thornbury and Jeremy Harmer."

The use of various multimodal resources such as videos, interactive PowerPoint or other texts to enhance content presentation demonstrates that there were changes in the tools (in the teacher education activity system demonstrated in Figure 7.3) that the teacher educators drew upon in the process of knowledge making, which then helped enhance the students' understanding of the content. The TEs were able to draw upon a wider range of content during discussions in their lessons.

When the TEs did not use technologies, most of them relied predominantly on the locally available resources (as discussed in section 7.2.1), many of which lacked scholarly rigour. However, with the use of digital tools, the TEs were able to embed multimodal content in their lessons as teaching aids to explain and present information better. Because the multimodal content introduced newness in the lessons, it helped the PSTs to remain attentive and thereby supported in-depth learning (Rackaway, 2012). Likewise, multimodal content, through the use of visuals and audio, helped them to comprehend and explain abstract concepts (Malik & Agarwal, 2012).

Other than enhancing content presentation, the TEs also said that they used multimedia files to teach different aspects of the English language, such as correct pronunciation. For example, TE9, TE13 and TE20 stated that they downloaded sound files from the web and played them in the classroom while teaching English phonetics, phonemes and the International Phonetic Association (IPA) chart. These TEs said that

the use of these sound files helped students learn the correct pronunciation of sounds that did not exist in the Nepali language. For example, TE9 said:

> "As I teach phonetics and phonology, I use the audio for English sounds on IPA chart… I find it helpful because some sounds, such as different /sh/ sounds in English language do not exist in Nepali language, so it is easier to tell the difference and make students aware [of such differences] when I use the resources from the web - those are authentic resource to teach correct pronunciation to future EFL teachers."

Likewise, TE13 said that he visited the BBC's *Learn English* webpage and showed his students how they could listen to sounds and pronunciation:

> "Last week, we [explored the] *teachenglish.org.uk* - a website designed by British Council. I showed how they could listen to the phonemic symbols in English that are pronounced there. That helped them learn the right way of pronouncing the sound."

The evidence in the data suggests that when the TEs employed new and authentic digital resources in teaching, they were able to teach English language skills such as pronunciation in more efficient ways. This finding is congruent with those of Lee (2008) and Rahimi and Yadollahi (2011) who established that educators used ICT tools effectively in teaching different features of English language, including pronunciation. A benefit of using such multimedia resources as teaching aids in EFL classrooms is that they provide authentic language input to teach features such as pronunciation (Trinder, 2017).

The use of digital tools (as mediating artefacts in the activity system) to teach pronunciation was significant for the fact that the participating TEs had a non-English

speaking background, and most of them had limitations in their abilities to teach certain aspects of English, especially subtle features of spoken English language such as sounds, tone and intonation. Therefore, when multimedia files relating to English phonemes were used in the classroom, they were able to demonstrate the differences in the sounds and teach how each is pronounced. In this context, the changes in the tools (in the teacher education activity system) mediated promotion of correct EFL teaching practices. It is important that future EFL teachers be aware of the subtle features of English language because such knowledge will help them teach correct English features (Baker & Murphy, 2011; Coskun, 2011).

In regard to providing the cognitive freedom that is required for student engagement during lessons, three TEs noted that student engagement in lessons had increased since they started using digital tools in their class because these tools freed students from the burden of copying lecture notes, sometimes word-for-word. For instance, TE1 stated that with the use of the digital tools, he was able to free students from taking notes, which meant that they could focus on the content and ask questions during the lecture. In that regard, TE1 noted:

> "After ICT use, I have seen more cases of student interaction in the class because they can pick up on the points on the slide and ask us to explain those. For example, when I am discussing without any visual aids…or simply [giving] lectures without any visual support, students are busy making notes than trying to understand [ideas]. Now, because I use PowerPoints and share [the notes], they…concentrate on the lessons and [some of them] ask me questions."

On a similar note, TE9 observed that he found it easier to engage students in different activities when he used a multimedia projection in the class. He contended, *"*The use of visualisation tools has made it easier for brainstorming, prediction, and

asking discussion questions. The class becomes more interactive when I use such tools." In the same vein, TE13 noted:

> "Because the technology is there, I involve students, I mean, I can sit back and ask students to take charge of the class, give a demonstration of things using the ICT tools. [For example,] I show a video and get students to talk."

The data from these three TEs shows that the use of digital tools supported their practices by providing the PSTs with the means to view their lecture notes, which meant that they did not need to copy these verbatim (as in the case of TE1), and they had opportunities to share their understanding (as in the case of TE13). Whilst there is no data to back up these TEs' claims that student engagement was enhanced as a result of the use of the PowerPoint or other visual tools, the interviews show that by using digital tools the TEs were able to display their lecture notes during their lessons.

Because the PSTs did not need to copy their TEs' words verbatim, they had time to listen to the TEs' lectures and ask questions in the class, or through email and SNS after the class. This practice introduced some important changes in the usual teacher education activities and contrasted with the traditional practice where the teacher is the sage, and the students follow instructions (Luitel & Taylor, 2006). One such change was that the PSTs had more opportunities (than in a class where TEs dictate notes) to reflect on TEs' arguments and have a more nuanced understanding of their content.

This section, therefore, demonstrated that TEs were able to bring important changes around the roles, rules and tools when they used digital media to enhance their lessons.

7.3 Conclusion to the Chapter

In summary, the participating TEs' practices demonstrated that they were aware of the implicit values of social media and email technologies by the ways they repurposed the digital platforms and used them to support their practices. The TEs used such tools to share resources with the PSTs, to communicate with them, and to enhance the content presentation. In so doing, the TEs were responsible for some significant changes.

When the TEs used different digital platforms to share resources with their PSTs, they were able to break the barriers caused by under-resourced libraries and enhance students' access to a wider range of information. As well, the TEs' use of digital tools resulted in the PSTs' roles changing from being passive recipients to active explorers of information. This is because the PSTs followed the TEs' cues and found the resources and information independently. They also shared that information with their peers. This implies that they had greater control over the resources and knowledge they needed as PSTs.

By using the digital tools for communication, the TEs were able to promote anytime-anywhere interactions, both teacher-to-student and student-to-student; collect students' questions and opinions prior to the lesson; create an egalitarian platform for discussion; provide more equal learning opportunities to students; supplement their classroom interactions; and engage students in content related discussion outside the classroom.

Because the tools that the TEs used for communication were informal in nature and neutralised the power hierarchies, the PSTs felt empowered and thus willing to differ with their tutors when their opinions varied. This was an important change because, in normal classrooms, the students would rarely challenge their teachers'

arguments due to the high-power difference between them and the revered teachers. This suggests that the TEs were also able to overcome the barriers related to this context through the use of digital tools.

Likewise, because the digital tools (such as Facebook and messaging applications) are asynchronous and informal, they allowed time and space to reflect on the posts, questions and responses, and provided a sanctuary that allowed less participative PSTs to ask questions to their TEs without a risk of being exposed to their peers. Therefore, the use of digital tools provided equal learning opportunities to the PSTs.

As regards the use of the digital technologies for enhancing content presentation, it was seen that the TEs were able to use additional materials to support content presentation and provide authentic input of language learning, especially around the subtle but key features of the English language.

The TEs noted that they were able to structure their lessons better so as to provide the cognitive freedom for their PSTs to ask questions about their TEs' arguments during lectures. In using digital resources for these purposes, the TEs provided opportunities for PSTs to reflect on TEs' arguments and ask questions if they felt the need for more information or clarification.

While the TEs were not able to leverage features such as synchronous communication or flipped learning, they were able to pitch their lesson content to the level of their students' understanding, concerns and questions. Such practices enhanced students' learning experiences. This introduced another important change: prior to the TEs using digital tools, they would have followed the syllabus and determined lesson content using their personal judgment, rather than considering whether students understood the content.

Whilst the use of digital media helped the TEs introduce changes, it was also found that most of these practices hinged on their personal decisions. As has been discussed in earlier chapters, most TEs (other than the ones teaching at the private university) were not required to use any digital tools. The TEs used digital tools because, as discussed in Section 5.2.2, they believed in the use of ICTs.

This is the last of three chapters that presented data and related discussions. In Chapter 8, the conclusions of this thesis will be presented.

Chapter 8 – Conclusions

In Chapters 5, 6 and 7, the findings, analyses and related discussion were presented in integrated ways to respond to the three questions that guided this study. In Chapter 5, the external and internal factors that influenced and underpinned Nepalese teacher educators' (TE's) technology use were explored. In Chapter 6, the discussion focused on how TEs developed the competencies required to use digital technologies. Chapter 7 focused on how the development of such competencies supported the TEs' practices and the educational changes they were able to achieve through technology use.

This chapter draws together the findings, analyses and discussion from the three previous chapters in order to respond to the issues raised in Chapter 1. The discussion is presented in the order of the three research questions.

Following a discussion of the findings related to the research questions, the implications of the study are identified and discussed. Next, the limitations of the study are presented, and recommendations for future research are suggested.

8.1 Research Question 1: How do different factors influence the digital practices of teacher educators?

In Chapter 5, the findings, analysis and discussion focused on how external and internal factors influenced and underpinned the Nepalese TEs' digital practices. It was established in that chapter that different external and internal factors influenced TEs' digital practices. Whilst some were barriers that obstructed TEs' use of technologies and resulted in contradictions of different nature in the technology use activity system, others were found to facilitate TEs' technological practices.

In discussing the external factors, it was found that the Nepalese national policy on ICT in education policy was a barrier. In fact, the Ministry of Education Nepal (MoEN) did not have any policies about ICT integration in teacher education

programmes, despite identifying digital competencies as a core competency of a school teacher (Government of Nepal Ministry of Education, 2016a). Whilst the ministry expected all TEs to possess ICT skills, they did not provide any directives to TEIs regarding what they expected from pre-service teacher preparation programmes regarding digital competencies because they considered universities as autonomous entities. The lack of engagement of MoEN in teacher education activities at the universities resulted in quaternary contradictions (Engeström & Sannino, 2010), which manifested as little guidance and support in TEs' digital practices, and lack of policies on what TEIs should do regarding TEs' and PSTs' digital competencies.

A ripple effect of the absence of a national directive was that the TEIs had no policy deliberation about what skills and knowledge they expected the TEs or the PSTs to have as regards to technology use. For example, there were no institutional policies and rules or professional standards concerning technology use. A limited budget was available for enhancing existing technology facilities, and limited efforts were made towards providing support to TEs for technology integration. In other words, in the hierarchical division of labour (Leont'ev, 1978) in the technology use activity system, the TEIs did not undertake their part of the job. As results, there were secondary contradictions (Engeström & Sannino, 2010) in the activity system between the object (to use technology to enhance practices) and the division of labour (TEIs doing little to support TEs' technological practices). The contradictions manifested as limited ICT-related professional learning, few directives on why, how and when technologies should be used. As a result, in most cases, technology use depended on the TEs' personal discretion.

As well as institutional policies, the limited resources at Nepalese TEIs was another barrier that TEs faced in their digital practices. This resulted in secondary

contradictions between the rules (i.e., the explicit and implicit institutional and classroom realities) and TEs' object (i.e., to use technologies to enhance their practices) in the activity system. These contradictions occurred when TEs wished to use digital tools in their lessons, yet the technologies available for their use were limited. Likewise, slow internet speed at the TEIs meant that the TEs were required to spend considerable time at home preparing materials for use in class. This added to the problem of not having time to prepare for lessons at TEIs. An effect of this was that TEs' struggled to manage their personal and professional lives.

A factor contributing to the secondary contradictions related to resources was that the TEIs lacked economic resources, which influenced their abilities to set up or expand their existing technological facilities and provide related support to TEs.

It was also established in Chapter 5 that a top-down approach to examination and assessment at the public university was another barrier that caused contradictions between the rules (i.e., the institutional reality associated with examination) in and the TEs' object (technology use to enhance their practices) in their activity system. Because of concerns about exams and course completions, some TEs were not able to use digital tools in the way they would have preferred; instead, they used the available tools to support the transmissive pedagogical approach. Whilst changes were noted in the instances of interactions, as discussed in Chapter 7, the structure of the examination and TEs having to conform to the externally set curriculum and assessment systems limited what TEs could do in class. Having to teach the content-loaded syllabus to help students prepare for exams that tested content knowledge meant that some TEs used the Microsoft PowerPoint and multimedia projector in teacher-centred ways.

Whilst different kinds of barriers beyond TEs' control impacted TEs' digital practices, especially those based in TEIs, by giving rise to quaternary and secondary

contradictions in the activity systems, as discussed above, TEs' individual technology-related beliefs were found to have sustained their digital practices. Despite not having the basic facilities in the classroom and not receiving enough support from the TEIs, the TEs used digital tools in their practice creatively because they were convinced that digital tools were of benefit to their professional growth and sustenance and that the use of digital tools gave them positive emotions, such as confidence, self-empowerment and self-satisfaction.

The external (professional growth and sustenance) and internal gains (confidence, self-empowerment and satisfaction) convinced the TEs that the use of digital tools was inevitable. As a result, despite the limited infrastructure and access to ICT tools, TEs still used digital tools in teaching and learning (see Chapter 7 for a detailed discussion on this). This demonstrates that if teachers have positive dispositions about technology use, they are prepared to overcome barriers and take up the technology in their practice, despite a lack of a conducive environment at the TEIs. This suggests that TEs' technology use beliefs are of high importance in sustaining their digital practices, which illustrates that the subjects – as the self with their individual agency, beliefs, and motives towards technology use – have an important role to play in technology uptake.

The TEs' agency and technology-related beliefs were of significance because these internal factors promoted and sustained their digital practices in an environment where most TEs were not required to use digital tools and were not provided with any kind of support that are prerequisites to ICT use.

8.2 Research Question 2: With whom and in what ways did the teacher educators develop their digital competencies?

The data analysis and discussion related to this question were presented in Chapter 6. It was established that the development of TEs' digital competencies was not an outcome of a single learning activity; rather, it was the result of different activities that the TEs undertook out of volition. These activities included learning computer operational skills from private computer institutions, attending online courses or talking to colleagues, and attending training at their TEI.

A key finding from Chapter 6 was that through their engagement in different professional learning and professional development activities, the TEs developed digital competencies required to use and sustain their ICT-related professional learning. It was found that continuous engagement in different professional learning activities prepared the TEs to integrate technologies in their practice, despite limited institutional readiness to support and sustain their digital practices.

The analysis also shows that the professional learning and development activities that TEs undertook afforded unique learning opportunities. For example, by attending online courses, the TEs learnt about different digital tools that they were not able to experience in their own education; those courses compensated for vicarious learning experiences which they missed during their own education as PSTs, in particular, the opportunity to experience how to teach and learn using digital tools. Likewise, by learning through different resources, they were also able to address the challenges brought by the protean nature of ICT tools.

Being able to address the challenges brought by the progressive nature of technology is an important one. That is because even when TEs have technology use experience as PSTs, they are unaware of recent or future developments. TEs learned

about them through professional learning networks (PLNs), self-directed learning or online courses.

It was found that online courses developed and sustained the TEs' ICT-related learning because the e-courses were completely based on digital technologies, and the TEs were required to use technologies to participate in them, which made the learning experiential. The use of digital tools to accomplish the activities set in the e-courses meant that the TEs were able to gain skills required to use the tools; understand their educational values; and gain knowledge about how they could be used in teaching and learning. This suggests that because the professional learning was ICT based, it was impactful (Albion et al., 2015). Likewise, because the learning experience was built on actual practice, it provided TEs with opportunities to learn how digital tools could be integrated in practice, along with understanding the essence of those technologies, which many scholars argue as being important to practitioners (Krumsvik, 2014; Maher, 2018; Obonyo et al., 2018).

The online courses about technology use in EFL practice that some TEs attended also included didactic discussions on technology use, such as the pedagogical and theoretical underpinnings of using technologies in teaching and learning. Such knowledge is an important aspect of TEs' digital competencies (Instefjord & Munthe, 2016; Krumsvik, 2014) because TEs need to discuss the didactic aspects of technology use as well as using different tools in their practice (Krumsvik, 2014). As well, the TEs were able to gain such knowledge by attending online courses.

An important finding related to the TEs' ICT-related professional learning through online course was that the rules in the activity system – such as anytime, anywhere learning using digital tools (Malita et al., 2018) and convenience (White et al., 2015) – were facilitative of the subject's actions (TEs' effort to enhance digital

competencies). Thus, the TEs were encouraged to participate in the learning activities. Indeed, most TEs undertook two or more such courses despite their busyness because the rules of the activity system meant that they did not need to travel and could complete the courses at their own pace. Rules are generally defined as explicit and implicit conventions, norms and regulations and influence subjects' actions (Flavin, 2016; Uden et al., 2008; Yamagata-Lynch, 2010). The rules, in this case, were facilitative of subjects' actions; therefore, TEs exerted efforts in learning about technologies.

Another key finding of the study was that by interacting with colleagues, the TEs were able to gain social, organic – first-hand experiences of using specific tools or application (Trust et al., 2017) – informal, and just-in-time learning about digital tools because the interactions were based on the actual use of ICT tools in the classroom. Interactions about the actual use and the TEIs' experience of such use was made possible by the fact that the TEs and their colleagues were co-learners, and there were no power differences.

Another finding of this study is that the TEs were able to break the silos through the use of digital tools and gain professional support from colleagues or professional groups. Some TEs were the sole users of technologies at their TEIs, which meant that there was no opportunity for learning in face-to-face settings. In such cases, they contacted colleagues located elsewhere or joined communities of EFL teachers on virtual platforms using digital applications. As results of such technology-mediated interaction, the TEs were able to traverse spatial and geographical boundaries. The mediation of digital technologies allowed them to gain access to the knowledge that was not locally available at their TEIs, and access anytime, anywhere learning related to technology use in education.

An implication of learning from the professional groups on the virtual network – in other words, professional learning networks (PLSNs) – was that the TEs were able to see what was happening in places where technologies were a regular feature of teaching and learning, despite the fact that technology use was in its infancy in their own setting in Nepal. This finding demonstrates that by providing opportunities for flexible and contemporary knowledge, PLNs can support TEs' professional learning activities related to digital learning.

Other than learning from online courses, online PLNs and colleagues, seven TEs also had the privilege of attending formal training on technology use through their TEIs. From the perspective of the hierarchy of activities (Leontiev, 1981), such training may be identified as object-oriented activities. Because such training enhanced TEs' knowledge of digital tools, and the skills were transferrable, they were found to have influenced the lower level activities in the hierarchy, namely, the TEs' implementation of those skills in teaching and learning.

However, it was also noted that the training at the public university was highly limited and had a different objective than promoting ICT use in face-to-face EFL courses; it was provided primarily to prepare human resources to run the open education courses. Therefore, only a select group of TEs were offered the training. This meant that the TEs from the public university and its campuses were required to overcome the barriers of lack of opportunity by exploring learning opportunities elsewhere, such as online courses or PLNs, to be able to use ICT tools in their practice.

At the private university, the training was available to all the TEs. However, the primary focus of the training was on the operation of a particular virtual platform, Moodle. Whilst this helped some TEs to gain the operational skills of Moodle, it was also found that the decision-making process was fairly top-down, which meant that the

TEs had a minimal role in setting the training agenda and, despite a regular training opportunity, there was limited application of the tool. An implication of this was that not every teacher's learning needs were met. This suggests that whilst the object-oriented activities (i.e., ICT training at TEIs) are necessary to initiate actions at the lower level (e.g., ICT use by TEs), if the people responsible for lower level actions (e.g., TEs) are not delegated authorities in the decision-making process, there will be limits to what they can accomplish when their learning needs are not fulfilled.

The findings in this section contribute to the knowledge area of professional development/learning of teacher educators, which scholars suggest merits more research (Loughran & Hamilton, 2016). From data about TEs' engagement in both formal (university-organised training or online courses) and informal training (learning with colleagues), it can be argued that the TEs' ICT-related professional development can be supported when both the formal and informal activities are available. This is also highlighted by the findings that show much of the participating TEs' learning was supported by colleagues and online training. Even when there was some institutional support (as in the case of the TEI at the private university), the TEs learnt from PLNs and online courses to enhance their digital competencies.

Additionally, the findings of this study make it clear that digital competencies take time to develop. From the analysis of the TEs' participation in several learning activities, some of which spanned many weeks (e.g., the online courses were at the least eight weeks long), it is evident that the digital competencies required to use technologies in educational activities need time to develop, especially if the TEs had little experience of using them in their own education.

A lack of experience also meant that the TEs did not have the practical and theoretical awareness, which are required for meaningful use of digital tools

(Krumsvik, 2014). Because not all ICT-related professional learning activities afford both kinds of learning, the TEs would need to engage in a series of learning and development activities that focus on both practice and the theoretical/pedagogical underpinnings of technology use. Such that they have opportunities to develop the various aspects of digital competencies required for meaningful use of technology.

One important conclusion that can be drawn from TEs' engagement in several activities or using various resources to enhance digital skills shows, as demonstrated by Gunter and Reeves (2017) and Trust et al. (2017), that one-off training or workshops (such as the ones organised by TEIs) are insufficient for making TEs' digitally competent to use technologies. Whilst the significance of one-off training related to particular technology use or an aspect of digital competencies cannot be discredited, these need to be mixed with ongoing opportunities such as learning from online courses, PLNs and digitally mediated self-learning to gain authentic and varied learning opportunities that prepare them to use digital tools meaningfully.

8.3 Research Question 3: How did such learning enable the emergence of changes in TE practices?

Chapter 7 focused on the outcomes of the development of the participating TEs' digital competencies. The chapter explored the kinds of digital tools and resources they used in teacher education courses, and the changes they were able to achieve in their practices. Through commonplace use of digital tools (such as social media, emails, Microsoft PowerPoint and multimedia presenter), at their own discretion, the TEs were able to enforce significant changes in teacher education practices. The findings contribute to the knowledge area of how TEs use technologies in their practices and how this results in transformations in curricular activities in teacher education.

Through the analysis of the data, it was found that the TEs used email technologies, social media features such as private group pages, and chat groups on Facebook Messenger to share resources with students. By doing this, the TEs were able to bring two important changes related to the division of roles and rules in the activity system of existing teacher education practice. The first important change was related to independent access to the funds of knowledge that the PSTs needed. Because they could access the required information using different kinds of resources (journal, books, web-pages), the PSTs changed from being passive recipients of information to active learners. In following the TEs' cues to locate, seek and share resources independent of the TEs, the PSTs were able to explore the knowledge and information that they needed and pass these to their peers through the mediation of the commonplace technologies.

The second change was that with the help of the mediation of digital tools, the PSTs were able to overcome the socio-economic barriers that restricted their access to required resources such as books and journal articles for teaching and learning. This is because through using technologies to share and receive resources, the PSTs were able to access original books, chapters, journal articles, and audio/video content that the TEs shared. Likewise, the PSTs were able to use web-links to search for and explore information and access original texts and authentic knowledge independent of TEs. This was an important change in teacher education activities because the TEs and the PSTs were able to break the barriers related to under-resourced libraries and lack of personal access to information, which was part of the larger societal realities in their activity system.

A third important change that the TEs were able to bring by using digital technologies for communication was also related to the rules in the activity system, namely, the exam-focused teaching/learning; the numbers of students in the classroom;

TEs' teaching hours; and no provision of one-on-one tutorials. As results of those rules, the TEs did not have many opportunities to engage in interactions with students during lectures. Therefore, when they used digital tools such as Facebook private pages and the messenger groups, the TEs were able to create platforms outside their classrooms for anytime and anywhere communication. As the results of those, as discussed in Chapter 7, there were increased instances of teacher-student and student-student interactions on content and logistics related to their studies. The students could ask questions anytime on these issues and have their queries answered.

The fourth finding, which was equally significant, was that digitally enabled platforms provided time and space for TEs and PSTs to reflect on and compose question/answers. As a result, all PSTs, regardless of their competencies in subject matter, language, and confidence to interact in face-to-face situations, felt more comfortable to participate in interactions with their TEs and their peers. This provided equal opportunities for everyone to ask questions and have their queries responded.

Similarly, the fifth key finding was that digital tools provided an egalitarian platform for interactions between the TEs and their PSTs because Facebook private pages, for example, do not have the same formalities and boundaries as in a face-to-face classroom. This meant that the power difference that culturally defines the teacher-student relationship in the Nepalese educational context (a rule in the teacher education activity system) was less prevalent on such platforms than in traditional classrooms. This was because technologies omit the vertical hierarchies in social relationships (Hofstede, 2003; Kiesler et al., 1984).

On these social networking platforms, the TE's social status was less obvious than in a formal classroom. TEs, therefore, reported that their students felt comfortable with differing with their teachers when their opinions did not align. This was an

important change because in face-to-face classrooms, students would rarely challenge their TEs even if they had different opinions. This finding demonstrates that through the mediation of digital tools, the TEs were able to break the barriers related to the traditional protocols that governed formal classrooms and obstructed egalitarian interactions between the TEs and their PSTs. This finding thus marks an important change in their teacher education activities. Whilst there was no data, such habits from social networking sites can transfer to classrooms (Bosch, 2009), which, if happened, leads to democratic teaching/learning practices.

Additionally, through the mediation of digital technologies, the TEs were able to introduce significant changes in their educational practices, which were predominantly lecture based and transmissive in nature. The change was related to exploring students' understanding by asking them to send their questions through email or Facebook. These questions helped the TEs shape their lessons by pitching the content to the level of the PSTs' understanding and identifying and addressing their concerns. This was also an important transformation because, in a lecture-based teaching context, not all the TEs would have considered, modified or included content that addressed PSTs' learning needs.

As regards the use of digital technologies for enhancing content presentation, the TEs were able to enhance teaching and learning practice by leveraging the digital tools at their disposal. In particular, the TEs were able to bring in additional materials to support the presentation of content around language teaching during lessons. An example of this was the use of multimodal content (such as audio, video, images and excerpts) from the web to provide authentic input of language learning, especially around the subtle but important features of the English language. This allowed for a more in-depth understanding of the content.

Similarly, the TEs were able to provide PSTs with the cognitive freedom to ask the TEs questions during lectures. TEs said that when they gave their lectures without using digital tools, their students would be busy copying what they said, sometimes word for word, which obstructed the PSTs from listening to the lecture intently and asking questions. However, when the TEs used PowerPoint, the students did not need to copy their words verbatim as the TEs would share the PowerPoint and lecture notes. Because students had the time to listen to TEs more carefully, they had the cognitive freedom to reflect on the TEs' arguments and then ask questions. It was an important change in the activity system because the PSTs were more active compared to the times when ICT tools were not used. An outcome of such interaction was that PSTs had clarity about ideas and an enhanced understanding of the content.

In conclusion, the use of digital media helped TEs change their teacher education practices, break barriers related to the lack of resources or inability to interact with students, and understand their students' concerns related to lessons. At the core of TEs' technology use were two factors. The first was observed to be their beliefs about digital media: 21 of the 25 TEs chose to use these technologies in their practice volitionally. As established in Chapter 5, none of those 21 TEs had an obligation or institutional requirement to use the technologies. The importance of beliefs and what that implies in a technology-use activity system will be discussed in the ensuing section. The second factor was PSTs' use of their own devices and resources when participating in technology-related activities. If it were not for the PSTs using of their personal devices, the changes discussed in this section would have been impossible to achieve.

8.4 Theoretical Implications

At the core of this dissertation lies the exploration of Nepalese TEs' digital practices. The constructs of Activity Theory were used heuristically to analyse and

discuss the data. During the analysis, constructs such as activity system (Engeström, 1999), hierarchy of activities (Leontiev, 1981), mediation (Vygotsky, 1978) and contradictions (Engeström, 2001) were drawn upon to understand the data, explore the meaning and anchor the discussions. When this study was initiated, few studies were found to have used Activity Theory the way it is used here to discuss and critique TEs' digital practices and roles of beliefs and agency underpinning their practices.

Whilst the construct of contradiction has been widely used to explore barriers in technology use and the consequences of different factors in ICT use in education (e.g. Blundell et al., 2016; Castro & Nyvang, 2018; Dotong, Castro, Dolot, & Prenda, 2016; Guzman, 2016; Ramanair, 2016), very few studies have looked into what factors facilitate technology use in teacher education as an activity system, as has been done in this study. As established earlier, TEs' beliefs about technology use were found to have supported their practices and helped them to internalise digital tools as useful for promoting technology use in their teacher education activities.

As Engeström and Sannino (2010) also contend, in their analysis of the role of beliefs in technology use in this study, it was observed that Activity Theory does not encapsulate how personal beliefs, attitudes and reactions to such beliefs contribute to the subsequent actions of the subjects as self in the Activity Theory. By exploring technology use beliefs, and their role in TEs' internalisation and subsequent technology-related actions, this study highlights the cognitive dimension and its value in subjects' actions in Activity Theory. These findings contribute to the theoretical development of beliefs, self and Activity Theory.

Likewise, the role of mediation and the division of duties in the activity system have demonstrated that through the use of the technologies as mediating tools, the TEs were able to address issues such as lack of resources for teaching and learning, and lack

of opportunities for professional learning on educational use of digital tools at the TEIs. In doing this, the mediation of tools helped TEs to find workarounds to the systemic contradictions outside the TEIs. Whilst the contradictions or misfits (such as TEIs not having the infrastructure for technology use or not supporting TEs' technology use) remained unsolved, the TEs were able to keep using technologies and enforce changes in the existing practices. This also highlighted the importance of TEs' cognition (beliefs and agency related to technology use) and its significance in exploring workarounds to the contradictions to keep their digital practices ongoing. The theoretical implication of this finding is that when subjects are agentic, even when the contradictions are unresolved, the activity system can progress because subjects can draw upon resources outside the context to engage in the action.

There is a general argument that contradictions in an activity system create instability (Morales, 2017; Wilson, 2014). Only when the contradictions are resolved, it is argued that the activity system progresses (Engeström, 2001; Engeström & Sannino, 2010). In the present study, however, the contradictions in the activity system did not drive the change; rather, the TEs (i.e., the subjects in the activity system) found workarounds to the contradictions by exploring alternative ways of using digital tools outside the TEIs to support their practices. In doing this, the TEs' personal discretion, attitudes and beliefs about ICT use in their practices played important roles. This finding is unique in that it is generally argued that the contradictions need to be resolved for the continuation of activity (Engeström, 2001; Engeström & Sannino, 2010).

In this study, the quaternary and secondary contradictions were left unattended. Nonetheless, the participating TEs engaged in digital practices. This finding showed that TEs' beliefs helped in the internalisation of the digital tools, which contributed to their practices. Whilst this finding might be due to the theoretical approach used in this

study, what it has shown is that subjects as self, along with their beliefs and agency, warrant attention in Activity Theory and activity system analysis.

8.5 Pedagogical Implications

An important pedagogical implication of this study is related to the impact of digital tools in Nepalese teacher education practices, despite the limited use of technologies in the classroom. It is a general assumption that the lack of ICT tools obstructs technology uptake in pedagogical activities. However, this study established that TEs can still draw on freely available tools (such as Facebook, email or YouTube), appropriate them to fit their needs and use them not just to support their practices but to enforce changes in the curricular activities. Such practice of TEs was supported by PSTs in that they engaged in activities with TEs using their personal devices, such as mobile devices. Whilst this is encouraging, the issue of equal access (access to devices that support the use of the tools such as Facebook and access to internet use amongst students and TEs) needs to be considered when replicating similar practices in other classrooms.

A second pedagogical implication of this study concerns the TEs' technology-related professional learning. The ways the TEs enhanced their digital competence suggest how TEs' ICT-related learning can be managed to support and promote technology use. Given the fact that Nepal's higher education system is cash-strapped, and its mountainous landscape imposes challenges on travel and movement of TEs, professional development opportunities for TEs are very limited. Consequently, TEs face professional isolation and lack of face-to-face contact with other professionals sharing similar interests. For this reason, based on the findings of this study, it can be argued that online courses can address their professional development needs, including the enhancement of their digital competencies. Likewise, TEs can form learning groups

and PLNs to supplement learning from online courses. As has been established by this research, the TEs' interactions with colleagues provided authentic and just-in-time learning experiences that sustained their digital practices.

Because online courses and PLNs were found to support the TEs' professional learning, Nepalese TEIs should design professional development activities around learning resources that are already available so that they do not need to invest in reinventing the wheel. TEIs can link their professional development activities to existing online courses and PLNs and, if necessary, design activities to supplement, support, and contextualise the learning from those courses. A benefit of such training would be that they cover both the global and local context and content. By doing this, TEIs – as the responsible body for object-oriented activity in the hierarchy of activity (Leont'ev, 1978) – can provide meaning and motivation for TEs to uptake and integrate technologies in their activities.

8.6 Policy Implications

Having reviewed the policy discourse in Chapter 2, it was established that there were limited policy guidelines around the use of technologies in Nepalese teacher education courses despite the fact that TEs and teacher education courses have important roles in ICT integration in school education. The paucity of technology use policies in teacher education activities was found to have influenced TEs' digital practices. These findings lead to the conclusion that existing Nepalese policies should be made more prominent and visible. Likewise, broad guidelines and expectations around how technologies should be used in teaching and learning should be provided by the educational policy bodies.

One policy discourse on technology use in teacher education courses constitutes ICT standards for TEs and PSTs. It is necessary that such guidelines be developed so

that TEs and PSTs can map out their existing digital competencies and work towards other areas if they believe they are falling behind on any of them. To accomplish this, international documents such as 'Digital Competence Framework in Teacher Education' by the European Union (Redecker, 2017), Teacher Educator Technology Competency (TETCs) commissioned by the International Society of Technology in Education (ISTE) (Foulger et al., 2018) or the Australian Professional Standards for Teachers by the Australian Institute for Teaching and School Leadership (Australian Institute for Teaching and School Leadership, 2019) can be considered. All of these standards have been developed with rigour, and they provide comprehensive understandings of what is required of digitally competent TEs and PSTs.

Given the Nepalese context of this research, the authorities at the MoEN, the University Grants Commission Nepal, universities and their teacher education departments also need to consider whether all TEs are digitally competent – not just having basic digital literacy but also possessing ability to use digital technology meaningfully with an awareness of its didactic implications. This is important because most TEs who entered the teaching profession until recently have had very minimal experience of using technologies for teaching and learning. As TEs with lack of digital technology use in their education find it challenging to integrate technologies, the authorities need to plan and implement professional development opportunities to help TEs develop the required competencies for the successful uptake of any given ICT tool.

As described in Chapter 5, this study also found that the MoEN provide limited guidance to the TEIs, and there was a minimal collaboration between these two educational stakeholders. Therefore, in planning the professional development/learning activities discussed earlier, the MoEN and TEIs need to liaise and collaborate to ensure

that any ICT-related programmes they implement generally align with technology integration policies and standards.

8.7 Suggestions for Further Research

This study explored the digital practices of Nepalese TEs. Data were collected and analysed to find how participating TEs enhanced their digital competencies, how such learning supported their technology uptake, how the use of commonplace digital tools led to the emergence of changes in teacher education practices, and what factors influenced technology use at TEIs. When this study took place, there was very little information on how TEs actually gain skills and knowledge to use digital tools, how and why TEs use digital tools, and what influenced their practices. Likewise, there was minimal use of technologies at the study sites; technology use in teacher education in Nepal was in its infancy, and only a few early technology-adopting TEs were using digital tools in teaching/learning practice.

However, at the time of writing this thesis, studies have started to emerge around what impacts TEs' technology use (Castro & Nyvang, 2018) and whether TEs are digitally competent and how this might be assessed (Foulger et al., 2018). Additionally, with the ongoing evolution of technologies and growing opportunities for technology use, TEs have started to use technologies more frequently inside the classroom, even at the sites of this study. Three recommendations are therefore proposed as way forward for further research.

Firstly, to better understand Nepalese TEs' use of digital tools, how they learn about technologies, how they use technologies and why they make such decisions, it is recommended that future research adopt a longitudinal approach combined with digital ethnography. Such studies might follow TEs in their professional learning journey and their use of technology, as well as investigate their reasons for the use of different

technologies. Qualitative data could be collected through discussions on lesson design, lesson plans, actual classroom teaching practices, TEs' and researchers' reflective journals, and observations on how these tools are used inside and outside the classrooms. Such data could help develop a comprehensive understanding of TEs' digital practices.

Secondly, there are very few large-scale studies that have actually surveyed the digital competencies of TEs. Therefore, it is advised that such studies be carried out internationally to explore the digital competencies of TEs. The findings of such studies would inform whether TEs are ready for the use of digital technologies in their practice. This is important because TEs are expected to use digital tools without even considering whether they possess the required competencies. The findings from a large-scale study would also help to understand and answer why the use of digital tools has failed to deliver the expected learning outcomes (Livingstone, 2012).

Whilst there has been much research around technology use, a limited number of studies have actually measured the impact of technology use in the learning outcome of learners (Selwyn, 2012). Therefore, studies that implement technology innovations in a teacher education course and explore their effects should add to this knowledge area and provide valuable information about whether a given technology can bring desired changes to students' learning. For this, action research can be used.

8.8 Thesis Contribution

It is important for teacher educators to be digitally competent because, as second-order teachers, their digital practices have ripple effects in effective uptake of ICT tool in school education. The ways TEs use digital tools, and the ways they engage PSTs in theoretical and pedagogical discussions about such uses, are likely to influence how effectively technology uptake happens in their future classes. Therefore, it is

necessary for TEs to have their digital competencies enhanced so that they can use digital tools meaningfully in teaching practices.

It is a general assumption in the literature that for the effective use of digital tools in schools, certain conditions should be met. It is argued that infrastructure should be provided and easy access should be guaranteed. However, with the never-ending proliferation and evolution of digital technologies, access and infrastructure issues can be addressed by allowing PSTs and TEs to use their personal devices, through which digital platforms such as social media and other applications can be accessed. This is, however, only possible when the practitioners have positive dispositions about technology use in educational activities. The findings of this study show that when practitioners have positive dispositions, they can take up digital technologies in curricular activities, even without much facilitation from the TEIs, and issues of infrastructure and access.

The primary contributions of this thesis are:

- It is a qualitative case study of digital practices of an under-researched group: Nepalese EFL TEs. No studies of this nature had ever taken place when this study was initiated. Therefore TEs' digital practices were little understood. Because this study highlights the digital practices of TEs in an under-developed country, the findings have broader implications, especially in the context of other countries with similar socio-economic and technological situations. Likewise, this study expands the discussion on teacher educators' digital practices outside the Nordic regions, where most studies have centred.
- It provides a detailed account of the ways TEs may enhance their digital competencies, the reasons they use digital technologies in teacher education

activities, and the outcomes of such use. It was found that through the ordinary use of commonplace technologies, the participating TEs were able to generate important changes in teacher education activities.

- It establishes that internal factors, especially beliefs related to technology use, are important for promoting and sustaining TEs' digital practices. It illustrated that even when there were external issues, such as acute lack of infrastructure and access, TEs continued using ICT tools because they believed that using them was inevitable.
- It demonstrates that despite Activity Theory being a theory to analyse collective work, subjects (as the self with their own beliefs and agency) warrant attention and their cognitions need to be encapsulated in discussions to better understand their engagement in actions.

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Appendix A– Ethics Approval Letter

Dear Applicant

Thank you for your response to the Committee's comments for your project titled, "Preparedness of EFL Teacher Educators to Teach With ICT". Your response satisfactorily addresses the concerns and questions raised by the Committee who agreed that the application now meets the requirements of the NHMRC National Statement on Ethical Conduct in Human Research (2007). I am pleased to inform you that ethics approval is now granted on condition that your Stage 1 Doctoral Assessment outcome is provided when received.

Your approval number is UTS HREC REF NO. ETH16-0653.

Approval will be for a period of five (5) years from the date of this correspondence subject to the provision of annual reports.

Your approval number must be included in all participant material and advertisements. Any advertisements on the UTS Staff Connect without an approval number will be removed.

Please note that the ethical conduct of research is an on-going process. The National Statement on Ethical Conduct in Research Involving Humans requires us to obtain a report about the progress of the research, and in particular about any changes to the research which may have ethical implications. This report form must be completed at least annually from the date of approval, and at the end of the project (if it takes more than a year). The Ethics Secretariat will contact you when it is time to complete your first report.

I also refer you to the AVCC guidelines relating to the storage of data, which require that data be kept for a minimum of 5 years after publication of research. However, in NSW, longer retention requirements are required for research on human subjects with potential long-term effects, research with long-term environmental effects, or research considered of national or international significance, importance, or controversy. If the data from this research project falls into one of these categories, contact University Records for advice on long-term retention.

You should consider this your official letter of approval. If you require a hardcopy please contact Research.Ethics@uts.edu.au.

To access this application, please follow the URLs below:
* if accessing within the UTS network: https://rm.uts.edu.au
* if accessing outside of UTS network: https://vpn.uts.edu.au , and click on " RM6 – Production " after logging in.

We value your feedback on the online ethics process. If you would like to provide feedback please go to: http://surveys.uts.edu.au/surveys/onlineethics/index.cfm

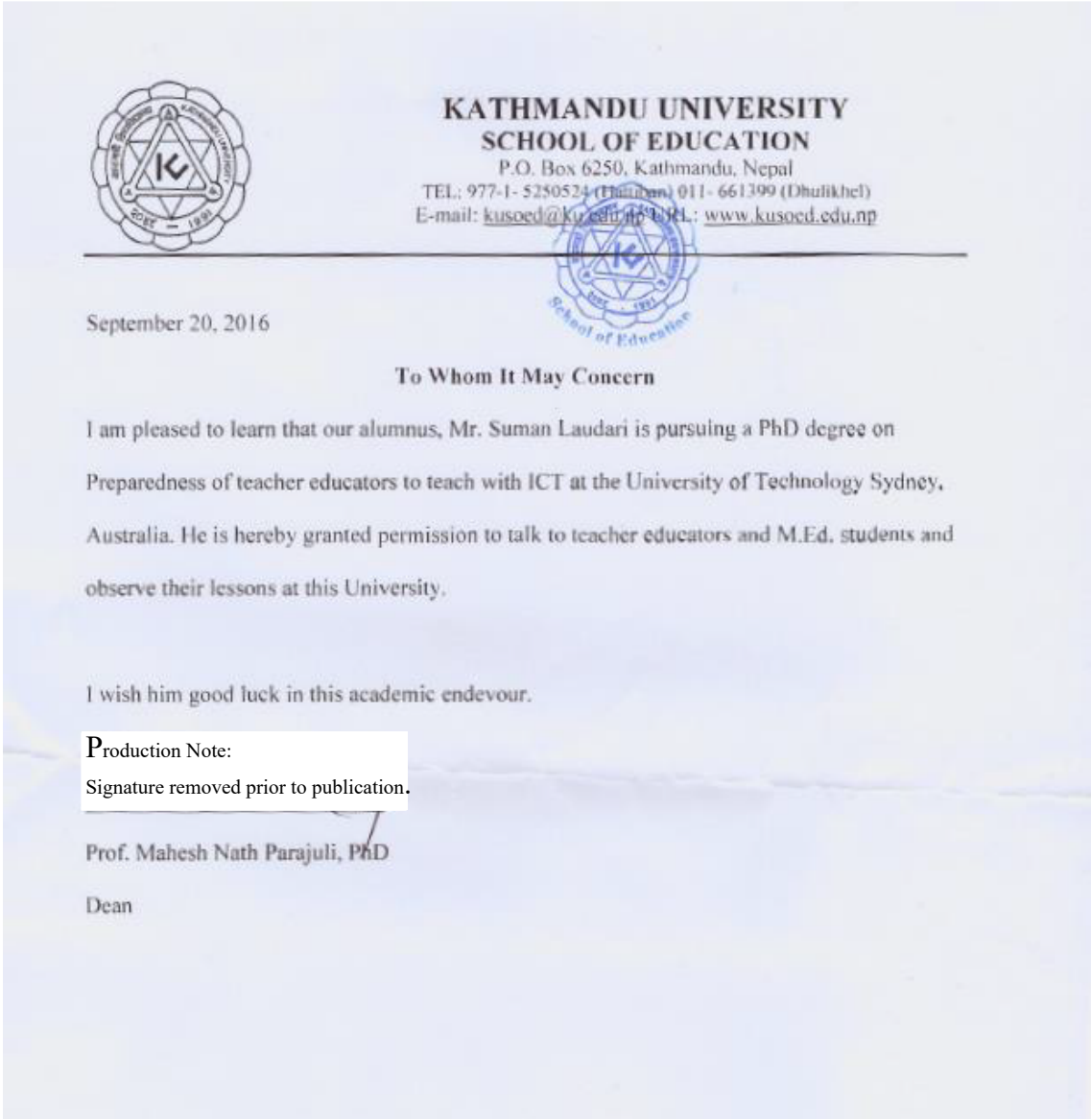
If you have any queries about your ethics approval, or require any amendments to your research in the future, please do not hesitate to contact Research.Ethics@uts.edu.au.

Yours sincerely,

Professor [De-identified]

Chairperson
UTS Human Research Ethics Committee
C/- Research & Innovation Office
University of Technology, Sydney

Appendix B – Approval Letters from the TEIs in Nepal



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September 20, 2016

To Whom It May Concern

I am pleased to learn that our alumnus, Mr. Suman Laudari is pursuing a PhD degree on Preparedness of teacher educators to teach with ICT at the University of Technology Sydney, Australia. He is hereby granted permission to talk to teacher educators and M.Ed. students and observe their lessons at this University.

I wish him good luck in this academic endevour.

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Prof. Mahesh Nath Parajuli, PhD

Dean

त्रिभुवन विश्वविद्यालय
शिक्षा शास्त्र संकाय
शिक्षा शास्त्र केन्द्रीय विभाग
TRIBHUVAN UNIVERSITY
FACULTY OF EDUCATION
CENTRAL DEPT. OF EDUCATION

विश्वविद्यालय क्याम्पस
कीर्तिपुर, काठमाडौं, नेपाल
UNIVERSITY CAMPUS
Kirtipur, Kathmandu, Nepal

पत्र संख्या:-
Ref.

मिति:.....
Date:
16 September 2016

To whom it may concern

We understand that Mr. Suman Laudari, a PhD scholar at the University of Technology Sydney, has contacted us for a letter of approval about his PhD project entitled "Preparedness of Teacher Educators to Teach with ICT" being conducted under the supervision of Dr. Damian Maher. We are pleased to invite him to conduct his project at the Department of English Education, Tribhuvan University, Kirtipur, Kathmandu, Nepal. We have been informed that Mr. Laudari will survey teacher educators and students in M.Ed. by interviewing them.

Should you have any questions, feel free to contact at +[redacted] or write an email to anjana.wastii@gmail.com.

Production Note:
Signature removed prior to publication.

Anjana Bhattarai (PhD)
Professor and Head
Department of English Education
Tribhuvan University
Kirtipur, Kathmandu, Nepal

Appendix C – Participant Information Sheet and Consent Form

PARTICIPANT INFORMATION SHEET
Digital Practices of EFL Teacher Educators in Nepal
UTS HREC ETH16-0653

WHO IS DOING THE RESEARCH?
My name is Suman Laudari and I am a Ph.D. student at UTS. My supervisor is Dr Damian Maher.

WHAT IS THIS RESEARCH ABOUT?
This research aims to explore the ICT skills, practices and beliefs of teacher educators teaching MEd and BEd courses in English language education at Nepalese universities. The study aims to explore the teacher educators' ICT competencies, how they develop the skills required to teach with ICT and the factors that influence their practices.

IF I SAY YES, WHAT WILL IT INVOLVE?

1. I will invite you to answer a questionnaire, which will take 20 to 25 minutes of your time. The questionnaire looks at teacher educators' ICT practices, beliefs, motivation and competencies.
2. You might be contacted for one to one semi structured interview, which will take approximately 45 to 60 minutes. The venue for the interview will be a place of your convenience. In the semi-structured interview you will discuss how, where and when you learned digital skills and your use ICT in teacher education courses and the impacting factors. The interview will be audio recorded.

ARE THERE ANY RISKS/INCONVENIENCE?

1. Yes, there are some inconveniences. You might feel uncomfortable sharing information on what you think about your ICT knowledge, skills, beliefs and your opinions about digital practices.
2. You might feel discomfort when I ask you to share your opinions about how your students demonstrate ICT skills in and outside your classroom.
3. You might not feel comfortable discussing the practices of your campus or university.

WHY HAVE I BEEN ASKED?
You have been approached because you are a teacher in a teacher education course in one of the universities/campuses in Nepal and you use digital technologies in your curricular practices.

DO I HAVE TO SAY YES?
Participation in this research is voluntary.

WHAT WILL HAPPEN IF I SAY NO?
I will thank you for your time and will not contact you about this research again. If you do say yes you are free to withdraw from participating in this research at any time without any consequences. Any data collected on you will be destroyed

IF I SAY YES, CAN I CHANGE MY MIND LATER?
You can change your mind at any time without any consequences. Any data collected on you will be destroyed

WHAT IF I HAVE CONCERNS OR A COMPLAINT?
If you have concerns about the research that you think I (email - Suman.Laudari@student.uts.edu.au) or my supervisor Dr. Damian Maher (email - Damian.Maher@uts.edu.au) can help you. Or, please feel free to contact Mr. Hemanta Dahal, Director of Cosmic Education, Training and Research Academy (CETRA) on [redacted] He is the local point of contact for this study.

NOTE:
This study has been approved by the University of Technology Sydney Human Research Ethics Committee (UTS HREC). If you have any concerns or complaints about any aspect of the conduct of this research, please contact the Ethics Secretariat on ph.: +61 2 9514 2478 or email: Research.Ethics@uts.edu.au), and quote the **UTS HREC Number ETH16-0653.** Any matter raised will be treated confidentially, investigated and you will be informed of the outcome.

INFORMED CONSENT FORM

Digital Practices of EFL Teacher Educators in Nepal
UTS HREC ETH16-0653

I _____ *(participant's name)* agree to participate in the research project Digital Practices of EFL Teacher Educators in Nepal **(UTS HREC ETH16-0653)** being conducted by Suman Laudari, GPO PO Box 123, Broadway, NSW, 2007, Australia. Funding for this research has been provided by Graduate Research School, University of Technology Sydney.

I understand that the purpose of this study is to investigate how EFL teacher educators use ICT in teaching and learning and how this impacts pre-service teacher preparation.

I understand that I have been asked to participate in this research because I am a teacher educator in Nepal and that my participation in this research will involve filling up a questionnaire, which takes around 20-25 minutes long and participating in a face-to-face interview, which is around 45 minutes long and audio recorded. I also understand that if I choose not to participate in the study this will not impact on my personal and professional lives, and I can withdraw my participation from the study at any time by contacting Mr. Laudari. I also give permission for the use of

I agree to keep confidential all information including all conversations and discussions, materials and methods provided to me by the UTS research team (if applicable).

I agree to be:
☐ Audio recorded
☐ Video recorded
☐ Photographed

I agree that the research data gathered from this project may be published in a form that:
☐ Identifies me
☐ Does not identify me in any way
☐ May be used for future research purposes

I am aware that I can contact Suman Laudari if I have any concerns about the research. I also understand that I am free to withdraw my participation from this research project at any time I wish, without consequences, and without giving a reason.

I agree that Suman Laudari has answered all my questions fully and clearly.

_____ ____/____/____
Name and Signature (participant) Date

Suman Laudari, researcher ____/____/____
Name and Signature (researcher or delegate) Date

NOTE:
This study has been approved by the University of Technology Sydney Human Research Ethics Committee (UTS HREC). If you have any concerns or complaints about any aspect of the conduct of this research, please contact the Ethics Secretariat on ph.: +61 2 9514 2478 or email: Research.Ethics@uts.edu.au, and quote the UTS HREC reference number. Any matter raised will be treated confidentially, investigated and you will be informed of the outcome.

Appendix D – Excerpt of Interview with Teacher Educators

TE4 – First Round

Facilitator: Have you used any ICT tools while teaching in the teacher preparation course in the last two weeks?

Interviewee- Yes, I have been using them. I have used them in the past and also in the last two weeks. I have basically used Internet related stuffs. I have created google groups for my students. I use that platform to interact with students. I also use social media and share ideas, links to the resources through the social media. I have got a separate group for each cohort of students, Facebook group. Twitter, not many students use so I do not use that. However, I wish I could use that. I use google group. I share YouTube video links a lot with my students. I encourage them to watch. But, not many of them have personal internet access, so they are not able to access all these things. But within the campus we have access though not regular students use it frequently. So, I hope they watch those videos as well. In the classroom, we do follow-up activities based on that however it's not much. I wanted to use Moodle for my face-to-face cohort but I was not been able to do that last semester. I have started using it but I am planning to do it more efficiently from the next semester onward though. I am planning to blend what I do so that some part of it needs to be done using Moodle. I am planning to do that in the fourth semester. Right now, I have not been able to do that basically because of large number of students - basically, students' access to internet and those resources.

Facilitator: In response to my question, you said that you currently use google group, and social media platform to share video links, information and links to other resources. How do your students react to such practices?

Interviewee – Most of them are happy that I share those pieces of information with them but some find it overwhelming because of their background. Because many of them come from rural areas; they hardly had any access to internet and computer. Many of them use internet just for Facebook prior to coming to this course. When I ask my students to create email id, I have insisted my students to create email address in the first semester, I remember that. I also remember one particular batch opposed my ideas of sending materials through email. In the past, I used to provide them with printed form of handouts and they used to make copies of them, but now I do not leave anything for photocopy. If I have to send anything, I exclusively send it through email. One purpose behind that is to encourage them to use ICT; to make them getting used to email, internet and all these things. So, many of them do not come with basic information and knowledge about all of those things so it's difficult in the beginning but we have been trying to do that. In regard to YouTube videos, they face challenges in browsing that because of a low bandwidth of Internet. When I share information on the Facebook they are happy about that. Sometimes to overcome the challenge of slow internet, what I do is, I copy everything from the website and paste that information on the Facebook page so that they can read when they log on to Facebook. I have found them reading and making use of such information more often that visiting the links that I provide. So I realized that if I put information on Facebook they make use of it.

Facilitator: Could you discuss about the Facebook page and how you use that in a bit more detail? [4:32]

Interviewee – I have set a private group page on Facebook for each of the class that I teach. The students of only that particular class can become the members. The students and I can post on the page. Rather than casual post, I encourage them to read what I post and comment on that. However, not many students comment. Usually it is between 15-20% of students comment. I do some follow-up questions in the classroom in my next class. I ask them "did you read my post?" Many of them answer "yes, we read". But, when I ask them why didn't you comment, many of them are hesitant about writing something in the public platform because that's a public group class wise. Also, I encourage my students to give honest and critical opinions on such it when I write something or share readings materials.

There are around 40-45 students in each class, they read but they do not feel confident about being exposed to their classmates in the class in the group so they do not write. When I talk to them in person they say the same. They usually say "Sir, we have problems in writing, and we do not find anything to write about." And, also I send them notes, links and critical ideas. Besides I also send them things that are interesting but may not be directly relevant to what they are doing. [5:36] For example, I found an article on the quality of good teacher somewhere on the web, it is related to teacher development but I shared with the cohort where I teach language, society power. I still shared the info with that cohort. Some ideas and materials are common to all the groups regardless of the course and cohort that I teach. I still share that to other groups because they study those things at a certain point of time during their course and they need those ideas. I usually use social media for that as most students find that convenient. And then I post the links whatever I have got.

Facilitator: In terms of discussion that you have on social media, how rich is the discussion? I mean what kinds of comments do they post?

Interviewee – In the beginning, they used to write only 'thank you, sir" because I shared the article or I liked it. Then I started telling them not to write short comments or thank you messages in the class and also on the post. I told them that I know you like it, this is relevant, useful and new to you so I post it on the page. So, please go for further discussion. Now, the number of comments are lower than what it used be in the past but the comments are constructive, and they raise questions themselves. I remember a lady did not understand a particular phrase in an article that I posted, so she asked a question. I answered that as a follow-up discussion. In the past, they did not ask questions, nowadays they do. There are a few occasions when students initiate discussion by themselves. For example, I was doing Piaget's theory last week and they asked questions on the Facebook page asking 'could anybody answer this question?" There were a few students who answered those questions. Then I shared a material to answer that question.

Facilitator: How have such practices impacted students' learning and their classroom practices if they are already working somewhere else?

Interviewee – I think those practices have two-fold implications. The first is they are more engaged with ICT and they will explore things and they are used to those things. When they graduate from here, they at least know how to use those things such YouTube, Facebook and email, most importantly. I remember teaching them how to

write professional emails as they did not know how to do that. Earlier they would write 'Sir, send me that material'. Then I told them to at-least write greetings and signature at the end. Those are basic thing but they are all new for them as they come from a very humble background. I am in a way preparing them to use those things in their workplace as well, one thing. The other thing is a kind of emotive reason, I would say. They are so much engaged in the social media so when you give them something to read or links, they hardly find any motivation to visit that but when I post something on the Facebook page, there are people who immediately like, share and comment after reading. They find it easier to do that. I feel that they are more of social media people, they are overwhelmed in the beginning, but excited about using it and then gradually I also use email. I do not send the core material on Facebook. [9:17] For example, classroom note, sometime the text book, I do not post them on Facebook. I always send those kinds of things through email. This is to make sure that they use professional way of correspondence not just social media. So, I feel that they are more confident and encouraged. They also know how to use it for their studies.

Facilitator: Based on what you just said, would I be correct in inferring that your ICT use is based at home rather than the university?

Interviewee – Yes. I agree with you. Besides power-point and things related to it, which are the basics of ICT, I am not sure whether you call them ICT tools as they are basically teacher's tool, there is no proper ICT/IT system at the university. I told you we have Moodle but is not for regular program. I talked to the head of the Open and Distance Education Centre of TU about blending Moodle in conventional mode. As he has agreed to my proposal, I am planning to use it from the next semester. However, until now, we've not used Moodle as an institutional programme. Whatever I have done is my personal initiation. I have created those groups and approved those things myself. There is no university policy about integrating ICT in its conventional programmes and engage students and teachers collaboratively using ICT tools. There is nothing like that.

Facilitator: So, there's no university policy about using ICT in its face-to-face programme?

Interviewee – Yes, none.

Facilitator: And, during my visit to the department, or the teachers' office, I did not see any computer at the teachers' desk or any other such facilities. So, how do you find that and how do you manage to keep yourself motivated?

Interviewee – That's a good observation! A couple of us who are young in the department insist that the department should have a reliable connection. For a nominal fee, you can get a good internet connection for the department. Everyone is not using it at the same time. I hardly remember using internet for two or three times in the university. Even if I use, I bring my own portable connection and use that in the day time. To give you an example, [our de-identified] has a wireless system but they are not functioning all the time. There are facilities but they are not accessible. For example there are computer labs that we cannot use. And there is no mechanism to ensure that the available facilities are working properly, for example the wireless system. The speed could be increased very easily and, I am sure, the connection could be made more

stable. I think, it is more of willingness and commitment more than lack of resource. They do not have correct attitude and understanding of the values of technology.

TE4 – Second Round

Facilitator: Why do use ICT? What is it that makes you use digital tools in your practice?

Interviewee. There are two things. When I integrate ICT, in the first place, it updates my ICT knowledge, ICT related pedagogy – as you know technology has become a part of daily lives. ICT use helps me to update my knowledge in those areas.

Secondly, our graduates go to different places to study after graduating from the course. So, if I use technology in teacher education course, they, at the least, learn what technologies are, how to use them. They need to learn about technologies. I believe that for them to sustain in the practice, they have to know more than ELT theories and pedagogies. I had a feeling that someone has to begin integrating technologies somewhere. So, I began it.

Again, to answer it in short, I wanted my students have the basic knowledge of ICT at least. For instance, most of my students did not know how to write emails or attach files to emails. And, I can relate that to my experience. I did not know what email is when I was doing my master's degree in 2008. I learn about those things after I completed my master's degree. Most of the new enrolments in the master's degree have little knowledge of ICT. They do not have email and do know how to write emails. So, I encourage and insist them to use tools and tell them that they have to have ICT knowledge.

Say until a few semesters back, we used to distribute hard copies of class notes. Now, I do not give hard copies of handouts. What I tell them is if you want to receive the notes, you should all give me your email. That's a basic think but what I am doing is trying to get them used to using digital technologies.

Facilitator: You said that in your first interview as well. What I am interested to know is why you think your students should have ICT knowledge? What are you views as a teacher educator?

Interviewee. Two/three reasons. The first thing is for their ongoing learning. When they know how to use ICT for them to be able to access new resources, new materials, and new knowledge. For that they have to know about certain ICT tools compulsorily. Along with that, for their professional growth, to collaborate with other people, say someone whom they have met virtually or professionals in a different geographical location, they have to have knowledge of ICT – that's the second thing. Thirdly, they should be able to use ICT tools in teaching. These days, in good schools, they have started promoting the use of digital tools, such as multimedia, GoogleGroup, project works through Google Docs – you know similar tools. Schools have started introducing them. For their professional sustenance in the future, they should have these skills.

For them to become competent EFL teachers, just having content and pedagogy knowledge of English language teaching won't be enough. They should know how to use technologies in what they do. Therefore, they should know ICT knowledge.

In short, I would like to divide these into three: first, to become competent teachers and to keep their professional learning ongoing they should have ICT knowledge. You can become a lifelong learner only through the use of digital technologies as most resources are available on digital space so if they have related knowledge they can access those learning resources. Second, they can find good jobs with ICT knowledge when combined with pedagogical and content knowledge. Thirdly, it is also related to professional development. Only when they are digitally able, they can connect to others, link with people and collaborate on different projects.

Facilitator: To what extent, what you just said is related to your experience? Did your experience motivate you to encourage your students to use technologies?

Interviewee. Of course. If I did not have a positive experience and was not able to gain benefits from using digital technologies or enrich my professional knowledge, I would not use those technologies and encourage my students to use them as well.

It is because I have had a positive experience with using technologies – that I can see what benefits I have gained, what I have learned from using technologies, I am encouraging my students to use technologies.

Facilitator: Can you discuss a bit more about the positive experiences? In which areas of your professional lives, were you able to get benefits from using technologies?

Interviewee. Two areas: professional development and career enhancement. In fact, only when you have professional developments, you will have career enhancement. I would like to share an anecdote with you. I am not sure if I shared this with you in our first interview.

I use Twitter to connect to professionals in my area – I am sure it is also considered a kind of digital technology as it can be used to teaching and learning.

One of the professionals that I follow on Twitter is [XYZ] who works at [a university in Melbourne]. Because he works in the area of EFL and indigenous language, I followed him. One day he twitted asking if anyone was interested to collaborate with him for a panel presentation at a conference in Kazakhstan. Because we shared interests, I replied to his tweet expressing my readiness as a direct messaging. Then he responded asking me to send an email with my ideas on the topic, and how I could contribute. I did [send] him an email and then we discussed our ideas and decided the topic and content of the presentation. Then, we sent our abstracts [to the conference committee], which has been accepted for the presentation later this year, and I have received promise of funding to attend the conference.

What I am trying to tell is if I was not on Twitter - or any digital technology for that matter - and had not been able to connect to him, I do not think I would be connect to him or I would not work on that area and develop a proposal. So, what I am saying by sharing this story is that I have been able to get benefits by using technologies.

The other thing is when a new book is published, I come to know about that the from the social media profile of the writers or the publishers that I follow on Twitter - I am not active on Facebook now but Twitter.

Also, I am on Academia and ResearchGate and follow the works of people that I am interested in. Because I receive regular update on my email, I do not need to look for the information on web – I get updates. It helps me get updated

Say, when an author that I am following uploads a paper or research, I get update and when I click on the link, it takes me to the page. So, if I was not on these platforms, I may have still done that but there had to be an absolute necessity to do so. Right now, because of those platforms, I am reading and writing regularly and informally.

Facilitator: In your earlier interview, you noted that you and your students have shortage of resources, and you said that ICT use helped you access the required resources. Is that also a reason behind using ICT?

Interviewee. Definitely. Whatever resources that I have with me, I do not know the number, but 99% of the EFL related materials comes out of through the use of technologies. I already told you that I am able to access books, articles, and research papers through Academia, GoogleBook, ResearchGate. Likewise, I also search for books and journals on – there are some websites that share those.

One thing that enhanced my knowledge about those web platforms – I would like to give credit to the social media sites. It helps me get updates from publishers, authors – you know about books, new issue of journals or special issue of journals, call for chapter notice, which they put on social media and send to their subscribers.

Another example, I went to a conference to [de-identified] last month. So, how I came to know about the conference was through a website called *conferencealerts*. I have subscribed my email to their email list serves, and I get regular updates about different conferences in different parts of the world. If I had not received regular updates, there was no way, I could find about the conference as it was on multilingualism, a small but focused conference of those who are interested in the field. Until a couple of years back, conference outside Nepal were meant only TESOL and IATEFL conferences and NELTA conference in Nepal. Other than those three conferences, I did not know about other conferences, but now, because I have internet access, I can find information about conferences about in different parts of the world using *ELTcalendar, conferencealerts* on simply through Google search.

So, what internet has done is, it has enabled me to find the required resources and information with ease. Therefore, I use ICT and promote its use.

Facilitator: Now shall we talk about your curricular use of technology. From what you said in the earlier interview and what I have observed, teaching/learning practice at [your TEI] is very exam-focused and you can teach without using ICT… (21:15')

Interviewee. Sure, sure. There is no rule or mandate that we have to use technology. What we do is we encourage each other – you know just as collegiality - we discuss with other and say 'let's use technologies', but there is nothing like institutional requirements…..

Appendix E – Excerpt of Interview with a Policy-Maker

Facilitator: What technologies (computer-based technologies) are currently being used in teacher education programmes and are there any specific reason to that?

Interviewee. ICT based tools, the ones that we are using, there are two things to consider, hardware and software. In relation to hardware, basically it's computers, we also have an IT board, it's only for the display, only sometimes who have good knowledge of it, use it; it's not that it's never been used. However, it's not used the way it should have been.

With regards to Software, we use Moodle. And, we also have online students. Theoretically, it is supposed to be the means for contacting them but sometimes even teachers do not have aptitude (skills) and the students also lack skills so, we are using Moodle, but we also other modes of communication, email, skype and telephone.

There are other things that we would like to use but have not been able to; we have used them only sometimes. For example, MOOC. There are multiple courses, programs and software, there are courses on how to learn them. For example, courses on software or teaching grammar or aspect of English. Because we have not been able to use them, we wish that we could use them for their learning. I mean, we should have been able to use them.

But, because teachers lack aptitude (skills), I mean it is not just teachers to be blamed. If we look at it from an institutional perspective. It's been many years that we have been using Moodle. It's already been more than five years that we have been using Moodle in an organized way, but we have not been able to use the Moodle in a successful and full scale. We have trained teachers time and again. They were supposed to communicate with the students, receive students' feedback, giving grades and feedback on the same platform. I mean, there are multiple ways we could use the platform. Regarding those, one/two teachers have used it effectively. But, many of the teacher-educators, have not used effectively; we had to push them and enforce. But, the extent of their use, is different. Only a few have used it in full scale, others have just used it for the namesake; they have uploaded a few things on their page, but not used it effectively. [TS: 5:12]

Facilitator: In regard to Moodle training, is there any frequency or is it demand-based?

Interviewee. To be honest, as for the training, we run one training at the beginning of the semester and there is one more session in that semester. So, there is at least one or sometimes two training every semester.

As for demand, a few teachers who begin teaching at the university for the first time, they request if they could learn about Moodle [06:05]. They say they are interested and would like to learn. Some have attended the training, they have learnt and used the Moodle.

But as I said earlier, the training is only for two days or three days training, if he/she is interested, the training should give them enough exposure to explore and learn about the tools. They should be able to use those tools with that training. For example, say the word programme, a literate program could learn about using Word programme; it does not require many days training. Likewise, Moodle is user-friendly to a large extent , so it could be learnt very friendly. So, it can be learnt easily. But the problem is

In each semester, the training is organized for two days, three days. Sometimes, we do general training, for everyone. At other times, we discuss only a specific aspect.

Facilitator: Other than Moodle, has the university run other training on using other tools?

Interviewee. In regard to other training, because Moodle is more frequent, we aim to make it a major platform to communicate with students, so we have prioritized it. As for other tools, we have invited experts from external agencies sometimes. They come and deliver the training.

We are also a centre of UNESCO in their initiation of making the teaching/learning process ICT based. Therefore, we have some program and sharing related to the program. However, we have not done major activities under that. But, because we are their member, we have access to their repository and can access their teaching resources. We have used those resources in sharing with the in-house teaching faculties. The other benefit of being a centre of UNESCO, it is not just our faculty members, but other people, because it is a school-based program, we have given a few trainings to the school teachers. However, those trainings are not intensive one. So, we have worked in that too.

Facilitator: Are there other programs related to the ICT policy of the university?

Interviewee. What I said earlier are the programs that we are doing, the school is doing. To discuss other programs related to the ICT policy, the central department also runs program. Such programs are run by the specialist in ICT for teaching staffs and admin staffs. But, those programs are not very long. They are run for only two days/three days.

The other thing is, it's again the University's initiation, rather than the School of Education, two of our staffs are, in fact, one of them, [De-identified] explored the opportunity by himself. He went to [De-identified] for a two/three-month long training. The University acknowledged that the training was useful so he was given a paid leave.

Another staff has also gone to Delhi for another training, but his training was a short-term one.

Facilitator: And, there are a few staffs who are doing PhD on ICT in education, right? Could you discuss that program?

Interviewee. We are a partner agency of the NORHED project. The project is about delivering teaching training programs and service via the means of ICT. Enhancing the access of teachers to trainings and resources. The other major aim to extend the master's program of KU to online mode. Doing online means that we have to open outer centre in a couple of places. Therefore, like we have already opened one in Butwal, we have set up computer labs and connected them to the internet. We have trained a few teachers. That is our learning centre. When in need, one/two faculty members visit the centre and discuss the content with the teachers, which will also cover computer skills by default.

Under the same program, [12:45] the university is awarded with three PhD opportunities to right candidates. Of three, one project is related to ICT in Education, other two also consider other aspects. [De-identified] project is technically oriented, other two researchers are also in the field of ICT in Education but their project also discusses the social aspects. I mean, one of the two research projects studies how the use of online program has contributed to the learning of students studying at KU, and

what challenges they face because of the online courses. So, they also look into the social aspect. [De-identified] research is rather technical.

Facilitator: The reasons behind asking this is related to pre-service teacher preparation. In the pretext of ICT skills having been recognized to be one of the core competencies of teachers in high school, what do you think about KU graduates regarding their skills to embed technology if they are available in the school and the class they teach? I mean, as you said, they seem to have experienced a few things but in relation to their learning, what are University's policies and how have they affected what students learn about ICT tools?

Interviewee. I think, what you just did was not just ask questions but also made me aware that the University has to think from that perspectives as well.

Students have used Moodle and at least. I came to this University in 2004 as a visiting faculty. Then and for the next few years, the students did not even have an email address. However, after that, it's common to have an email address. Almost all the students have email address. However, we still find teachers and students who have never experienced PowerPoint use, skype communication or Moodle. Or say, Facebook, everyone's on it but there are students and teachers who do not know there are platforms similar to Facebook. I mean, the extent of use has increased. However, as you asked, whether students are skilled to embed technology in their practice in the future, there is another thing. We also assign assignments to students that require them to use internet to explore information for other purpose. They have to use internet for one or the other purpose. Therefore, I feel, they are aware of use of digital use definitely; they have know-how knowledge. However, as for the independent use of technology, how capable they are and what skills they have, we have never thought from that perspective.

Facilitator: I asked you this question because the students in the teacher education programs are going to be future teachers and if they lack the skills they may not be ready for the future jobs, right?

Interviewee. You asked an important question. As I said earlier too, you have made me aware of those issues. In all of our discussion related to ICT, we are concerned with enhancing TEs' digital skills. We had not thought about it from students' perspectives.

There is this course called "Leadership and Management". That is an IT based course. The students and teachers who study that course, I am confident that they will learn enough skills. Likewise, in the Mathematics teaching course too, there is a subject related to using digital tools. But, I am not sure about English language teaching course. There might be a one but I think it might be some small portion. In Mathematics, there is a course on using ICT in Mathematics teaching.

The University needs to think about ICT use from student perspective. And, I will bring this issue in the future discussion. As well as developing the expertise of our teaching faculty members, what students learn out of the program, we will assess that.

Appendix F – Information Sheet for FGD

PARTICIPANT INFORMATION SHEET
Digital Practices of EFL Teacher Educators in Nepal
UTS HREC ETH16-0653

WHO IS DOING THE RESEARCH?
My name is Suman Laudari and I am a Ph.D. student at UTS. My supervisor is Dr Damian Maher.

WHAT IS THIS RESEARCH ABOUT?
This research aims to explore the ICT skills, practices and beliefs of teacher educators teaching MEd and BEd courses in English language education at Nepalese universities. In doing so, it investigates into teacher educators' ICT competencies, how they develop the skills required to teach with ICT and the factors that influence their practices.

IF I SAY YES, WHAT WILL IT INVOLVE?

1. I will invite you to participated in a focus group discussion (FGD), which may last between 60 to 90 minutes. The venue for the FGD will be a place of your convenience. In the FGD you will, along with your friends, discuss and share your observation on ICT practices at your campus, especially what ICT tools your lecturers use, when and how. Also, your will share your observations about the impact of your lecturers' ICT practice. The FGD will be audio recorded.

ARE THERE ANY RISKS/INCONVENIENCE?

1. Yes, there are some inconveniences. You might feel uncomfortable sharing information on what you think about your lecturers' ICT practices and your observations about the efficiency of such practices. However, I ensure that the data that I obtain will not be shared with anyone. Your participation and anything that you say will be anonymised. Nobody, other than me, will have access to the FGD or its transcription.
2. You might feel discomfort when I ask you to share your opinions about how your campus.

WHY HAVE I BEEN ASKED?
You have been approached because you are a pre-service teacher in a teacher education course in one of the universities/campuses in Nepal and your TEs use digital technologies in your teaching.

DO I HAVE TO SAY YES?
Participation in this research is voluntary.

WHAT WILL HAPPEN IF I SAY NO?
I will thank you for your time and will not contact you about this research again. Even if you say yes now, you are free to withdraw from participating in this research at any time without any consequences. Any data collected on you will be destroyed

IF I SAY YES, CAN I CHANGE MY MIND LATER?
You can change your mind at any time without any consequences. Any data collected on you will be destroyed

WHAT IF I HAVE CONCERNS OR A COMPLAINT?
If you have concerns about the research that you think I (email - Suman.Laudari@student.uts.edu.au) or my supervisor Dr. Damian Maher (email - Damian.Maher@uts.edu.au) can help you. Or, please feel free to contact Mr. Hemanta Dahal, Director of Cosmic Education, Training and Research Academy (CETRA) on hemanta_dahal@hotmail.com. He is the local point of contact for this study.

NOTE:
This study has been approved by the University of Technology Sydney Human Research Ethics Committee (UTS HREC). If you have any concerns or complaints about any aspect of the conduct of this research, please contact the Ethics Secretariat on ph.: +61 2 9514 2478 or email: Research.Ethics@uts.edu.au), and quote the **UTS HREC Number ETH16-0653.** Any matter raised will be treated confidentially, investigated and you will be informed of the outcome.

Appendix G –Excerpt of FGD with a Group of Pre-Service Teachers

Facilitator - Let's begin this discussion by sharing what technologies you have used in relation to teaching and learning in the last two weeks. If you used any platform, do you any particular website or do you run searches on Google?

PST18: I am a teacher in higher secondary school. I teach economics. I use internet, especially google search, to find simplified ideas on different theories of economics. I also use a particular website related to economics. For example, econometrics. Those kinds of websites discuss economics related issues. I searched for information on the internet while preparing my lessons. As for my study, I rely on the internet while doing my assignments. I visit websites and look for relevant information. In the last two weeks, I have used different sources excessively for my assignments.

PST19: We also use the website called *Bookfi. Bookfi* is a book sharing website. We can download books from it. I download a book on Structuralism this morning. Besides, that I have used email, internet and computer.

PST18: I usually run searches on Google. The other particular website that I use is Jstor. I have downloaded a lot of reading materials from *Jstor.*

PST20: Because of assignments, I have used email, internet, Google and *Jstor* all 14 days in the last two weeks. I have also used *Bookfi,* Google Scholar and library genesis to find assignment related academic journals, books for information and reference.

PST21: In the last two weeks, I was supposed to submit an academic essay on ELT. For that I searched on Google. I used the term 'ELT as a profession'. Google gave some reference. Likewise, I used internet and Google to complete an assignment on "Fast track initiative". I found a pdf file on Google which I downloaded. I collected most of the information from Google. For most of my assignments, I take the help of Google but not any particular website.

PST22: I also visited different websites for my assignment. Likewise, I used email to find resources that our teachers sent at different points of time.

Facilitator - Your responses suggest that most of your technology use was internet based. Could you discuss whether you used internet at home or here at the University?

PST18: Because I have internet access at home and also at the university, I use internet at both the places. To use *Jstor*, I use the connection at the university. For other things, I use internet at home.

PST17:I mostly used at the university.

PST20: Because I stay at a student hostel, which has an internet facility, I do all my work right at home.

PST19: In my case too, I use internet at both the places. Whenever I have to use *Jstor*, I use the connection at the University as the university has an institutional subscription and we cannot access that from home. In other cases, I use internet at my home.

PST22: I use internet at the university and also at my home. At home, I use a mobile subscription.

Facilitator - The data from your teachers suggested that they all use technology. Could you discuss with me your usual lesson? Could you discuss how the technology is used in your lesson. ?

PST18: Mostly, our teachers use emails for correspondences and also to send documents rather than using Moodle, which the University wants us to use. They first send us emails with the attachment and then upload that on the Moodle system. Sometimes, teachers do not even reply to our emails for days. Though out TEI boasts of using technology in teaching and learning, some teachers use of technology does not reflect that. They do not acknowledge whether they receive emails. In some cases, I make a call to them and ask if they received the email. That's one of the issues.

Facilitator – That's something that happens beyond the class. Could you discuss how the technology is used within the class?

PST19: All our classes use projector. No classes are done without using the multimedia projector. We have not had any lesson without the use of projector.

PST20: The professors bring the all slides and class notes and they teach. They upload the handouts on the Moodle.

PST17: Within the classroom, they basically use a multimedia projector.

Facilitator: How are the lessons delivered when a projector is used in the classroom? For example, is it lecture based, student oriented or how is the class done?

PST20 It depends on the individual lecturer.

PST18: Like [de-identified said] that depends on the lecturer. Some teachers project the slide and deliver lectures. Other teachers involve us in discussion. Some teachers show the slide and stop the projection and ask us to discuss and present.

PST19: I think, the content also determines the nature of the class. But, most of the time, most teachers use a lecture-based delivery. As for projects, we have not done any until now. Interactions also happen in the classroom. So, what they do is they stop projection and ask to us discuss things in groups or pairs. We also do whole class discussion.

PST17: Mostly, the theoretical classes are lecture-based but as the nature of the courses are theoretical in nature, the lessons are not that practice based.

PST20: Yes, the classes are lecture based. Teachers come with slides and discuss what is on the slide. If we have any questions, we can ask questions. However, sometimes there are group discussions. In one of the modules, we are asked to make presentation and groups have been divided but we are not told what we are supposed to do. It is Fiction and Prose. In that module the teacher engages us in group discussion.

PST17: The classes are mostly theoretical in nature. I have been studying here for the last one and a half year and I have never experienced field work, or practically oriented classes.

PST22: Though this course is about how to teach by using all kinds of materials. Rather than [demonstrating how it could be done] practically, they [depend on] lecture [methods]. That's the main

Facilitator: So, what you are indicating is that you do not have practical classes. If you are studying TBLT, the teacher does not demonstrate TBLT but give lecture?

PST20: It is mostly theoretical, not much more practical.

PST19: There are [some practical classes] but that happens mostly within the classroom. We do activities when we are in the classroom. However, it is all classroom bound.

PST18: Some teachers do not ---[Unclear]

Facilitator: Did you want to say something about the teachers' technology use?

PST18: Some teachers do not even know how to log-in to the [Moodle]. We have to help them to log-in.

PST19: I think, all teachers have that basic knowledge; it would be wrong to put it that way [referring to PST18's comment]. Some teachers need help in certain things where we assist them in the class. There are cases when we felt that the teachers needed our help.

Facilitator: So, they have some basic skills but when it comes to using technology in teaching, they are not skilled. Is that what you are trying to say? So, you have to help them in certain things.

PST18: Yes.

PST22: There are cases where we need to help certain teachers.

Facilitator: – I am asking this because your ultimate goal is to become teachers. The latest policy [Teachers' Competence Framework] by MoE stipulates that all the teachers will have ICT competencies when they enter the service. Further, the framework also states that the teachers need to be able to use ICT in their practices. That suggests you should be ready to teach English using ICT tools. In that context, how have the current use of technology contributed in the learning of English language, its theoretical underpinning and teaching using technology? I mean, the way technology is used in your teacher education course, how have they contributed in building those skills?

PST21: Because we have to make presentations using a laptop and the projector, I think that is main training that gives us knowledge about those things.

PST17: Yeah, making slides and that by making references and…

Facilitator: Alright, making slides will teach you how to do so but my question is about three issues: 1. Your English language development 2. Understanding of theory of teaching 3. How to use technology in classroom. How have the use of technology helped you?

PST19: I think, [my TEI] is in the forefront in terms of technology use in the classroom. I did own a laptop before I joined [this TEI]. I rarely used it. I did not have internet connection at home but I could go and use at a [cybercafé] nearby, where I went to use internet sometimes. As of now, if I do not have laptop, it is impossible for me [to do my tasks]. I saw the projector before I joined [this TEI] but did not have any experience of it using that in the classroom. Since I started studying at [this TEI], I have also gained technical knowledge about operating a projector. If I were to use these tools in a classroom later, that's an advantage that I have. Besides, I am aware of different websites, and I know where to find relevant information about learning English language. I can refer those websites to my students for their learning.

As for English language understanding, we have had a lot of opportunities. For example, recently we had had a discussion with a teacher trainer teaching at the Warwick University in the UK. That was a new experience. It was a good experience to be able to talk to a native speaker and an expert in the field of ELT and teacher education. Therefore, I think, technology has helped us given opportunities to learn about the language.

PST17: As for English language development, now we know how we can do it, where to find the location using internet. The technology use that the university promotes has helped locate the vantage point for further development. However, what happens in the university is not enough. I feel, we need learn things by ourselves to compete in the market.

PST18: I give credit to [my TEI] for being able to compete with my colleagues at my workplace. Until I joined [this TEI], I did not know about technology use in teaching and learning. Now, I use technology for my learning and to teach. I use internet to update my knowledge and to enhance my knowledge. For example, I Google for information and watch videos and tutorials on YouTube. I present that ideas to my students. It the technology that helps me to improve my teaching practice, firstly. Until I joined [this TEI], I did not know about technology use in teaching and learning. Now, I use technology for my learning and to teach. I use internet to update my knowledge and to enhance my knowledge. For example, I Google for information and watch videos and tutorials on YouTube…Technology has helped me to improve my English language skills. For example, there are video tutorials on English language on YouTube. I watch them and learn about pronunciation, stress, intonation and the vocabulary. Watching YouTube video has been helpful in that that has enhanced my English skills.

PST20: The use of technology has helped me improve my reading, writing and speaking skills. I have improved my pronunciation. Before I joined [this TEI], I knew nothing about email, and other basic things such as designing power-point slides. Likewise, I did not know about other functions such as Microsoft office. I have learnt that too. Having studied here in [this TEI] and using ICT tools, I have gained confidence in speaking in front of mass.

PST18: For example, last night I was working on PowerPoint design last night and I did not know how to delete a page number on the slide. So, Googled that and learnt how to do. So, having studied at [this institute], I have gained that confidence. The use of technology has helped me improve my personal and professional lives and make changes in my weaknesses.

Facilitator - So what you are saying is that you have improved your writing, pronunciation, speaking and other aspects of English language; as for theoretical understanding, you know the vantage point; as for technology knowledge you have learnt the operational skills of technology, skills related to information search and location . Would I be right in saying that?

PST19: We also use Moodle. We did not use that in the first semester because of different reasons. In the second semester, we were told that it was mandatory to use that but we felt comfortable using emails. Later, we asked the university that we needed some orientation on using Moodle. Our teachers agreed to the request but that never materialized. So, what we did was we sat in group and learnt it by self-practice. For any technical problems that we had, we visited [de-identified] sir, the ICT manager. We visited him numerous times. We have also learnt it by watching the technical assistant operating and using Moodle. Because the training never happened, that the was weak point. We should have been provided that.

PST18: If that were made mandatory, we would have probably learnt that too. Because it was not compulsory, we did not learn that. If they had forced us to use Moodle, we would have definitely used that instead of the personal emails. We know how to operate that Moodle, but this is the point in the case of English language teaching students at [this TEI].

List of Publications and Conferences

Following is the list of publications or the conferences that were published/attended by the researcher during his engagement in this research.

Articles in Referred Journals

Laudari, S. & Maher, D. (in press). Barriers to ICT use in EFL Teacher Education Courses in Nepal: An Activity Theory Perspective. *NELTA Journal, upcoming issue*.

Prior, J., **Laudari. S**. & Leaney, J. (2019). What is the Effect of a Software Studio Experience on a Student's Employability? *The Twenty-First Australasian Computing Education Conference*

Conference Presentation

National Conference of Nepal English Language Teachers' Association (NELTA), 2-3 March 2019, "Technology to Transform EFL Teaching/Learning". Hetauda, Nepal.

Faculty of Arts and Social Sciences (FASS) HDR Conference, 15-16 November 2018, "Transforming Teacher Education Practices Through Digital Technology Use", University of Technology Sydney (UTS), Sydney Australia.

NSW Teachers' Guild, The Annual Guild Research Presentation, 13 August 2018, "Exploring Digital Competencies and Practices: A Case of Nepalese Teacher Educators". Sydney, NSW, Australia.

Faculty of Arts and Social Sciences (FASS) Higher Degree Research Conference, 23-24 November, 2017, "Merging the World of Technology in Teacher Education : How Prepared are Teacher Educators?", University of Technology Sydney (UTS), Sydney Australia.

NSW IER, 2017 Student Research Showcase, 18, November 2017, "Activity Theory Analysis of Barriers in Technology use in Teacher Education Courses". New South Wales Institute for Educational Research, Sydney, Australia.

22nd International Conference of Nepal English Language Teachers' Association (NELTA) Conference, 24-26 February 2017, "Are Teachers Ready to Teach in a Digitally Enabled Classroom?" Kathmandu, Nepal.