

**The relationship between five Omani teachers' technology use,
and their teacher cognition and instructional practices: a case
study at Sultan Qaboos University**

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Dedication

Avril begot the love but once
Except for thee, I shan't pine
Grievous is the journey to thee
But thee art terminus... mine
Rare and dainty maketh dearth
Thy harte and thou art twine
Bewray your love betimes
That thine love for dateless shine
Behoveful, as thou list
The world is bawbling and indign
Whenever you exuberantly bray out
Thy soul, becometh fain and fine
To thee I devote a life and a story
And a poem worth of a thousand line

Mahmood Al Waaili

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Abstract

This study attempted to explore five Omani teachers' relationship with technology use. It explored the impact of technology use on teachers' cognitions and instructional practices and the contextual factors that might influence the impact. The study also explored the ways in which teachers interacted with technology and how their previous experiences as learners impacted their technology integration practices and beliefs. A case study approach was used employing narrative inquiry to present stories of how technology integration influenced five Omani teachers' cognitions and instructional practices at Sultan Qaboos University (SQU). The first phase of the study aimed at selecting participants using a questionnaire that was prepared for the purpose of this study. Omani teachers who showed advanced levels of technology competency and frequent technology integration in their teaching were selected to participate in the study. The qualitative phase aimed at exploring teachers' perceptions and practices about technology integration using autobiographical accounts, initial interviews, classroom observations, post observation interviews and final interviews. The findings demonstrated that the relationship between teachers' cognition about technology integration and instructional practices is two-sided. That is, whereas teachers' beliefs affect their decisions to use technology, teachers' frequent integration of technology also influences their decisions on how to use technology in their classes. The findings also showed that some teachers perceived technology to be influencing their cognitions and instructional practices in that it encouraged them to employ a learner-centred approach, a constructivist approach, different teachers' roles and different classroom management among other influences some teachers cited as a result of using technology. In addition, the study found that one teacher experienced no effect of technology on her actual instructional practices. Findings revealed some of the reasons behind the mismatch between beliefs and practices. Five major contextual factors were reported to be influential when the five teachers used technology namely: professional development, technical support, institutional environment, personal factors and socio-cultural factors.

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List of Abbreviations

BBM	Blackberry Messenger
CET	Centre for Educational Technology
CPS	Centre for Preparatory Studies
eLearning	Electronic learning
ELT	English Language Teaching
ESP	English for Specific Purposes
FPEL	Foundation Programme English Language
ICT	Information and Communication Technology
IT	Information Technology
LC	Language Centre
LCD	Liquid Crystal Display
LMS	Learning Management System
Moodle	Modular Object-Oriented Dynamic Learning Environment
SQU	Sultan Qaboos University
TESOL	Teaching English to Speakers of Other Languages
WebCt	Web Course Tools

Definition of some terms

Technology

Technology: Information technology such as computers, devices that can be attached to computers (e.g., LCD projector, interactive/smart whiteboards), networks (e.g., Internet, local networks), and computer software/applications. Other non-computerized technologies such as OHPs (Overhead projectors) are not included (Gray et al., 2010). Also Mobile phones, iPads and Tablets.

Technology integration

Technology integration (interchangeably referred to as technology use in this document): The act of using technology in the different phases of teaching .i.e. preparing, teaching, assessment, communicating with students...etc.

Impact or influence?

Cambridge dictionary defines the word “influence” as: **“the power to have an effect on people or things”**. This meaning is what best describes what I have in mind when I write about the influence of technology on teachers in that it has (or not) an effect on their perceptions of actions. The influence can cause positive or negative effects on teachers. The word “impact” is also defined as: **“to have an influence on something”** among other meanings suggested by Cambridge dictionary. Therefore, it is important to draw attention to the fact that I used the words “influence” and “impact” interchangeably in my research to stand for the same concept.

Instructional practices and classroom practice

Classroom practice and instructional practice have been interchangeably used throughout this document to represent the activities of learning and teaching processes, and the instructional practices of the teacher which take place within a classroom as a system (Li and Oliveira, 2015) (see Section 2.8.3 for more).

1 Chapter One: contextual background

The following chapter gives an overview of the context of this study. It begins with my autobiographical account which documents my personal experience with technology which was my main motivator to start this study. It then provides an overview of the context of the study; Sultan Qaboos University (SQU) and the Centre for Preparatory Studies (when this study commenced, it was called the Language Centre). The chapter then presents the issue of the study and ends with a discussion of the significance of the study.

1.1 My personal experience with technology

The current study was largely inspired by my own personal experience in which technology has had a positive impact on my beliefs and practices as a teacher. Under the Omani government plan to promote the use of technology in teaching, teachers were offered the ICDL (International Computer Driving License) course to introduce technology to them and to encourage them to implement it in their teaching. I attended this course, followed by another online course offered by iEARN (International Educational and Resource Network). These two courses have had a considerable impact on me personally. First, the ICDL course was teacher-oriented in that it featured the technological skills that were necessary for teachers to integrate technology in their teaching by using several software programs and providing teachers with sufficient knowledge to use technology successfully. Second, the online course on integrating technology involved ongoing support to integrate technology in teaching writing in a creative way by using the various technological tools. The course provided a rich platform for teachers to persistently interact with, and learn from each other as well as from the other tutors who were available to offer help and support.

My choice to adopt technology in teaching happened simultaneously with another educational reform that was taking place in the Omani schools. It was the advent of the post-basic educational system, Grades 11 and 12 of the new educational system that preceded higher education study (Issan and Gomaa,

2010). The new system introduced a major change of teaching from a teacher-centred approach to a more learner-centred approach where students become the focus of learning. The positive influence technology integration has had on my way of thinking as a teacher was also reflected on my teaching practices in the classroom. For example, prior to adopting technology in my teaching, I had experienced difficulties catering for a learner centred approach with a high number of students in the class and with the limited time provided. I had a strong belief that a teacher centred method was more appropriate for teaching in such circumstances. The aptitude of technology, from my personal point of view, to sustain a learning environment where students can learn by doing contributed largely in transforming my teaching role from that of a teacher to a facilitator. These, in turn, made me more appreciative of a new concept of teaching and adhere to it as a successful way of teaching. For example, my students were given the chance to undertake the same reading activities but at different levels and at their own pace. Therefore, I was motivated to explore this change, if it existed in the way that I had experienced it, from teachers' perspectives to be able to better recognise the potential impacts of technology. The claim I make here meets perfectly with Dascal and Dror's claim that "as technologies are used in our cognitive processes, as they cognize with us and for us, they influence and impact the very way we think and affect the very nature of cognition" (Dascal and Dror, 2005, p. 452). Therefore, my interest in investigating whether the frequent use of technology leads to changes in teachers' cognitions and practices at SQU CPS is largely based on my own experience with technology.

Moreover, technology has become essential in various aspects of our lives including our educational systems. More and more technology is being integrated into academic institutions worldwide and at all stages, particularly in ELT teaching. The introduction of technology into ELT teaching and learning is based on the assumption that it will lead to different patterns of teaching and learning and promote a positive change in teachers' cognitions and instructional practices. All educational and higher education institutions in Oman are heading towards more implementation of technology in teaching. Sultan Qaboos University (SQU) has also invested largely to provide such technologies and to

encourage teachers to integrate technology in teaching mainly to make a positive change in teachers' ways of teaching which will ultimately reflect on students' learning. Therefore, it is worth looking at how technology influences teachers' cognitions (see Section 2.6) as this will provide indications as to whether the technology implementation plans are successful or not.

1.2 The Centre for Preparatory Studies (CPS)

Sultan Qaboos University (SQU) is the only state-owned university in the Sultanate of Oman and was opened in 1986 by His Majesty Sultan Qaboos. There are nine colleges in SQU: Agricultural and Marine Sciences, Arts and Social Sciences, Economic and Political Science, Education, Engineering, Law, Medicine and Health Science, Science, and Nursing. In addition to the nine colleges, there are several centres such as the Centre for Information Systems (CIS), Centre for Educational Technology (CET), Human Resources and Staff Development, Centre for Preparatory Studies (CPS) and others. The Centre for Preparatory Studies comprises the largest learning component in SQU (Al-Busaidi and Tuzlukova, 2013) with more than 4000 students and over 200 instructors from around 30 countries including 50 Omani teachers (SQU, 2013). The CPS staff represents over 30 different nationalities from all over the world. According to the CPS website, some of the stated objectives of the CPS are to:

- Equip students with the required knowledge and skills necessary for undertaking university education.
- Provide students with sufficient analytical skills and knowledge in their areas of study.
- Improve the efficiency of teaching and learning in the classroom through students' independent study.
- Provide quality education in English language, Arabic language, Mathematics, Information Technology, and Life Skills (CPS, 2017).

1.2.1 Technology integration at the CPS

The importance of using technology in preparing students in the different educational sectors has been significantly signposted in the Philosophy of Education in the Sultanate of Oman document. The document which is "regarded as a principal reference for educational policy-making and planning in the Sultanate and an important driver towards the achievement of the main

objectives and targets for all stages and levels of education” gives remarkable emphasis to the use of technology (The Education Council, 2017, p. 10). The latest edition of the document (The Education Council, 2017) provides eight objectives to be followed by the various levels of educational systems in Oman, including higher education institutions, namely:

1. Reinforce the ability to deal with current information and modern technology.
2. Encourage the production, dissemination and utilization of knowledge and technology.
3. Increase awareness on the importance of information security and of issues relating to technology and networking.
4. Instil concepts related to building intellectual capital.
5. Build awareness on the need for a knowledge-based economy.
6. Encourage the production and development of local knowledge.
7. Encourage the development of information technology in Oman and the building of capacity in research and technological development.
8. Acquire competencies and skills required for the knowledge society (The Education Council, 2017, p. 26).

SQU’s vision to integrate technology falls in line with the above orientation. The integration of e-learning technologies at SQU started in early 2001 with just a few courses available online (Sultan Qaboos University, 2012). When the WebCT, Web Course Tools system, was first introduced in 2001 (Musawi et al., 2004), there were only eight courses available with less than 820 students enrolled but the number of courses increased to ten in 2002 with over 1900 students. The CET (Centre for Educational Technology) continued to administer WebCT as the main VLE, Virtual Learning Environment, used at SQU until a transfer was made to Moodle, Modular Object-Oriented Dynamic Learning Environment, with the purpose of providing SQU faculty members with more opportunities to implement e-learning using the multiple features available in Moodle.

The CPS efforts to integrate e-learning into teaching and learning were inspired by the Academic Standards for General Foundation Programme set by the Oman Academic Accreditation Authority (OAAA) (OAAA, 2017). The OAAA standards stress the significance of helping students to develop independent learning skills through the utilization of various techniques among which is the

active use of e-learning and technology (The Language Centre, 2012a). The CPS strategic plan 2007-2012 admits that in order to enhance the curriculum and make it more learner-centred, more technology integration should be incorporated (The Language Centre, 2007). The CPS views the integration of technology as a major determinant that supports achievement in language learning in general, and in the FPEL (Foundation Programme English Language) in particular. For example, “increased motivation, student achievement, authentic materials for study, greater interaction and individualization of a learning process” (The Language Centre, 2012a, p. 16) are only some of the claimed advantages of using technology and Moodle programmes. Such tools, the CPS claims, will also “contribute to students’ progress and autonomy in learning” (The Language Centre, 2012a, p. 16) through their abilities to individualize learning.

College	Total Number of Courses	Number of seats in a course	Total number of seats
AGR	93	206	1595
ART	191	203	4809
COM	78	124	1020
EDU	196	189	2875
ENG	216	294	6826
MED	165	435	6594
NRS	120	113	1317
SCI	302	2084	19620
LAW	1	14	14
LC (Now CPS)	269	537	9589

Table 1 Moodle (LMS) Usage Statistics. Adapted from (CET 2011).

The Centre for Preparatory Studies, where figures show an increasing use of technology in teaching, views the diverse activities and tools that exist in Moodle as enabling teachers to overcome different educational challenges that

they could not find other solutions for elsewhere (Sultan Qaboos University, 2012). Table 1 shows the number of courses offered through Moodle in 2011 by the different colleges at SQU along with the number of seats available for students. It is evident from the table that the Centre for Preparatory Studies is one of the largest users of Moodle with over 9500 seats. Table 2 also demonstrates that more than 100 courses were offered by the Centre for Preparatory Studies in 2011 and with various activity modules. These activity modules show the variety of activities used for students and the numbers are high in the CPS which show an inclination to use technology in teaching and learning in the CPS.

College	Number of Courses	Resources modules		Activity Modules								
		Resource	Label	Forum	Quiz	Assignment	Wiki	Hotspot	SCORM	Chat	Glossary	Journal
AGR	57	1248	72	128	18	122	10	0	0	12	5	1
ART	129	1667	42	370	46	86	7	0	0	8	13	0
COM	35	405	91	124	17	100	5	0	0	5	1	0
EDU	94	1713	287	444	198	179	226	30	199	76	11	39
ENG	127	2850	297	156	77	206	9	0	0	1	0	2
MED	72	1815	233	119	147	28	2	1	0	7	2	0
NRS	31	519	13	48	10	23	3	0	0	13	0	9
SCI	202	5249	1238	203	148	477	4	0	0	53	56	0
LAW	1	9	0	2	0	7	0	0	0	0	1	0
LC	104	4222	798	361	1163	202	41	233	3	18	66	59
TOTAL	852	19697	3071	1955	1824	1430	307	246	202	155	155	110

Table 2 Moodle Modules Usage Analysis at SQU (CET, 2011)

The above tables demonstrate that technology is being integrated increasingly particularly in the Centre for Preparatory Studies (previously language centre LC) and that teachers are using technology in their teaching. The above

statistics demonstrate that technology is being increasingly incorporated in teaching and learning in the CPS at SQU. However, research is still needed to see if the frequent use of technology by teachers in the Centre for Preparatory Studies has influenced their teacher cognitions and instructional practices in the way that it was hoped to (Windschitl and Sahl, 2002).

1.3 Issue of the study

The big investment in the introduction of technology into teaching and learning is fundamentally based on the assumption that it will lead to different patterns of teaching and learning and will promote a positive change in teachers' cognitions and instructional practice (Windschitl and Sahl, 2002). Likewise, the CPS's vision to use technology is based on the assumption that it will promote a more learner-centred environment compatible with the curriculum used (The Language Centre, 2012a). For instance, the use of e-learning at SQU has brought about changes in the roles of teachers (Al-Ani, 2013) into more facilitative roles. In fact, several other studies claim that teachers experience a change in their beliefs about teaching, and in their instructional practices, when integrating technology over time (Becker and Ravitz, 1999; Baker et al., 1996; Mehlinger, 1996; McGrail, 2005; O'dwyer et al., 2005). For example, a study by Becker and Ravitz claims that teachers in approximately 153 schools, where adequate technologies were provided, experienced a change in their beliefs into a more constructivist method (see section 2.15) of teaching as a result of increased use of technology (Becker and Ravitz, 1999). They claim that teachers became more accepting of students' ideas, keener to explore the areas that they were not confident about, allocate more complex tasks to their students and provide them with varied learning styles. Even though they claim that the relationship between technology and teachers' cognitions change is casual, they evidently state that it is still unclear whether teachers experienced the change into a more constructivist approach as a result of their existing inclination to do so, or because technology led them to transform their beliefs when used substantially.

Kerr (1996, p. 24), too, asserts that the frequent integration of technology may entail "a radical shift of what classroom life is all about". Such a change in the

wider visions and beliefs of teachers will basically impact teachers' cognition about teaching. Some studies have shown that the use of technology has achieved, to some degree, helping teachers change their beliefs about teaching and learning which may have helped them to adopt technology more confidently and efficiently. Yet, the nature of this impact and how it occurs remains an area of investigation (Albion and Ertmer, 2002).

However, even though studies claim the ability of technology to change teachers' cognitions and instructional practices (Becker et al., 1999), they do not offer clarifications as to how this change takes place and what factors impede or stimulate it (Windschitl and Sahl, 2002). This is partly because literature has attempted to explore teachers' beliefs and instructional practices in isolation from other institutional factors that may impact teachers' development of their thinking (Little, 1987) when using technology. For instance, some studies increasingly emphasize the importance of contextual and institutional factors on teachers' cognitions (Putnam and Borko, 2002; Burns, 1992; Borg, 2003). In fact, Borg states that the study of the contextual factors is central and he believes that investigating teachers' "cognition and practice without an awareness of the contexts in which these occur will inevitably provide partial, if not flawed, characterisations of teachers and teaching" (Borg, 2003, p. 106). Although research demonstrates that the more teachers integrate technology in their teaching, the bigger the chance that they will experience a change in their cognitions and instructional practices, how and what factors impact this change is not as clear and requires further investigation (Windschitl and Sahl, 2002). As for the Centre for Preparatory Studies at SQU, even though statistics demonstrate how much technology is integrated by teachers (see Table 1 and Table 2 above), little is known about how this has influenced what teachers believe and do. Therefore, the overall aim of this analysis is to investigate whether technology has an influence on ELT (English Language Teaching) teachers' cognition and practice along with the contextual factors that contribute in this process. This investigation, therefore, is driven by my own personal experience with technology and the necessity to further explore whether the introduction of technology as a new medium of teaching at the SQU CPS has influenced teachers' thinking and behaviour.

1.4 Significance of the study

The current study is significant in several ways. First, most of the evaluations conducted to measure the impact of technology emphasized measuring “changes in skills”, “equipment distribution” of technology, or the “amount of time” teachers and students spend using technology (Bober, 2002, p. 87). Those evaluations according to Bober (2002, p. 87) did not pay attention to “how and in what ways do access to and use of technology alter classroom practices?”, and whether or not teaching is transformed. Second, most of the studies conducted in the Omani context with regards to technology use in higher education have dealt with the general status of e-learning and technology (Al Musawi and Abdelraheem, 2004; Akinyemi et al., 2001; Musawi, 2002; Akinyemi, 2002a; Al-Mughairy et al., 2011), perceptions, barriers and motivators by the faculty (Abdelraheem, 2004; Al-Senaidi et al., 2009; Jabur Razzouki, 2002; Al-Badi et al., 2011) and students’ perceptions when integrating technology (Akinyemi, 2002b; Castellano et al., 2011; Aamri and Suleiman, 2011; Al-Mukhaini et al., 2014). Most of the studies that have explored faculty perceptions of integrating technology have approached their attitudes of using technology without exploring the impact of technology on their beliefs or teaching actions. The current study, hence, will consider a different perspective to exploring teachers’ relationships with technology. It will attempt to explore the impact of technology integration on teachers’ cognitions and instructional practices and the contextual factors that mediate the relationship between technology use and teacher cognition. There has been no prior study conducted, to my knowledge, to investigate the impact of technology on teachers’ cognitions and instructional practices, and the possible factors influencing this impact in the Omani context. Nationally, the current study will hopefully present an analysis of how technology use, as learners and as teachers, influences Omani teachers’ cognitions and instructional practices which will provide stakeholders in the higher education sector with an indication of whether the technology implementation plans are successful or not. For example, has technology been able to shift teachers’ perceptions of who they are as teachers? How has technology altered teachers’ beliefs and ways of thinking about their roles as teachers? How has teachers’ cognition been

impacted by educational technology? Is this change reflected in teachers' instructional practices? How have teachers' relationships with technology influenced their cognitions and instructional practices? What factors contribute in the change in teachers' cognitions/instructional practices? Such details will enable educators in Oman to further support teachers in higher education institutions to develop the desired ICT-facilitated pedagogical orientations.

Moreover, since the few studies previously conducted to explore the influence of technology on teacher's educational change are based on Western, or non-Omani, literature, the current study will further add a new perspective to the existing international literature by featuring the perceptions of Omani context teachers. On one hand, the results will optimistically provide researchers around the world with new understandings that are different from those currently found in the literature. On the other hand, the results of this study will enable researchers in the future to make comparisons between how Omanis perceive the impact of technology on their cognitions and instructional practices compared with how Western literature views it.

This study is also important because it explores how the integration of computer technology in teaching influences teachers' reactions, how technology transforms their actions and in what way the context that they work within contributes. The findings will then be beneficial for both pre-service and in-service teachers when looking at the reflections of the Omani teachers concerning the management, influence and factors of integrating technology in teaching. Findings will provide guidance on how to support teachers to begin to integrate technology in their teaching.

1.5 Thesis outline

The thesis is made up of seven chapters. The first chapter provided an overview of the context of the study with particular attention to technology integration in the Centre for Preparatory Studies at SQU, Oman. It also provided a rationale for the study and discussed the significance of the study both locally, in Oman, and internationally.

This is followed by a literature review of the pertinent studies and research projects that relate to the area of investigation and which situate the study within

the international and Omani literature. The literature chapter includes an overview of how technology is hoped to change teaching and learning, as well as a discussion of the teacher cognition framework which has informed this study. In addition, the chapter also explores how technology is viewed as a medium for teacher change and how it caters for a constructivist approach. Finally, the factors that support or impede the integration of technology are discussed.

Chapter three presents a detailed description of the design of the study. I begin with the purpose of the study and the research questions. I then go on to define and discuss the narrative inquiry and justify why I chose a case study. This is followed by an overview of the data collection instruments and a detailed account of the data analysis process. The chapter is concluded with comments about issues concerning the research trustworthiness and ethical considerations.

Chapter four presents the individual case findings of the five Omani teachers who participated in the study (Arwa, Basma, Muna, Rashid and Tasneem). Every case is presented with reference to the teacher cognition framework (Borg, 2006) and the themes that emerged from the thematic analysis of the data. A short profile about each participant is presented followed by their early experiences with technology. Then, participants' cognitions about technology and teacher education are presented. This is followed by an overview of their cognitions about technology and higher education. After that a discussion of their instructional practices inside the classrooms is provided based on classroom observations and post observation interviews. The perceived impact of technology is then discussed in details followed by the factors that each participant perceived as impacting their technology integration. A summary wraps up the findings of each case.

Since chapter four provides findings unique to every participant, chapter five seeks to present cross-case findings to add a more detailed and in-depth analysis of the findings. The cross-case findings chapter is organized according to the themes that have emerged from the data analysis with the help of Nvivo11. These themes are early experiences with technology as learners, teachers' cognitions about technology use, influences of technology on

teachers' cognition and instructional practices and the contextual factors affecting participating teachers' integration of technology.

In chapter five, I discuss the findings of the study in relation to the literature. The key issues resulting from the findings of the current study are compared to the literature. In chapter six, conclusions are made and the implications and contributions of the study are discussed. I also make suggestions for future research and highlight some of the limitations for this study.

1.6 Summary

This chapter provided an overview of the contextual background of the study. I started the chapter with a narrative of my own personal experience with technology and how this experience motivated me to start this study. Then I introduced the Centre for Preparatory Studies in which the study took place. I discussed the situation in relation to technology integration in the centre. For the discussion of the technology integration situation in the CPS, it was evident that technology is being integrated gradually and that teachers are using technology in their teaching. However, research is still needed to see if the frequent use of technology by teachers in the Centre for Preparatory Studies has influenced their teacher cognitions and instructional practices the way it was hoped to (Windschitl and Sahl, 2002). I also presented the issue of the study and why this study is important with particular reference to the international and Omani literature, which will be further discussed below (see Chapter 2). The chapter was concluded with a description of the thesis outline.

2 Chapter two: Literature Review

2.1 Introduction

In the previous chapter, I have explained the major issues that motivated me to conduct this research, particularly my personal experience with technology, and have outlined the context, issues of the study and its significance. The next chapter provides an overview of the literature that has mainly informed the current study. The development and organization of the chapter reflects the course of my thought processes as I researched the topic, and echoes the need for more knowledge that I felt the more I read about the topic. The chapter provides a historical overview of the origins and development of teacher beliefs, teacher knowledge and teacher cognition. Then it defines teacher cognition according to the existing literature and describes the constructs related to it. The teacher cognition framework suggested by Borg (2006) is also discussed in order to help rationalize the study and provide a theoretical framework for it. The main elements of the framework are reviewed such as teacher beliefs, teacher attitudes, teacher knowledge, and teacher identity. This is followed by an overview of the definition of teacher change according to literature and the models of change that explain it. The role of technology as a medium of change is also discussed addressing how technology is hoped to promote learner-centred approaches and constructivist principles within teachers. It addresses technology and higher education. Next, I discuss the researches and studies conducted with regards to the planning, implementation and evaluation of technology integration in the higher education sector in Oman, with particular attention to SQU. The chapter ends with a discussion of the factors that impact teachers' technology integration. A conclusion wraps up the issues discussed in the chapter and outlines some of the gaps based on the literature review.

2.2 Origins of teacher beliefs and teacher knowledge

The history of teacher belief as a construct dates back to early 1970s when the focus was on teachers' learning-to-teach processes (Borg, 2006). Teachers were mostly evaluated based on their behaviours inside the classrooms without much focus on the psychological processes they went through. For example, teachers' actions inside the classroom were thought to affect directly students' behaviour. Therefore, the process-product research was mainly concerned with

the relationship between teachers' actions, students' behaviours and the eventual effect of this relationship on student achievement (Fang, 1996). The relationship between teachers' classroom behaviour, students' behaviour and student achievement was believed to be unidirectional with each leading to the other. There were continuous attempts to find generalizable principles for good teaching based on what teachers do inside the classroom (Fang, 1996) and how those actions contributed to the overall achievement of students.

In addition, researchers also realized that teachers tended to do routine actions when they were teaching. Routines were defined by Yinger (1979, p. 165) as "established procedures whose main function is to control and coordinate specific sequences of behaviour". Routines were viewed by researchers in two different ways. In the first, they are thought to represent teachers' automatic behaviours when they are not "thinking" (Halkes, 1986, p. 212). In the second view, routines are thought to be teachers' practical results of teachers know.

However, with the advent of cognitive psychology, researchers became more interested in teachers' thinking (Fang, 1996). For instance, in 1974, a report by a team of academics in the USA drew attention to the influence of teachers' beliefs on their instructional practices (Halkes, 1986). Since then, researchers began to further explore the area of teacher beliefs and constructs like decision-making and teacher knowledge. Furthermore, the focus shifted to how teachers' thinking affected their actions inside the classroom. This indicated a shift from the emphasis on "observable teacher behaviours" to a "focus on teachers' thinking, beliefs, planning and decision-making processes" (Fang, 1996, p. 47). This gave emphasis to teacher beliefs as an important construct that influences what teachers do inside the classrooms. Moreover, teacher knowledge has also become the focus of interest to researchers in teacher education (Shulman, 1986). Teacher knowledge has been viewed as the total knowledge teachers have at their disposal at a certain time (Clandinin and Husu, 2017). Verloop et al. (2001) argue that the concept "knowledge" is used as "an overarching, inclusive concept, summarizing a large variety of cognitions, from conscious and well-balanced opinions to unconscious and un-reflected intuitions" (Verloop et al., 2001, p. 446).

However, there was a need to unify the different terms like teacher theories, teacher beliefs, teacher thoughts and teacher assumptions under one umbrella. During 1990s, research on language teacher beliefs blossomed based on the idea that it was not possible to fully understand teachers and teaching without focusing on their beliefs, thought and knowledge that informed their practice

(Borg, 2009). Much of this research aimed to investigate the knowledge base of language teachers with a special emphasis on its relationship with cognitive processes and classroom practices. It is an undeniable fact that this research has broadened the perspectives of both scholars and practitioners and has served to the understanding of teachers' mental lives and their learning-to-teach processes significantly. On the other hand, as Borg (2003) stated in his seminal review, these studies created a kind of terminological variability and has led to misconceptions and overlapping in the field. Therefore, it is essential to shed some light upon the different terminologies that are thought to influence teachers' act of teaching.

2.3 Teacher beliefs

A lot of confusion exists in literature when it comes to defining beliefs (Ertmer, 2006) due to the variety of terms used, the unclear conceptualization and diverse identifications of beliefs, and the structures underpinning them (Pajares, 1992). Pajares (1992) claims that belief, in general, cannot be clearly defined because "as a global construct, belief does not lend itself easily to empirical investigation" (Pajares, 1992, p. 308). Despite that, he insists that the study of beliefs is a legitimate inquiry in all fields. Hence, in an attempt to resolve this confusion, Pajares (1992) suggests that a variation should be established to signal the difference between teachers' common beliefs and those pertinent to education and teaching. He argues that the viability of belief researching is strongly associated with researchers' abilities to narrowing down beliefs, and choosing thoughtful design and appropriate methodology (Pajares 1992).

However, even though the term beliefs is difficult to define, since no clear distinctions can be made between this term and other terms such as attitudes, perceptions and conceptions (König, 2012), Richardson (1996) attempted to define beliefs as "understandings, premises or prepositions about the world that are felt to be true" (Richardson, 1996, p. 103). In an educational setting, there is evidence that the teachers' beliefs influence their choice of the teaching methods that they opt to use (Leinhardt and Greeno, 1986). The struggle to develop a clear understanding of an association between teachers' beliefs and instructional practices is perhaps owed to researchers' failure to define beliefs accurately (Pajares, 1992). Munby (1982), in a review of literature in the area of

teachers' belief, shares the same view, and further claims that the absence of a relationship between both aspects is caused by either inappropriate instrumentation or unsuitable model (Munby, 1982). In fact, some view "good teaching" to include "references to belief change, reformed ideas about what it means to know and what it means to teach" (Tatto et al., 2003, p. 125), signifying a constant reformation and refining of cognition which in turn impacts instructional actions. Hence, "belief change will, by implication, result in better practice and benefit pupil's learning" (Tatto et al., 2003, p. 147).

Furthermore, teacher beliefs about technology are thought to influence their technology use in the classroom. For example, Ertmer (1999) considers teachers' beliefs as a key factor to their use of technology. The level and type of ICT use in the classroom by teachers are related to teachers' educational and pedagogical beliefs (Ertmer, 2005; Becker and Ravitz, 2001). Some studies suggest that there is a strong link between teachers' existing pedagogical beliefs and their actual use of technology (Sugar et al., 2004). The overall results of the study of Sugar et al. (2004) indicated that technology use decisions are influenced by teachers' individual attitudes and personal beliefs about technology use. Also, it was found that if teachers hold constructivist beliefs about teaching and learning, they are more likely to use technology in their classes (Ertmer, 2005). Several factors affect teachers' beliefs. For example, teachers' experiences as learners were found to highly influence teachers' beliefs (Borg, 2006). In addition, teachers' beliefs may be altered or strengthened by the various experiences which teachers gain through the different professional development courses that they attend (Pajares, 1992).

Philipp (2007, p. 259) defines attitudes as "manners of acting, feeling, or thinking that show one's disposition or opinion". Bhargava and Pathy (2014) stated that attitudes are shaped through the experience and they influence the response of individuals towards a stimuli. Although teacher attitudes are used interchangeably with teacher beliefs (Pajares, 1992), Philipp (2007) argues that attitudes change more quickly than beliefs and are less cognitive than beliefs as well. That is, beliefs are harder to change than attitudes because beliefs are psychologically deeply held. Attitudes are important because they drive teachers' actions since positive attitudes towards an innovation, for instance,

would make teachers more motivated to employ or apply that innovation (Estrada et al., 2016).

Nevertheless, while beliefs have been used as substitutes to attitude, values, perceptions and personal theories (Pajares, 1992), the difference between beliefs and knowledge has caused some confusion in teacher cognition research (Richardson, 2003). The attempt to “separate knowledge, belief and related concepts is not a particularly fruitful exercise given that in the mind of the teachers these constructs are not held or perceived distinctively” (Borg, 2006, p. 33-34). Therefore, what follows is an attempt to further understand what is meant by teacher knowledge in teacher education since teacher knowledge forms an important element of teacher cognition (Borg, 2006).

2.4 Teacher knowledge

Teacher knowledge is a key component in teachers’ cognition (Borg, 2006). Shulman (1986) suggested that we distinguish between three different categories of teacher content knowledge namely: subject-matter content knowledge, pedagogical content knowledge and curricular knowledge. In addition, Cochran-Smith and Lytle (1999) make distinction between three key conceptions of teacher knowledge which are “knowledge-for-practice” which refers to formal knowledge and theory, “knowledge-in-practice” which represents teachers’ practical knowledge, and “knowledge-of-practice” that teachers generate when working within their context to theorize and construct their work (Cochran-Smith and Lytle, 1999, p. 250).

While previously the focus of teacher education was on teachers’ content knowledge, the focus shifted recently towards pedagogical knowledge (Koehler and Mishra, 2009). Later, Shulman (1986) introduced the notion of Pedagogical Content Knowledge to emphasize the significance of addressing both types of knowledge in a combined manner. However, based on Shulman’s (1986) notion of teacher knowledge, Koehler and Mishra (2009) added another dimension which is technology, in order to address the possible consequences of using technology in teaching as an innovation. They introduced a model called Technological Pedagogical and Content Knowledge (TPCK) based on the assumption that “technologies often come with their own imperatives that

constrain the content that has to be covered and the nature of possible representations” (Koehler and Mishra, 2009, p. 1025). This model argues that the three key sources of knowledge, technology, pedagogy and content, are interconnected to develop good teacher knowledge. It gives emphasis to the importance of teacher knowledge as a key constituent of teacher cognition particularly when integrating technology in teaching.

The TPACK model can serve as a reference for teachers’ abilities to use technology in teaching. It can be useful to understand the relationship between teachers decisions to integrate technology and their beliefs (Liang et al., 2017). Also, the model assists to measure teacher knowledge in relation to technology use which can help explain the complexity of teachers’ understandings of technology integration. Koehler and Mishra (2009) themselves emphasized the importance of TPACK to further understand teacher cognition in relation to technology use since the framework “seeks to assist the development of better techniques for discovering and describing how technology-related professional knowledge is implemented and instantiated in practice” Koehler and Mishra (2009, p. 67).

2.5 Teacher identity

Teacher identity has been defined as a “construct, mental image, or model of what “being a teacher” means that guides teachers’ practices as they aim to enact “being a teacher” through specific acts of teacher identity” (Pennington, 2014, p. 17). Pennington (2014) argues that teachers in different fields have different models of identity. Beijaard et al. (2004, p. 122) conducted a review of studies pertaining to teacher identity and identified five key features of teachers’ professional identity: teacher professional identity is an ongoing process, it implies both person and context, and it consists of sub-identities and active involvement in professional development.

However, literature suggests that teacher identity is dynamic and shifts over time as a result of a wide range of factors, both internal and external (Beauchamp and Thomas, 2009). Pennington and Richards (2016), too, argue that teachers continue to construct, reconstruct and modify their identities as

teachers based on the social and professional context they work within. Teachers' personal histories, the culture of the institution in addition to self-reflection influence teachers' identities and shape them (Vokatis and Zhang, 2016).

Technology integration can be one influential factor that affects teachers' identities (Lynch, 2002). Teachers might view technology integration as a threat to their teacher identities particularly when technology integration may be viewed as a loss of control (Lynch, 2002). For example, the findings of Curwood (2014) suggest that technology integration has contributed to changing teachers' professional identities. Teachers in the study struggled to re-imagine themselves as teachers as a result of using technology. Curwood (2014) states that "technology integration may challenge teachers' established identities or threaten their authority in the classroom" (Curwood, 2014, p. 156). This is confirmed by Liu and Geertshuis (2016) who emphasize the importance of attending to aspects of teachers' professional identity when technology is used for teaching and learning. In addition, Mario Barajas and Scheueremann (2003) state that teacher professional identities and technology both influence each other and are influenced by teachers' contexts.

The relationship between the different terminologies that are included under the umbrella of teacher cognition is thought to be strong. For example, Woods (1996a) argues that teachers hold a general cognitive construct in which their beliefs, knowledge and attitudes intersected. It was hard for teachers to separate knowledge from beliefs, for instance. Therefore, Woods proposes the hypothetical construct BAK (beliefs, attitudes and knowledge) encompassing them all to emphasize the relationship between the different constructs. On the other hand, teacher cognition was also proposed as a term to include different constructs like teacher beliefs, teacher knowledge, teacher assumptions and teacher actions inside the classroom. The following is an overview of what teacher cognition stands for and why it is considered important to look into.

2.6 Defining teacher cognition

The introduction of teacher cognition as a comprehensive and inclusive term to include the different interrelated terminologies was seen by some researchers positively. That was mainly due to the fact that diverse terminology were being attributed to it and with differing concepts referring to similar constructs (Pajares, 1992; Borg, 2006). For example, beliefs can be found to represent attitudes, values opinions and conceptions according to Pajares (Pajares, 1992). Kagan (1992b) views teacher beliefs as the thoughts that teachers possess about teaching and students. However, Kagan's definition of teacher cognition does not emphasize important aspects that are closely related to teacher cognition such as instructional practices and the context. In addition, while some definitions of teacher cognition emphasize teacher knowledge (Freeman, 2002), others highlight teacher theories (Borg, 1999), personal theories (Kelly, 2003) and teachers' personal philosophies (Raths, 2001). In an attempt to investigate the nature of teacher knowledge, Grossman et al. (1989) conclude that teacher knowledge is highly linked with teachers' beliefs. In fact, "teacher knowledge" has been used to refer to overarching concepts that "a person knows or believes to be true" (Alexander et al., 1991, p. 317). Verloop et al. (2001) suggest using the term "teacher knowledge" or "teacher practical knowledge" (Elbaz, 1981) to refer to teacher cognition including implicit forms of knowledge because "in the mind of the teacher, components of knowledge, beliefs, conceptions, and intuitions are inextricably intertwined" (Verloop et al., 2001, p. 446). Another term that was used to represent teachers' cognitions about teaching were "teacher's mental contents" (Ernest, 1989, p. 1) which include subject knowledge and beliefs about teaching and learning. All of these terminologies, in fact, attempt to describe how teachers make decisions about teaching. This suggests that different complex constructs are included when defining teacher cognition and that different definitions exist. Therefore, it is important to choose one particular definition that encompasses the major terms associated with teacher cognition.

In his book on teacher cognition, Borg (2006) strongly opposes the notion of introducing new terms that add more complexity to the issue of teacher cognition, and that rationalization in this respect will create unity and coherence

(Borg, 2006). In defining language teacher cognition, Borg (2006) includes “what language teachers think, know and believe – and of its relationship to teachers’ classroom practices” (Borg, 2006, p. 1), to which he later added the “attitudes, identities and emotions, in recognition of the fact that these are all aspects of the unobservable dimension of teaching” (Borg, 2012 , p. 11). For the purpose of this study, Borg’s definition will be used as a definition of teacher cognition for two reasons. First, it embraces most of the constructs that are found to influence teachers’ “mental lives”, including beliefs, assumptions, conceptions, knowledge and attitudes. Second, the definition suggested by Borg also accentuates the relationship between teacher cognition and instructional practice, and it is commonly recognized that teachers’ beliefs and perceptions about teaching influence their instructional practices (Pajares, 1992; Woods, 1996b).

2.7 Significance of teacher cognition

The importance of teacher cognition stems from the fact that teacher beliefs (see Section 2.3) constitute a major influence on what they do. Richardson (2003), for example, cites two main reasons why beliefs should be studied. First, it is thought that beliefs are the focus of change in teacher education programmes, and second, beliefs guide teachers’ teaching actions. Actually, teaching itself is viewed by some researchers “as an activity which has to do, among other things, with the modification and formation of belief systems” (Green, 1971, p. 48). In fact, not only are beliefs important for teachers’ change, but they are considered “most significant predictors of individual change” (Smylie, 1988, p. 23). The significance of researching language teachers’ cognition also stems from the impact of their cognitive processes on their instructional practices (Borg, 2006) . Kagan (1992) shares the same view, as he states that in order to better understand teachers’ abilities and skills, an understanding of their beliefs and attitudes is necessary (Kagan, 1992a). Findings also demonstrate that teacher cognition influences teachers’ instructional decisions (Kubanyiova, 2012). For instance, in Borg’s (2006) review of over 180 studies on foreign language contexts (Borg, 2006), teachers’

own beliefs, knowledge and self-perceptions of their level in the subject knowledge affect their instructional decisions in class.

However, even though research on teacher cognition has revealed the influence of teachers' beliefs on what they do in the classroom, there still exists an incongruence between both which may be attributed to other social, psychological and contextual factors (Borg, 2006). Teacher cognition does not happen in isolation because it is co-constructed by the individual teacher with the help of other members of the teaching community and under other contextual factors (Borg, 2006). Teacher cognition should not isolate teachers from the context within which they work but rather take into account the relationship between teachers and the community (Li, 2012). The identification of how and what influences teacher cognition has been a domain of inquiry in several studies (Borg, 2006). Research also demonstrates that teachers' beliefs and concepts about teaching are shaped during schooling experiences (Woods, 1996b), and that they may remain influential throughout their career. However, these concepts, beliefs and knowledge that shape teachers' cognition are affected by other professional programmes that they join where new practices, training or pedagogical orientations are introduced to them (Wilson and Myers, 2000). Other factors also contribute to this change through "complex interactions among teachers' cognitions and situational factors both inside the classroom and in the wider institutional and social context" (Borg, 2006, p. 105).

Figure 1 below demonstrates a proposed framework by Borg (Borg, 2006, p. 333) to investigate teacher cognition in which he involves an appreciation of the nature of teacher cognition and the issues related to it. The suggested framework was used to inform this study theoretically and to provide a road map for exploring teachers' relationships with technology use.

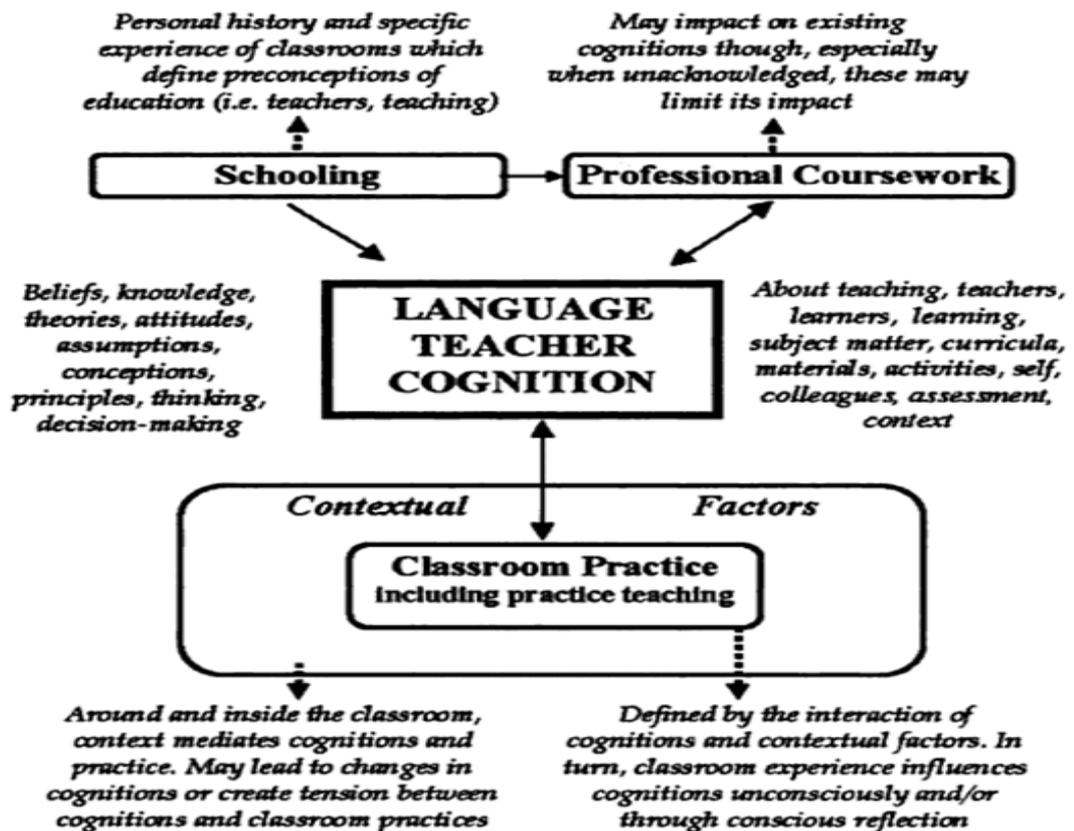


Figure 1 Elements and processes in language teacher cognition (Borg, 2006, p. 333)

2.8 Teacher cognition framework as a theoretical framework

The teacher cognition framework suggested by Borg (Borg, 2006) to study teacher cognition and instructional practices was chosen to inform this study for a few reasons. First, the framework was suggested by Borg (2006) for studying teacher cognition and the current study attempted to explore the relationship between teacher cognition and technology use, so it provided me with a comprehensive structure to explore teachers' cognitions in relation to

technology. Second, the framework emphasizes teachers' previous experiences and their influence on teachers' beliefs. Teachers' early experiences with technology formed an important source of data in this study. Third, the framework gives importance to the contextual factors that affect teachers' cognitions, which was one key aim of this study. Finally, several studies used the framework to study teacher cognition (Hill, 2014; Cooke, 2014; Suwannasom, 2010; Attia, 2011; Van Loi, 2011). However, since the framework does not include technology, as a tool or its relationship with teacher cognition, section 2.11 will make a link between teacher cognition and technology. Teacher cognition framework emphasizes four main aspects that are essential when addressing teacher cognition; teachers' experiences as learners, professional education courses and training, instructional practices and contextual factors. I now discuss three of these aspects which are teachers' experiences as learners, professional coursework, and classroom instructional practices. However, the role of the contextual factors will be discussed later in this chapter (see Section 2.17).

2.8.1 Teachers' formal and informal early learning experiences

Teachers tend to be influenced by their previous formal and informal learning experiences as learners. For example, to stress the influence of teachers' early learning experiences, Lortie (1977) coined the term "Apprentice of Observation" which he used to refer to the thousands of hours we spent observing teachers since we were school kids. Furthermore, Borg (2004, p. 274) provides the following definition for apprentice of observation:

The apprenticeship of observation describes the phenomenon whereby student teachers arrive for their training courses having spent thousands of hours as schoolchildren observing and evaluating professionals in action (Borg, 2004, p. 274).

These experiences, though not directly analysed by teachers, they form a point of reference for teachers' actions, interpretations and decisions (Borg, 2004). Teachers' past learning experiences also provide them with mental models of instruction which shape their behaviour in their classrooms (Windschitl, 2002).

For example, McGlynn-Stewart (2016) found that teachers' personal experiences in formal pre-service education programs played a significant role in their professional identities, decision-making abilities and instructional practices. McGlynn-Stewart (2016) recommends that in-service and pre-service programs provide opportunities for teachers to critically reflect on their early learning experiences and the role of those experiences on their cognition and practice. In the study conducted by Carter and Doyle (1996), participant teachers helped their students in ways that matched their experiences during the previous teacher education programs. This argument, that teachers are influenced by their early learning experiences, is also stated by Thompson et al. (2002).

Teachers' early informal learning experiences seem to have an influence on their cognitions and instructional practices. For example, teachers' personal and professional histories largely influence their professional identities. Barbezat and Bush (2013) found that teachers perceived an influence on their teaching practices which they associated with their early informal learning experiences during their teacher preparation programmes. In addition, Flores and Day (2006) conducted a study to analyse the influences of teachers' personal and professional histories on their current professional identities as teachers. The study revealed that teachers' personal and professional experiences, alongside school culture, strongly affect the type of teachers they become, as well as their effectiveness. In fact, the study also claims that the "relatively weak influence of pre-service programs might be strengthened by a stronger focus upon opportunities to experience and reflect upon personal biography and the cultural contexts of school" (Flores and Day, 2006, p. 230) which indicates the significance of early informal experiences. In addition, Cox (2014b) surveyed, observed and interviewed 44 instructors in seven different universities in order to examine teachers' perspectives about the influence of their early learning experiences on their teaching. Cox (2014b) found that teachers taught in ways that matched their own early learning experiences. In a study to examine teachers' thinking about technology use in higher education, Shelton (2014a) participants justified their decisions about technology use in terms of their personal choice, and tended to utilize technology in ways that also matched

their early personal learning preferences. Shelton's (2014b) study revealed that early learning experiences with technology "have shaped participants' thinking about technology" (Shelton, 2014a, p. 227).

Furthermore, other early social experiences that teachers go through may also influence their beliefs and teaching practices. For example, some of the participants in Shelton's (2014b) study associated their incorporation of technology in their classrooms with their social experiences when they used technology as learners. Social environment was also found to be an essential factor influencing teachers' cognition about technology in a study that explored the effect of early experiences on teacher cognition (Attia, 2011). In this vein, Richardson (1996) also argued that personal influences, schooling experiences and formal knowledge impacted teachers' cognition and knowledge. In their book, *Linking Practice and Theory*, Korthagen et al. (2001) emphasized the role of teachers' personal histories in influencing teachers' cognitions and actions and argued that this influence could be positive or negative. However, although studies that looked at personal histories revealed that teachers used their personal experiences as learners when making decisions about teaching and learning, it has also been argued that personal narratives can best present significant findings when used to examine how early learning experiences influence teachers' beliefs and practices (Carter and Doyle, 1996).

2.8.2 Professional coursework

The professional coursework that teachers join before or after they become teachers has a significant influence on their cognition and instructional practices (Borg, 2006). Several studies have attempted to investigate the impact of professional development on teachers' cognitions and practices which claim that a relationship between professional development and teacher belief change exists. For instance, Borg (2011) conducted a study to examine the impact of an intensive eight-week professional coursework program on the beliefs of six teachers. The findings provided evidence that teachers were influenced by the professional coursework they were offered. For example, their beliefs were strengthened as a result of participating in the course. Also some teachers reported that they experienced shifts in their previously held beliefs about some aspect of language teaching. Another study was initiated by Blanchard et al.

(2016) to find out the impact of technology-enhanced professional development course on the beliefs and practices of 20 teachers. The study revealed that teachers' instructional practices were transformed as a result of participating in the course.

For professional development courses to achieve their role of improving teachers' abilities to teach, there are some key features. For instance, professional development programs must include active learning whereby teachers practice what they learn (Heller et al., 2012). Also, teachers' content knowledge is considered essential when planning any professional development course so that the courses succeed in increasing teachers' content knowledge (Shulman, 1986). In fact, the professional courses where the content knowledge is missing were found to be unproductive (Cohen and Hill, 1998). The duration of the course and the active participation of teachers both contribute to the success of any professional development program (Birman et al., 2000). In addition, the work context in which teachers work has been cited as an important factor that determines the success of any professional development course (Scribner, 1999).

Having examined how early formal and informal learning experiences, as well as the role of professional coursework, influence teachers' cognition and practices, we now address the relationship between teacher cognition and classroom practices. Classroom practice is a key element in the teacher cognition framework, as suggested by Borg (2006), and which informed this study.

2.8.3 Teacher cognition and classroom instructional practices

Classroom instructional practices relate to the teacher's actions or behaviours inside the classroom (Scribner, 1999). They represent the activities of learning and teaching processes, and the instructional practices of the teacher which take place within a classroom as a system (Li and Oliveira, 2015). Although classroom instructional practices are viewed as part of the context, they have ample influence on cognition either unconsciously or through conscious reflection. Several studies have addressed the relationship between teachers' cognitions and instructional practices (Woods, 1996b; Golombek, 1998). For

example, the model suggested by Guskey (2002) for teacher change proposes that instructional practices which prove to be successful in teachers' views cause them to change their beliefs about teaching. This highlights the significance of the classroom instructional practices which may sometimes lead to significant changes in teachers' belief systems. Moreover, as far as technology is concerned, there are a number of studies which suggest that teachers' instructional practices in relation to technology influenced their beliefs and eventually changed their styles of teaching. For example, Kim et al. (2013b) revealed that three out of twelve teachers seemed to be influenced by their technology integration in their classes, and adopted different teaching styles such as the employment of problem-solving activities. Teachers' actions inside the classroom contributed to the reshaping of their beliefs and eventually the instructional practices. Teachers' instructional practices are greatly influenced by their cognitions about teaching (Calderhead, 1996; Kagan, 1992a).

On the other hand, beliefs were also found to affect teachers' decisions about their actions inside the classrooms. For example, the study conducted by Haney et al. (2002) suggested that "there is a relationship between what teachers believe (as identified through self-instruments) and what they do in the classroom" (Haney et al., 2002, p. 184). To examine the relationship between teachers' beliefs and their classroom practices, Brickhouse (1990) interviewed and observed three teachers. The study revealed that teachers' beliefs not only influenced their lesson delivery but, also shaped an "implicit curriculum concerning the nature of scientific knowledge" (Brickhouse, 1990, p. 53). This finding was also confirmed by another study by Farrell and Ives (2015). The findings of the case study demonstrated that teachers' instructional practices inside their classrooms were influenced by the beliefs they held about teaching (Farrell and Ives, 2015).

2.9 Refined teacher cognition framework in relation to technology

Using a case study approach, Attia (2011) investigated teacher cognition and technology use in the context of three teachers of Arabic language. Teachers' early learning experiences, teacher education, classroom practice and work

environment were examined in relation to technology use. Attia incorporated several data collection methods such as questionnaires, interviews, classroom observations, stimulated recalls and technological reflections. The findings revealed that teachers' context act as a mediating force. Moreover, findings showed that teachers' cognition about teaching and learning, and about themselves as Arabic language teachers influence their decisions to use technology. Another significant contribution of the study was that teacher cognition is largely influenced by teachers' early schooling experiences along with other social interactions with parents and social networks.

The study concluded with a realization of where technology can be situated within the teacher cognition framework suggested by Borg (2006). Figure 2 below demonstrates a refined framework representing the elements and processes of language teacher cognition which was proposed by Attia (2011, p. 207). The diagram proposed by Attia gives emphasis to four key points namely:

- It emphasizes ICT as an important element in the investigation of teacher cognition.
- It replaces the title of the "schooling" box into "early experiences as a learner" and changes "professional coursework" into "teacher education".
- It accentuates the relationship between teachers' early experiences as learners with their teacher education experiences through language teacher cognition instead of around it.
- It places the contextual factors around teacher cognition and practice instead of practices only.

The diagram suggested by Attia (2011), and which is a refinement of Borg's (2006) original framework, provided insight into better exploring and understanding the relationship between teacher cognition and technology use when conducting this study because it provided an important attempt to explain teachers' cognition in relation to technology use. The diagram was particularly useful in recognizing the influence of early experiences with technology, for instance, on teacher cognition as compared to just "schooling" influence depicted in the original framework suggested by Borg (2006). It also provided a starting point as to where technology could be placed in the context of teacher cognition.

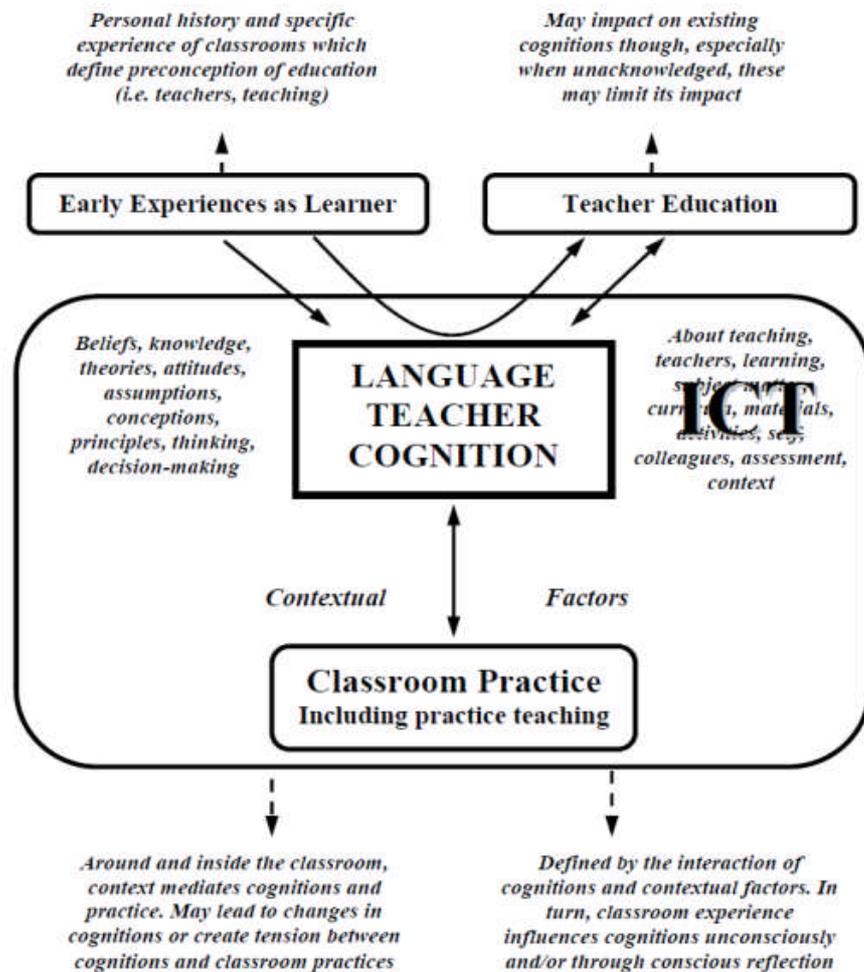


Figure 2 elements and processes in language teacher cognition refined framework by Attia (2011, p. 207).

2.10 Educational change

Different terminology has been attributed to teacher change in literature (Wedell, 2009) depending on the varying theoretical perspectives that it has been researched from (Kubanyiova, 2012). Terms such as innovation, teacher learning, teacher growth, cognitive change, reforms and others have been used to refer to different aspects related to educational change (Wedell, 2009; Kubanyiova, 2012). Wedell prefers to use the word “change” to describe any kind of alterations or adjustments that take place in the process or content of education. Kubanyiova (2012), though, distinguishes two distinctive broad approaches to change, each with a unique theoretical tradition. The first is concerned with change in its wider aspect featuring the social, cultural and

political contexts of schools. This approach is supported by sociology and anthropology. The second emphasizes on individuals or small groups where belief change, behavioural change and teacher cognition are key issues (Kubanyiova, 2012). Fullan (2007, p. 86) defines educational change as “a dynamic process involving interacting variables over time”.

The successful implementation of any educational change requires an understanding of the nature of change and how teachers perceive it (Clark and Clark, 1993). Flores (2003) too relates the success of change to exploring teachers' views of change and analysing the process more closely. Wedell and Malderez (2013) emphasize the need to recognize change as a process. Fullan (2003) claims that three dimensions are involved to achieve educational change; use of new materials, use of new teaching approaches and alteration in beliefs (Fullan, 2007) depending on what the change entails. That is, for educational change to succeed, it should alter teachers' beliefs in addition to other areas. For example, Wedell and Malderez (2013) suggest the need to afford time and support for teachers to think and rethink their pedagogical beliefs about teaching and learning. The last suggestion proposed by Wedell and Malderez (2013) to be of importance to ensure an effective change is the need to understand how teacher experience changes in reality.

Teacher change is considered crucial in the educational field and has been extensively researched (Richards et al., 2001). Richards et al. (2001) argue that teacher change can include knowledge, attitudes beliefs and instructional practices and that changes in teachers' practices are caused by changes in teachers' beliefs. Furthermore, Clarke and Hollingsworth (2002) identified different interpretations of the notion of teacher change:

- Change as training where teachers are “changed”
- Change as adaptation
- Change as personal development
- Change as local reform
- Change as systematic restructuring
- Change as growth or learning (Clarke and Hollingsworth, 2002, p. 948).

These non-exclusive interrelated perspectives on change are all essential when approaching teacher change, however, Clarke and Hollingsworth (2002) suggest that change as growth or learning is closely aligned with professional

development programs. For example, in a study to explore how teachers change as a result of participating in a professional development course, and the factors that influence that change Smith et al. (2003) identified four types of change that teachers experienced: no to minimal change, changes in thinking, changes in actions and integrated change. The most influential factors that have affected teachers' change are teachers' motivation to attend the professional development, years of experience, venue of first teaching experience and level of formal education (Smith et al., 2003).

2.10.1 Models of change

Successful and unsuccessful experiences during teachers' pre-service and in-service work contribute to changing their beliefs and knowledge about teaching particularly educational reforms or professional programs which attempt to change teachers' cognitions about teaching (Hoy et al., 2006). However, Guskey's (2002) model of change approaches change from another perspective. Guskey's (2002) model emphasizes that change first occurs in teachers' classroom practices and then it influences their beliefs and attitudes (Figure 3). The model presents another sequence to change where teachers' beliefs and attitudes are not changed until they have seen evidence of significant improvements or results of their practices. The model also emphasizes that "successful implementation" is what drives teachers' change and not the development program or change project in itself (Guskey, 2002, p. 383).

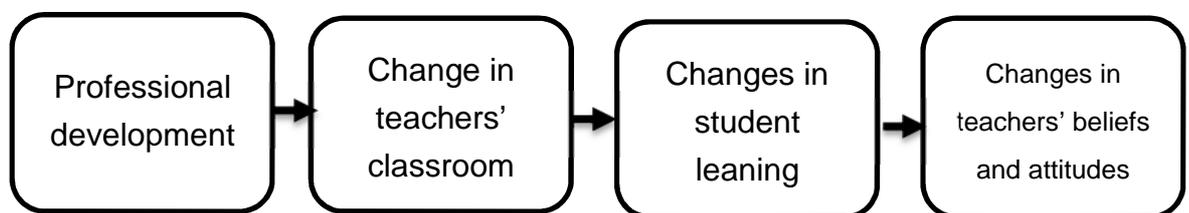


Figure 3 Guskey model of change (Guskey, 2002, p. 383)

A key role of this model is that it explains how teachers perceive and experience change. For example, Guskey proposes that change is a learning

experience that is motivated by what happens inside the classroom. If teachers see the result of their actions in the form of students' motivation and achievement, they are more likely to make a positive judgement about the effectiveness of their teaching (Rogers, 2007). The assumption proposed by the model that teachers' cognitions and beliefs are developed from their classroom experience helps to understand how students' reaction to technology use contributes to refining and reshaping of teachers' beliefs about technology. Teachers tend to try certain approaches or methods in their classrooms (e.g. technology) to see what happens and once improvements in students' learning and motivation are achieved, their thinking and decisions might change (Rogers, 2007). In addition the model also addresses "the relationship between teacher beliefs and practice and the influence of the stimuli for learning" (Boylan et al., 2018). However, it is imperative to understand how technology is thought to be a medium for changing teacher cognition.

2.11 Technology as a medium for changing teacher cognition

The last few decades have witnessed a global shift towards the use of Information Communication Technology (ICT). The worldwide inclination to implement ICT into the educational field is premised on the ability of ICT to improve learning (Punie et al., 2006). However, this shift to ICT in higher education has brought about several changes in education (Coates et al., 2005) and may be viewed as an educational change in itself (Watson, 2006). Watson (2006) claims that understanding the relationship between ICT and education means exploring innovation and change. ICT can renovate curricula and provide scaffolds to enhance teaching and learning (Kozma and Voogt, 2003). Its interactivity and ability to create channels of communications locally and globally fosters change within teachers. In a study by Collis and Wende (2002) to investigate the use of ICT in higher education and the implications for technology use, teaching and learning processes and staff, instructors were found to admit that the implementation of ICT led to some change in their teaching which occurred in several aspects (Collis and Wende, 2002). For instance, it promotes a learner-centred method of teaching, encourages

teachers to act as facilitators rather than lecturers and caters for autonomous learning (Dhanarajan, 2002).

The argument that technology can enhance teachers' abilities to use student-centred approaches is based on the potential of technology to provide opportunities for students to work together, practise problem-solving and obtain knowledge in creative ways through means of inquiring, experimenting, modelling and community building (Howland et al., 2013). Several studies claim that teachers experienced a change in their beliefs about teaching, and hence in their instructional practices, when integrating technology over time and may develop a more constructivist pedagogical approach (Becker and Ravitz, 1999; Baker et al., 1996; Mehlinger, 1996; McGrail, 2005; O'dwyer et al., 2005). For example, a study by Becker and Ravitz (1999) claim that teachers in about 153 schools where adequate technologies were provided experienced a change in their beliefs into a more constructivist method of teaching as a result of increased use of technology (Becker and Ravitz, 1999). They claim that teachers became more accepting of students' ideas, keener to explore areas that they were not confident about, interested in allocating more complex tasks to their students and provide them with varied learning styles (Becker and Ravitz, 1999). Even though they claim that the relationship between technology and teachers' cognition change is casual, they evidently state that it is still unclear whether teachers experienced the change to a more constructivist approach as a result of their existing inclination to do so, or because technology led them to transform their beliefs when used substantially (Becker and Ravitz, 1999).

Ruthven et al. (2004) believe that "research on technology in education has given surprisingly little attention to teachers' pedagogical perspectives, given the central part that they play in classroom technology use" (Ruthven et al., 2004, p. 260). In response to that, Ruthven et al. (2004) conducted a study to explore the nature of the pedagogical beliefs that teachers have when integrating technology in subjects such as English, Mathematics and Science at six secondary level schools. Using group interviews, the analysis indicates the contribution of technology in impacting teachers' pedagogical and instructional practices through helping teachers adopt a learner-centred approach. Another

study that explored the relationship between teachers' integration of technology and shifts in their pedagogical beliefs was carried out by Kerr (1991) who thinks that technology may stimulate change in teachers' thoughts and practices more than teachers consciously realize. Kerr (1991) argues that through the process of integrating, and adapting to, technology into teaching, teachers undergo pedagogical changes and reformation of their beliefs and instructional practices.

In the previous studies, teachers' attitudes and beliefs appear to play a major role in the success of technology to improve the quality of teaching and learning. It is thought that the fundamental role of technology is to support teachers to "change their way of teaching, and offer learning experiences to their students much better adapted to the learning needs (Pombortsis, 2005, p. 102). However, "if change is to occur in the classrooms, it must begin with the teacher, not the technology" (Buckenmeyer, 2010, p. 34). This influence of technology must first exist in teachers' cognition in order to successfully impact their instructional practices. As stated by Pombortsis, "any substantial existence of this instructional transformation should be primarily reflected in teachers' understandings about their teaching" and that it is a good reason why it is "imperative to record and analyse teachers' ideas, motivations, anxieties and practices concerning the integration of technology" (Pombortsis, 2005, p. 101). Backer and Ravitz (1999) found that teachers' transformation in instructional practices were likely to be associated with changes to constructivist pedagogies and that both are affected by the durability of technology implementation in the classroom by teachers and students (Becker and Ravitz, 1999). Bitner and Bitner (2002) also claim that for teachers to effectively implement technology, they must undergo a pedagogical paradigm shift from the teacher-centred method to a learner-centred one (Bitner and Bitner, 2002) and this change occurs as teachers' technology expertise rapidly grows (Groff and Mouza, 2008).

Yet, this is not always the case. For example, in some particular situations, even when teachers stated that technology helped them transform their beliefs about teaching into a more learner-centred approach, the findings show that either they failed to translate those changes into their instructional practices (Hill et al., 2005; Chen, 2008) or what they did in the classroom was not aligned with

their reported beliefs (Judson, 2006). Some researchers attribute the inconsistency between teachers' stated beliefs about technology and their actual instructional practices to their attempts to adjust their teaching according to the surrounding institutional supports and constraints (Tabachnick and Zeichner, 1986). Some possible contextual factors that have been reported as influential in teachers' technology integration are institution culture, educational policies, availability of equipment and adequate training (Bitner and Bitner, 2002; Bullock, 2004). In a qualitative research, Chen explored the relationship between teachers' beliefs and technology integration of 12 Taiwanese teachers and discovered inconsistency between teachers stated beliefs and enacted beliefs and related it to three factors; the contextual factors, teachers' limited theoretical understandings and teachers' other inconsistent beliefs (Chen, 2008). Moreover, in order to determine the impact of technology on teachers' pedagogical beliefs and the use of constructivist instructional practices, a study was conducted on 186 teachers in 11 school districts (Rakes et al., 2006). The results indicate a positive relationship between levels of technology integration and a change in instructional practice. However, all information in the survey is based on self-reported data without investigating whether these impacts have had a role in real classroom practice. Such self-reported instruments may reflect teachers' ideas but are inadequate when there is an interest in real instructional practice (Borg, 2006). This suggests that further research should be carried out to investigate how the availability of technology impacts teachers beliefs and what factors act in conjunction with technology that facilitate a change in teachers' beliefs and instructional practices.

Similarly, even those studies that claim the ability of technology to change teachers' cognitions and instructional practices (Becker et al., 1999) do not offer clarifications as to how this change takes place and what factors impede or stimulate it (Windschitl and Sahl, 2002). Studies usually "have not offered clear explanations for why some teachers transform their beliefs or change their belief profile" (Tondeur et al., 2008a, p. 2550-2551) or why teachers choose, or choose not, to apply the new changes in practice. Some research indicate that in conjunction with technology, other factors support teachers to change their beliefs but, nonetheless, "our understanding of how and under what specific

conditions these transformations take place is less clear and may require more highly contextualized investigations” (Windschitl and Sahl, 2002, p. 169). This is partly because literature has attempted to explore teachers’ beliefs and instructional practices in isolation from other institutional factors that may impact teachers’ development of their thinking (Windschitl and Sahl, 2002) when using technology. For instance, some studies have increasingly emphasized the importance of contextual and institutional factors on teachers’ cognition (Putnam and Borko, 2002; Burns, 1992; Borg, 2003). In fact, Borg states that the study of contextual factors is central and he believes that investigating teachers’ “cognition and practice without an awareness of the contexts in which these occur will inevitably provide partial, if not flawed, characterisations of teachers and teaching” (Borg, 2003, p. 106). Other studies have also ascertained that supplementary factors are associated with the success of technology to mediate with teachers’ cognition and practice (Becker, 2000a; Windschitl and Sahl, 2002).

2.12 Social shaping and technology

The social shaping of technology (SST) states that technologies are shaped by the available resources and organizational contexts but also shape the organizations and practices (Andrews and Haythornthwaite, 2007). The Social Shaping of Technology was originally developed by MacKenzie and Wajcman (1985). SST also helps to understand how the perceptions of the different parties (i.e. policy makers, administrators, teachers) involved in the implementation of technology socially support or impede the educationally-enabled change (Dutton et al., 2004). Teachers who use technology may be influenced by the type of technology they use in their classrooms because the whole process of technology integration is basically social. “The adoption and application of technology is as much a social as it is a technical process” (van Zundert, 2016, p. 899).

The success of any technology is largely determined by several social factors and not only its potential characteristics (Bjerregaard and Georg, 2011). Such social factors also allow for new understandings of the technology to emerge and a continuous questioning of how actors interact with the technology (Bjerregaard and Georg, 2011). For example, a technology that was designed to serve one particular function can be utilized in different contexts and for

different uses. That is why, Sparks (2014) argue that the benefit from the changes in social practices facilitated by technology must be clear and could be different from the one it was designed for.

2.13 Impact of technology on teacher cognition and instructional practices

Whereas some studies suggest that technology influences teachers' beliefs and teaching practices, there are others that suggest otherwise. For example, because of some factors that teachers cited as influential, technology did not lead to changes in beliefs and practices according to some studies (Abdussalam, 2016; Yamada et al., 2016; Çoklar and Yurdakul, 2017; Wong, 2013; Alev, 2003; de Aldama and Pozo, 2016; Tallvid, 2016). The study conducted by Yamada et al. (2016) showed that the use of laptops by teachers influenced their performance negatively and revealed that teachers were less likely to employ a student-centred approach in their teaching. This finding reiterates that of another recent study that was carried out to investigate teachers' technology integration experiences (Çoklar and Yurdakul, 2017). Four teachers were interviewed and the results indicated that teachers "took a teacher-centred stand in technology integration" rather than student-centred approach as they were expected to (Çoklar and Yurdakul, 2017, p. 19). The study found that teachers were not aware of how to integrate technology and concluded that teachers should be informed about how to appropriately integrate technology. Wong's (2013) study also revealed that teachers did not experience fundamental changes in their teaching practices and did not acquire knowledge-sharing strategies. Wong referred this to some influential factors such as lack of training and unawareness of the pedagogical benefits of technology. Alev (2003) explained that no fundamental change can occur if technology is incorporated in a limited way. That is, for technology to lead to shifts in teachers' beliefs and instructional practices, it must be integrated into teaching on a frequent basis. Furthermore, a recent study that was conducted to explore why technology failed to impact teachers' classroom practices by Tallvid (2016) revealed various key reasons that affect teachers' use of technology. Five diverse, yet interconnected, reasons were quoted by the participating teachers in the study which were; lack of technical competence,

unworthy effort, inadequate material, less control over classes and lack of time (Tallvid, 2016). In addition, Palak and Walls (2009) studied the relationship between teachers' beliefs and instructional technological practices and whether technology integration led to a change in instructional practice into a more student-centred approach. The findings show that teachers hardly used the student-centred approach and that technology did not cause a change in teaching styles. Palak and Walls attributed this to the effect of "teachers' educational beliefs and what they believed to be good teaching" (Palak and Walls, 2009, p. 435). Two other studies by de Aldama and Pozo (2016) and Abdussalam (2016) agree with the above results that technology did not facilitate a change in teachers' beliefs or instructional practices. Both studies discovered an extensive gap between teachers' held beliefs and their technology integration practices inside classrooms.

On the other hand, some studies have claimed that technology has impacted teacher cognition or instructional practice or both (Montrieux et al., 2015; Peled et al., 2015; Englund et al., 2017; Tondeur et al., 2016; Alharbi, 2014). For example, Tondeur et al. (2016) reviewed 14 studies to further understand the link between technology use and teachers' beliefs. In their review, 9 out of 4 studies indicated that technology can lead to changes in teachers' beliefs and teaching practices. They also emphasized that the relationship between pedagogical beliefs and technology use is bi-directional with each influencing the other. In addition, to identify 11 university teachers' perceptions and beliefs about technology, Shelton (2014a) conducted a qualitative multi-site case study to investigate how university teachers formed and reinterpreted their beliefs about technology. In Shelton's study, participants believed that technology impacted their teaching positively. Moreover, in their study to explore the impact of incorporating one to one computing in teachers' pedagogical beliefs and teaching practices, 3 out of 14 teachers stated that technology supported them with applying student-centred approaches where students were provided with more opportunities to reflect on their learning. In addition, a 10-year longitudinal study that aimed to examine teachers' conceptions and approaches to teaching in relation to technology use revealed similar findings. The study revealed that some teachers shifted their approach to teaching from a teacher-centred to

student-centred approach (Englund et al., 2017). Teachers were found to allow students more opportunities for learning by doing when using technology. Furthermore, three out of 14 teachers were also influenced by technology use in that they transformed their teaching ways as the study by Kim et al. (2013b) suggested. The three teachers experienced new roles such as acting as facilitators and guides more than as teachers. This perceived change of roles as a result of the use of technology was also a key finding in the study of Peled et al. (2015). Actually, the change in roles as a consequence of technology integration is largely suggested by literature (Riasati et al., 2012; McKnight et al., 2016; Gilakjani et al., 2013; Levin and Schrum, 2012). For instance, McKnight et al. (2016) found that the most influential effect of technology on teachers' practices was the shift to facilitator instead of knowledge transmitter.

In addition, Rossacci (2016) conducted a study to compare the differences between pre-teacher and post-teacher technological self-efficacy, technology proficiency, frequency of use, perceptions, classroom practices and student interactions following the implementation of ICT. The study attempted to discover whether the implementation of ICT results had any influence on teachers' classroom practices. Data was collected using surveys, teacher information technology logs, observation and interviews. The findings demonstrated that ICT influenced teachers' instructional practices in four main areas, such as classroom management, students' reflection, personalized learning and relevancy. In terms of classroom management, the teachers reported that they experienced a change in their use of time after implementing technology and also a change in their practices of monitoring students inside the classroom. Students' abilities to reflect on their learning was another dimension that teachers viewed as a change in their instructional practices as a result of technology implementation. Another important theme which emerged from the analysis of the teachers' data was their perception of a change into a more personalized learning approach after implementing ICT. The study showed that teachers' instructional practices transformed to integrate individualized learning opportunities to meet the different needs of students. These findings echo the results of another study conducted by Englund et al. (2017). In their study to examine nine teachers' conceptions of and approaches

to technology use in teaching, Englund et al. found that there were differences between novice and experienced teachers. For example, novice teachers demonstrated more rapid change from teacher-centred approaches to student-centred approaches of teaching compared to experienced teachers who, according to the study, exhibited little or no change at all.

2.14 Learner-centred approach

The learner-centred approach has been defined as “a system of instruction that places the student in its heart. It is teaching that facilitates active participation and independent inquiry, and seeks to instil among students the joy of learning inside and outside the classroom” (Ang et al., 2001, p. 2). A learner-centred approach “focuses on fostering communicative and collaborative skills amongst the students as well as with their teachers making the students more engaged rather than passive in their learning process” (Aguti et al., 2014, p. 391). Some of the principles that are associated with a learner-centred approach are giving learners more opportunity and choice about their learning, allowing learners more control and responsibility, the employment of various ways of learning, individualizing learning and independent learning (Hannum and McCombs, 2008; Reigeluth et al., 2015). Moreover, Ang et al. (2001, p. 5) cited some key elements of the learner-centred approach such as teachers acting as facilitators and not repositories of knowledge, teaching methods move away from knowledge transmitting into facilitation of students’ discovery and taking into account students’ skills and aptitudes.

Technology provides rich databases, tools, and resources to facilitate a learner-centred self-directed learning (Hannafin and Land, 1997). Evidence of the influence of technology to promote a learner-centred approach is seen when teachers use technology, and technology-enhanced learning environments, in the form of problems solving activities, interactive tasks, deepening understanding, and “establish conditions that enrich thinking and learning” (Hannafin and Land, 1997, p. 168). Furthermore, a learner-centred approach promoted by technology integration should create contexts where knowledge and skill are linked together to support authentic learning (Hannafin, 1995).

2.15 Constructivism and technology

Literature has linked technology integration with the use of constructivist approaches of teaching and learning. Constructivism has been defined as the “philosophical position which holds that any so-called reality is, in the most immediate and concrete sense, the mental construction of those who believe they have discovered and investigated it” (Saunders, 1992, p. 136). Furthermore, Saunders (1992) argues that the constructivist approach facilitates meaningful learning or understanding through learners’ interaction with the world. Saunders (1992) stated that the constructivist approach has implications for instructional practices. For example, making use of students’ experiences, allowing for more investigation techniques and students’ involvement in the activities. In addition, teachers should employ more hands-on activities which provide “learners with a high degree of active cognitive involvement, use of cooperative learning strategies, and the inclusion of test items which activate higher level cognitive processes” (Saunders, 1992, p. 140). One key feature of the constructivist approach of teaching is that knowledge must be constructed by learners themselves with the help of the teacher, rather than provided directly by the teacher (Feng, 1995). Paily (2013, p. 40) also states that “in a constructivist learning environment the role of the teacher is to facilitate and guide the knowledge construction process by engaging students in meaningful learning”.

Technology can assist teachers to promote a constructivist approach in their teaching. Computers can facilitate problem-solving perspectives within students and can also enhance learners’ cognitive and thinking skills (Petraglia, 1998). Learners can now learn in supportive environments facilitated by technology which provide them with various tools and choices that match their own needs and abilities (Jones, 1997). Moreover, it has been suggested that technology can provide a range of online environments and technology-based platforms that help students to design, create and use the knowledge available to them (Murphy, 1997). The authentic materials and collaborative tasks afforded by technology also contribute to the claim that technology can facilitate constructivist learning (Petraglia, 1998). For example, some technology-based activities require learners to explore the relevant information and develop

strategies for problem-solving (Gilakjani et al., 2013). In addition, Paily (2013) emphasizes the role of technology to support constructivism in the classroom that can transform the learning process through the incorporation of a myriad range of authentic resources, interactive content and collaborative materials.

2.16 Technology and Language teaching and learning

The history between technology and language learning dates back to the early time of humans when they started writing language down using some tools. Those tools enabled people to make language visible and preservable across distance and time (Chun et al., 2016). However, the use of modern technology in language learning has increased steadily since the introduction of computers in language classrooms. In fact, Chun et al. (2016, p. 65) states that “what is clear, however, is that it is not possible to ‘opt out’ of using technology: It is so pervasive and so interwoven with human activity that to teach language without some form of technology would create a very limited and artificial learning environment—if it were even possible at all”.

The research field of language learning and technology, commonly known as Computer Assisted Language Learning (CALL), covers research of every way of using computers for language learning purposes, from software explicitly designed for language learning to web-based environments such as virtual environments, social software and computer gaming. There is diversity in how the four basic language competences of reading, listening, speaking, and writing are represented in existing CALL research studies (Jung, 2005). This section gives an overview of the area and the research perspectives characterizing CALL, also pointing at the CALL interest in this thesis

The introduction of technology in language teaching and learning is also based on some potential benefits that technology is thought to promote. For example, the transfer of language learners from being more passive recipients of knowledge into participating as publishers when some technological application are used. This can be achieved by using web tools such as chat, e-mail, blogs and wikis (Godwin-Jones, 2003). The increased use of the web in today’s technology improved the language learning environment and hence provided more opportunities for communication and learning (Conole, 2008; Lankshear & Knobel, 2007). Thorne (2003) proposes that “digital communication technologies have made possible substantive aesthetic shifts in human communicative practices” (Thorne, 2003, p. 40). The structures of

communicative practices are affected by the usage of the technology and how literacy is materialized in different, sometimes unpredictable ways.

Research on online environments for language learning purposes is increasing. Turning to existing studies in online language learning, collaborative aspects of web-based tools in CALL are brought up (e.g., Arnold, Ducate, & Kost, 2009, Kessler, 2009, Mac & Coniam, 2008). Even though there are several case studies bringing up for instance online interaction and intercultural communication within language learning (e.g., O'Dowd & Ware, 2009; Thorne, 2010), there is a call for more research exploring and mapping out this area. The present thesis focuses on online language learning, in web-based environments where students interact within the frames of their language course. For the learners it is all about entering emergent communities and getting acquainted with new genres and discourses.

To sum up, the use of modern technology in language teaching is advocated by the assumption that it will help language teachers to provide several benefits to their learners like more access to the real world through online communication, access to language use and flexibility. Furthermore, the ability of blended learning to cater for the different styles of learning is also being appreciated in language teaching education field. However, some personal and contextual factors play a role in influencing motivating or demotivating teachers to use technology in ways that lead to positive changes in teaching and learning (Hu et al., 2003). The following is an overview of some of the factors that are thought to affect teachers' technology integration practices.

2.17 Factors that support/impede the impact of technology on teacher cognition

Teacher choice and motivation to fully integrate technology into teaching is due partially to some personal and contextual factors that exist in the culture within which they work such as how peers react to technology integration (Hu et al., 2003). A range of factors have been identified by research to influence teachers' decisions to integrate technology into teaching and under different classifications (Buabeng-Andoh, 2012a). These factors have been classified

into two different types, individual and institutional. For example, Rogers identified five attributes which impact teachers' choice to use technology as an innovation namely relative advantage, compatibility, complexity, trialability and observability (Rogers, 2005). Factors relating to teacher-level and school-level were also emphasized by Balanskat et al. (2006) as influential in terms of technology integration. In addition to the individual and school level factors, Sherry and Gibson (2002) found that technological and organizational factors also contribute largely to teachers' decisions to use technology. Neyland (2011) also classified factors affecting teachers' integration of technology into teacher level and institutional level. In addition, Ertmer (1999) discussed two main types of barriers that affect teachers' decisions to use technology: first-order and second-order barriers. First-order barriers to technology integration according to Ertmer (1999) include extrinsic factors such as a lack of access to technology and inadequate technical support while the second-order factors include teachers' beliefs. Therefore, a review of the main factors that influence teachers' integration of technology classified into teacher level and contextual level factors as the above literature review suggested, is shown below.

2.17.1 Factors related to Teacher-level

Zhao and Cziko (2001) indicated that personal factors motivate teachers to integrate technology in such a way that it promotes change. For instance, teachers must believe that: technology can meet their higher level goals, and that it will not cause disturbances in terms of goal achievement, and also that they are capable of using it effectively (Zhao and Cziko, 2001). Ertmer (2005) indicated that for technology to be able to change teachers' beliefs, teachers must observe effective technology implementation and where the cultural context promotes learning communities. Personal beliefs were also found to play a key role in motivating teachers to use technology in the classroom effectively (Ertmer, 2005) and that teachers should be involved in the process of integrating technology (Hennessy et al., 2005). Teachers' own beliefs underpin their decision to integrate technology (Lim and Khine, 2006) more often. Teachers who observe successful technology integration and who are personally convinced of the aptitude of technology are more likely to integrate it and experience a change in their beliefs (Zhao and Cziko, 2001; Lam, 2000).

However, various personal features might have some impact on teachers' integration of technology such as educational qualification, age, experience, and attitude towards technology (Schiller, 2003). Teachers' readiness to integrate technology highly determines how effective their integration is and not the mere provision of technology according to Jones (Jones, 2001). Hence, reviewing the personal characteristics that influence teachers' integration of technology is important.

2.17.1.1 **Teachers' attitudes**

It is likely that if teachers perceive technology as useful in fulfilling their educational aims, they will integrate it more widely into their teaching practices (Keengwe et al., 2008). In fact, beliefs constitute the most important element in a study that was conducted by Demirci (2009) to investigate teachers' views on the use of Geographic Information Systems (GIS) in Turkey. The research findings showed that even though various barriers were identified by teachers upon implementing the technology such as lack of hardware, software, and data existence, the positive attitudes of teachers towards GIS contributed to the success of the integration (Demirci, 2009). Another study where 139 teachers participated in a survey of teachers' attitudes about technology integration indicated that among the various factors that teachers cited as influential were their own positive attitudes towards using technology (Teo, 2009). In a similar study, Drent and Meelissen (2008) surveyed more than 200 teachers in the Netherlands in order to explore the factors that influence the innovative integration of technology into teaching, with the results of the study showing that teachers' pedagogical approach and positive attitude towards technology have a direct influence on their decisions to integrate technology. In fact, Wong and Li (2008) clearly state that "apart from organisational interventions represented by school climate and leadership, effective ICT implementation depends on pedagogical interventions as well" which made them propose that "perceived changes in teacher pedagogy" should be viewed as a factor to successful technology integration (Wong and Li, 2008, p. 103).

In a study to investigate the factors that affect teachers' technology use in the Netherlands, it was revealed that teachers' pedagogical beliefs and their positive attitudes towards technology use were important motivators towards

technology integration (Drent and Meelissen, 2008). In addition, the study carried out to investigate Chinese teachers' perceptions of the factors that mediate their technology integration revealed that their pedagogical beliefs about technology use influenced their decisions to use technology (Liu et al., 2017). For example, some participants chose not to use technology because they did not think it would be useful for their students whereas other participants thought that technology would cause distractions in the classes. These beliefs discouraged them from using technology in their classes.

However, teachers' positive attitudes towards technology do not always translate into frequent use of technology in the classroom. For example, Player-Koro (2012) conducted a study to investigate teachers' attitudes towards, and beliefs about, technology use. The study proposes a model wherein it is suggested that the positive attitudes to technology use generally do not seem to contribute much to teachers' technology use inside the classrooms. However, the study used quantitative instruments only to measure teachers' beliefs about technology use without any qualitative investigations.

2.17.1.2 **Computer competence**

Teachers' positive attitudes, although essential for successful technology integration, are also related to their computer experience. Teachers who possess adequate skills in using technology are more likely to show positivity towards technology (Sang et al., 2010). It has been recognized that teachers who reported negative attitudes in terms of technology integration signposted lack of skills in computer (Bordbar, 2010). For example, in a qualitative research by Peralta and Costata (2007) revealed that technology competence was a major indicator of teachers' inclination to integrate technology. Teachers involved in the study also quoted the importance of pedagogic competence in addition to computer competence in order for technology to be integrated successfully. Peralta and Costa conclude that teachers who are skilful in technology use are more confident to use it effectively. This is supported by Jones (Jones, 2004) who also thinks that teachers' competence in technology contributes greatly to their self-confidence and that teachers may become reluctant to use technology effectively if they lack such confidence. Gorder (2008) who conducted a study to explore how teachers integrated technology

for teaching in the classroom and teachers were compared based on gender, age, teaching experience, grade level taught, content area, and education level. The results of the study indicated that teachers who used technology frequently were more likely to integrate technology in the classroom (Gorder, 2008). A recent study by Liu et al. (2017) revealed that teachers' computer competency was a major factor affecting their technology use among other factors such as teachers' pedagogical beliefs.

2.17.1.3 **Teaching experience**

A significant correlation has been widely cited between teaching experience and technology integration. While one may expect that teachers with more teaching experience tend to use technology more often, the literature suggests otherwise (Wong and Li, 2008). For example, Baek et al. (2008) claim that teachers with less teaching experience are more likely to integrate technology. Further, Lau and Sim (2008), conducted a study on the extent of ICT adoption among 250 secondary school teachers in Malaysia. Their findings revealed that older teachers frequently use computer technology in the classrooms more than the younger teachers. The major reason for this could be that the older teachers have a rich experience in teaching, classroom management, and are also competent in the use of computers, and so can easily integrate ICT into their teaching. The result is in agreement with Russell et al. (2003a) who found that new teachers who were highly skilled with technology more than older teachers did not incorporate ICT into their teaching. The researchers cited two reasons: new teachers focus could be on how to use ICT instead of how to incorporate ICT in their teaching. Secondly, new teachers could experience some challenges in their first few years of teaching and spend most of their time familiarizing themselves with the school's curriculum and classroom management. However, the story is not complete if only factors relating to the individual teacher are taken into account. There is still a wide array of external factors involved which also play a significant role in motivating or demotivating teachers to integrate technology in their teaching.

2.17.2 Contextual level factors

Personal factors are not the only motive that stimulate teachers' transformation of their cognition when integrating technology. For example, lack of time (Becker and Ravitz, 2001), lack of technological resources (Mumtaz, 2000; Liu et al., 2016), lack of support (Ertmer, 1999) and lack of training all impact teachers' decisions to use technology and how they incorporate it in their teaching. A survey of more than 500 teachers conducted by Becker indicates that many teachers choose to use technology actively in their teaching because there were many teachers who used technology in their respective schools (Becker, 2000b). Becker claims that the community of teachers plays an important role in advocating teachers' integration of technology and further recommends that teachers "must have access to other people from whom they can learn, either experts who have already mastered the resource or a community of teacher-learners who pool their efforts and share their exploratory findings" (Becker, 2000b, p 303). In an inspiring culture that encourages technology integration, teachers immerse in using technology without fear of failure and with ongoing support (Clark, 2006; Vannatta and Fordham, 2004). This has been proved by a study to investigate factors that facilitated 25 teachers to integrate technology successfully in which important extrinsic factors such as professional development and technology support were found to help teachers translate their beliefs about technology use into practice (Ertmer et al., 2007). The study further indicated that technology not only provoked the development of more constructivist ideologies with teachers, but also facilitated teachers to translate them into practice when a supportive context was provided.

The framework proposed by Wong and Li (Figure 4) helps with understanding the complication of change in relation to technology integration and to unfold the various contextual factors of technology integration. The framework pays particular attention to the often disregarded social contexts and institutional culture in which teachers are situated (Wong and Li, 2008).

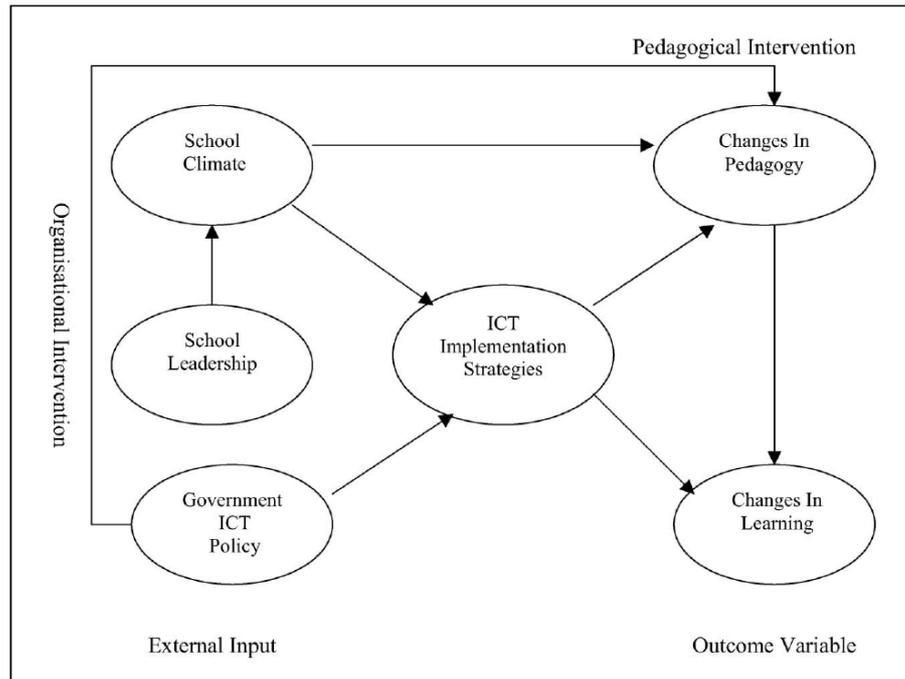


Figure 4 Theoretical framework conceptualising ICT implementation in schools (Wong and Li, 2008, p. 102)

Among the major contextual factors is the collegial exchange of professional experiences which enhances changes in pedagogical practices (Wong and Li, 2008; Zhao and Frank, 2003). A supportive context will lead to a more collegial exchange of experiences and capacity building (Wong and Li, 2008).

2.17.2.1 Professional development

Professional development has been viewed as a key factor that impacts teachers' decisions to incorporate technology in their teaching. Several studies have shown that technology-related programs highly motivate teachers to integrate technology (Mumtaz, 2000; Drent and Meelissen, 2008; Buabeng-Andoh, 2012b; Koh et al., 2017; Al-Hajri and Echchabi, 2017; Blackwell et al., 2014; Rienties et al., 2013). Professional opportunities influence teachers' attitudes and assist them to realize the importance, and ways, of technology integration (Plair, 2008). Sandholtz and Reilly (2004) warn that although teachers' technical abilities are essential, professional development programs enable teachers to use technology more frequently and purposefully to cater for students' needs. They argue that the professional development programs that empower teachers to use technology in their instruction are more important

because teachers, at the end of the day, are “teachers, not technicians”, and “to help teachers become more productive in their use of technology, we need to help them focus more on instruction and learning, and less on bits, bytes, and backups” (Sandholtz and Reilly, 2004, p. 510). Lack of professional training has been found to affect teachers’ levels of technology negatively. Teachers were demotivated to use technology because they did not possess the necessary skills and competence to use it in their classes (Kirkwood, 2000; Preston et al., 2000).

The quality of professional development programs makes a difference to teachers. For example, when more active engagement between teachers is involved in technology-related training courses, teachers benefited more. Lawless and Pellegrino (2007) argue that quality professional development programs should provide access to new technologies for teaching and learning, actively engage teachers in meaningful activities that match their relevant contexts, encourage collaboration, and have a clear vision for student performance. Access to resources for learning, and interaction with colleagues were also cited by Hoekstra et al. (2009) as important in professional development courses. Moreover, Caffarella and Zinn (1999) suggest that professional development programs should include three important elements: self-directed learning experiences, formal professional programs and organizational development strategies. Even though Lawless and Pellegrino claim that technology can eventually help teachers to adopt “new and arguably better approaches to instruction and/or change the content or context of learning”, they argue that “decisions about when to use technology, what technology to use, and for what purposes cannot be made in isolation of theories and research on learning, instruction, and assessment” (Lawless and Pellegrino, 2007, p. 581). Consequently, they determine that any professional development training targeting teachers’ integration of technology should combine professional development on the integration of technology in teaching, learning about technology and how to use a particular software. Actually, Lawless and Pellegrino (2007) believe that teachers who join professional training about technology integration can transform students’ performance.

2.17.2.2 **Technical support and availability**

Teachers might feel demotivated towards using technology if they are not provided with the necessary technical support, and access to resources, they need (Hsu and Kuan, 2013). In their review of studies, Tondeur et al. (2008b) found that teachers' technology integration is determined by the technological equipment and access provided to them. They argue that the provision of computers only encourage teachers to employ them for basic use in their instruction, and the provision of computers with the internet makes teachers use it as a learning tool. The study conducted by Liu et al. (2017) also revealed that a lack of technology, difficulty in accessing the available technology and lack of technical support were considered as barriers to technology integration by the Chinese teachers who participated in the study.

The study of Albugarni and Ahmed (2015) which attempted to identify the factors that affect the successful implementation of ICT in schools revealed that the lack of technological resources, among other factors, such as the lack of maintenance and the lack of ICT skills, were perceived as inhibitors from the perspectives of the participating teachers. These findings are also supported by Bozdogan and Rasit (2014) whose study to investigate the level and frequency of ICT technology use by teachers and the factors influencing their use revealed similar results. For example, the study found that technical problems negatively influence teachers. Furthermore, the lack of technical support has also been found to lead to "teachers' conservativeness of accepting technology" which can be eliminated by means of providing technical support to teachers (Huang et al., 2017, p. 128).

2.17.2.3 **Institutional environment**

The positive institutional environment where teachers work embodied in the support and inspiration to integrate technology has been quoted as a key aspect. For example, Salinas et al. argue that a supportive institutional environment can be a significant factor to teachers' technology integration. They clearly stated that "the more support received from colleagues, the higher technology adoption levels will be" (Salinas et al., 2017, p. 6). Positive institutional environment was also found as key influential factor to teachers' technology integration in a recent study by Liu et al. (2017) to explore pre-

service Chinese teachers' perceptions of the internal and external factors affecting their technology use.

Several qualities can create a positive and encouraging institutional environment for technology integration. For example, McNeal Jr (2015) suggests three key factors: the support of the institutional culture of technological advancements, the support of the institutional culture of innovative teaching and the support of the institutional environment of teaching excellence. Despite being distinctive in nature, the three factors are interrelated. For example, as McNeal Jr explains, there could be a link between technological advancements and teaching innovation. In addition, culture also plays an indispensable role in teachers' motivation to incorporate technology in their teaching (Barton, 2010). In the Arab world, for instance, culture was among the factors that inhibited teachers from using technology especially when there was a great deal of uncertainty and risk (Khushman et al., 2009).

2.18 Technology and higher education

The spread of technology across the world in all the various educational institutions has led to more implementation and incorporation of technology in the higher education institutions (Ryan and Rao, 2008). Several researchers have advocated the use of technology in higher education institutions for teaching, learning, research and communication (Yan and Fiorito, 2007). Technology has the potential to play an essential role in providing access to higher education for all (Yuan et al., 2013). However, to be able to provide access to quality education, higher education should take into account the following changes:

- Globalisation and the increased momentum for internationalisation in higher education.
- Worldwide growth and increasing demand for access to higher education
- Changing learner demographics and experience.
- Highly increased access to personal technology and social media
- The need for changes in cost, affordability and economic models for higher education (Yuan et al., 2013, p. 15).

Therefore, universities and colleges are investing in the implementation of ICT to support teaching and learning, and to make education widely accessible for all (Cheung and Huang, 2005). In particular, higher education institutions incorporate various ICT tools such as the internet, email, and administrative and management systems (Macharia and Pelser, 2014). Technology is being utilized in several areas in higher education such as course materials development, content delivery, communication between teachers and learners, research, and administrative and management systems (Mondal and Mete, 2012). The uptake of technology by the different higher education institutions has entailed a change from the traditional ways of teaching and learning into new ways (Minishi-Majanja and Ocholla, 2003). For example, the use of technology has resulted in some changes in how teachers teach and how students learn (Oliver, 2002). Therefore, technology plays a key role in enabling higher education institutions to fully participate in the knowledge society where technology is expected to lead to radical changes in teaching and learning (Peeraer and Van Petegem, 2015). “Innovation does not lie per se in the introduction and use of ICT, but in its role as contributor of student-centred forms of teaching and learning” (Iniesta-Bonillo et al., 2013, p. 164).

The introduction of technology to the higher education institutions has yielded numerous opportunities for teachers and students. Some studies suggest that the use of ICT in the higher education sector has resulted in positive influences. For example, a study by Mondal (2017) suggests that students who were taught using technology showed significant improvements in their achievement. Furthermore, 90 undergraduate students perceived various effects as a result of using technology in teaching in a university in Romania (Duță and Martínez-Rivera, 2015). For example, they used technology to improve their learning, facilitate autonomous and independent learning, and students assumed different roles and increased motivation. In his book, Bates (2000) emphasizes that the successful use of technology for teaching and learning requires significant changes in teaching and organizational culture. Three key aspects are essential when approaching the management of technology in the higher education sector. These aspects are: the need to do more with less, the changing learning needs of society and the impact of new technologies on teaching and learning. The higher education institutions in Oman have been keen to implement and

incorporate technology in teaching, the management and administration of education. What follows is a synopsis of the research on technology use in Sultan Qaboos University.

2.19 Research on E-learning at SQU

A number of studies have investigated the implementation of e-learning in the Omani higher education context with particular attention to SQU. Studies have attempted to explore staff perceptions and beliefs with regards to the implementation of e-learning in teaching and learning while others have inspected students' perceptions and the impact of e-learning technologies on students' learning. For example, Osman and Ahmed (2003) conducted a study to examine SQU students' attitudes about the impact of web-assisted teaching. The survey indicated that students had positive attitudes about web-assisted teaching and that online instruction was as effective as traditional teaching methods. Another study was conducted to evaluate students' awareness and acceptance level of M-learning (Parsons and Ryu (2006) defined Mobile Learning as the utilization of mobile computing devices to deliver learning content) using a survey by Sarrab (2015). The study's findings demonstrated good M-learning awareness and acceptance levels, which show that students have positive attitudes about the use of mobile learning. In addition, the study by Al-Mukhaini et al. (2014) explored the social networking tools that might have an influence on teaching and learning from students' perspectives at different higher education colleges and universities in Oman. The study used quantitative and qualitative methodologies and approximately 106 students took part in the study, of which 56 per cent were female and 44 per cent were male. The findings of the study showed that the majority of students (63 per cent) indicated that the traditional style of teaching did not attract them because it was a poor, obsolete way of presenting course material. Rather, they are more interested in e-learning tools. Overall, all of these studies attempted to investigate a different perspective about educational technology, but none of them explored teachers' perceptions of how technology may have influenced their teacher cognition.

Abdelraheem (2004) explored beliefs of the SQU faculty when utilizing technology in teaching. An instrument was used by Abdelraheem to measure 250 faculty members' context beliefs about technology utilization in teaching. The study revealed significant differences between faculty members depending on their academic rank and years of experience. Al-Washahi (2007) conducted a qualitative-inquiry evaluation to understand the perceived effectiveness and factors that affect the faculty when using educational technology in the College of Education at SQU. The findings of the study revealed that teachers lacked support as a result of having no structured form of program or plan with clear vision and goals. Moreover, the study found an absence of methodological evaluation and follow-up to motivate and support faculty members in applying technology in their teaching. This might suggest the importance of providing teachers with support to help them incorporate technology purposefully in a way that benefits learning. A study was conducted to explore the factors that impact the adoption of ICT by teachers at SQU in Oman using Roger's theory of diffusion of innovation (Al-Senaidi et al., 2009). Although the overall level of ICT skills for the SQU faculty was advanced, the findings show that they do not routinely use ICT in practice and therefore the study recommends further investigations of the critical factors impacting SQU faculty use of ICT. However, the study merely focused on the variables related to Rogers' theory neglecting other important factors that may have an impact on teachers' adoption of technology such as personal and cultural attitudes.

The research that was carried out by Al Musawi et al. (2012) targeting students at SQU and aimed to implement a model for an enquiry based learning environment which is defined as "approaches to learning that are driven by a process of enquiry" (Kahn and O'Rourke, 2005, p. 1) using learning tasks and to examine the impact of the model on students. The results of the research indicated that students were in favour of such well-designed learning environments that enhance their learning experience. Tuzlukova et al. (2013) conducted a study to explore computer self-efficacy of English language teachers at SQU and the challenges they face when using computer technology in teaching. Over 100 teachers with different socio-cultural backgrounds participated in the study. The study demonstrated that teachers face several

challenges in using technology which mostly relate to their own computer self-efficacy. The study recommended that future professional development is tailored to increase teachers' beliefs of their self-efficacy to integrate technology in language teaching.

Moreover, a study set out to investigate more than 330 SQU faculty members acceptance of e-books using the Technology Acceptance Model (TAM). The study explored the effects of language and personal characteristics (gender, age, field of study) in relation to perceived usefulness, perceived ease of use, and usage of e-books for academic work. The findings showed that participants, who perceived electronic books as useful, used them more frequently and that younger males whose mother tongue was Arabic used e-books more than others. The study concluded that TAM was a good predictor of e-book usage despite the fact that it is based on Western contexts (Al-Suqri, 2014).

However, most of the studies reviewed above did not investigate how technology use has influenced or changed teachers' beliefs or how it has affected teachers' practices inside the classroom. For example, Al-Kindi et al. (2017) emphasized the significant role of MOOCs (Massive Online Open Courses) in changing teachers' thinking and teaching practices. Since MOOCs are online courses which provide unlimited participation and open access through the internet, Al-Kindi et al. stated that MOOCs "will make instructors or lecturers in SQU to modify their way of thinking in conducting their teaching method" (Al-Kindi et al., 2017, p. 41). Yet, no study has been published in Oman that explores how technology affects teachers and how their relationship with technology influences them. Recently, a study was conducted by Saleem et al. (2016) to investigate the level of acceptance of Moodle (Modular object-oriented dynamic learning environment) as a teaching and learning tool by the faculty of the department of information studies at SQU. The results of the study showed that while some participants used Moodle for teaching and learning, a group of them did not seem to be interested in using Moodle. The researchers recommend to "probe into the attitudes and perceptions of faculty members" (Saleem et al., 2016, p. 21). From the above review of Omani literature with regards to technology use, it can be summarized that teachers' beliefs and attitudes play an important role on technology integration (Al Senaidi, 2009;

Saleem et al., 2016; Al-Suqri, 2014). This conclusion emphasizes the importance of looking at teacher cognition (beliefs and assumptions) about teaching from a qualitative perspective as an essential element in technology integration research.

2.20 Summary

This chapter has provided a detailed discussion of the different issues related to the study in reference to the literature. The chapter provided a historical overview of the different constructs like teacher beliefs, teacher knowledge and teacher cognition and the relationship between them. Then it provided a review of teacher cognition and its key elements according to Borg (2006). The elements of the teacher cognition framework suggested by Borg were discussed especially early formal and informal experiences, professional coursework, teacher cognition and classroom instructional practices and the contextual factors that mediate the relationship between teacher cognition and classroom practices. The chapter has also presented the teacher cognition model as the theoretical framework which informed the current study with particular reference to the refined teacher cognition framework suggested by Attia (2011). The link between teacher cognition (and its elements) and technology were further discussed and the discussion accentuated a strong link between teacher cognition and technology integration. In addition, teacher change and the models underpinning it were also debated with particular attention to the role of technology to change teachers' cognition and instructional practices. The review of literature emphasized that technology can have the aptitude to change teachers' beliefs and instructional practices into more constructivist learner-centred approaches. Finally, the factors that mediate the relationship between teachers and technology integration were overviewed where teacher-level and context-level factors were discussed. I addressed the role of technology in the higher education institutions and the changes it entailed on higher education. I also looked at the available research in technology use and e-learning at SQU and the Centre for Preparatory Studies. However, the review of studies showed that most of the research did not examine how technology integration influenced or altered teachers' beliefs or

how they affected teachers' instructional practices inside the classroom which dictates more research to be conducted in this area particularly in Oman. The review of the literature also suggests that there is a gap in terms of how previous experiences with technology influence teachers' cognitions and classroom practices. In addition, exploring how teachers' beliefs and instructional practices change as a result of technology is yet another important issue which some researchers have called for such as Fullan (2007) and Beauchamp and Thomas (2009) particularly in relation to language teachers' cognitions (Borg, 2006). The second gap which emerged for the literature review was the lack of qualitative study to explore how technology influences teachers' cognition and instructional practices in the Omani context. One way of approaching the study of teachers' cognitions and practices is through qualitative narratives as Johnson and Golombek (2002) suggested. Borg (2006, p. 303) suggests the use of autobiographical accounts to examine teachers' professional life experiences. Most of the studies reviewed above either used quantitative methods of investigation or attempted to identify the level of technology use and the factors motivating and demotivating teachers to use technology. However, there is still a need to explore teachers' stories of their relationship with technology and how technology use, in addition to their previous technological experiences, influence their beliefs and classroom practice. Therefore, given that no studies approached Omani teachers' relationship with technology integration using a narrative approach, this could be viewed as another gap in the Omani context. Hence, in light of the above literature review and the gaps that emerged out of it, I will outline the research questions of the study in the next chapter. I also will discuss the methodological aspects taken into account to carry out this study as well as the process of data collection and analysis.

3 Chapter three: Methodology

3.1 Introduction

The review of the literature suggested that there exists a gap concerning the nature of influence caused by previous experiences with technology on teachers' cognitions and classroom practices. We have seen that some researchers called for the exploration of teachers' beliefs and practices like Fullan (2007) and Beauchamp and Thomas (2009) particularly in relation to language teachers' cognitions (Borg, 2006). Another gap which emerged from the literature review was the lack of qualitative study to explore how technology influences teachers' cognition and instructional practices in the Omani context. As most of the studies reviewed above either used quantitative methods of investigation or attempted to identify the level of technology use and the factors motivating and demotivating teachers to use technology. This chapter discusses the methodology of the study. It starts with an overview of the purpose of the study and the research questions that I intend to answer. It then goes on to situate the methodological aspects on some related theoretical perspectives leading to the choice of methodology, data collection instruments and phases, data analysis, and ethical considerations.

3.2 Purpose and research questions

This study aims to investigate the impact of technology use on Omani teacher's cognitions and instructional practices. The study will attempt to answer the following research questions:

- 1- What is the relationship between five Omani teachers' cognition and technology use?
- 2- How do early experiences with technology as learners influence five Omani teachers' perceptions in terms of their cognition and instructional practices?
- 3- How does frequent technology integration influence five Omani teachers' perceptions in terms of their cognition and instructional practices about teaching?

- 4- What factors mediate the relationship between technology integration and teachers' cognition and instructional practices?

3.3 Philosophical assumptions underpinning the research

The conceptualization of any research begins with a consideration of the ontological and epistemological assumptions which direct the research and identify the choices of methodological procedures to answer the research questions (Creswell and Poth, 2017). Ontology refers to “the nature of reality and its characteristics” (Creswell and Poth, 2017, p. 20). Pring (2014) defines epistemology as people’s assumptions about the nature of knowledge. The epistemological assumptions help researchers to “get as close as possible to the participants being studied” through which knowledge is obtained (Creswell and Poth, 2017, p. 20). In this research an interpretivist paradigm was employed. Interpretivist paradigm is defined as “the subjective world of human experience” (Cohen et al., 2013, p. 17). The focus here is on understanding the phenomenon in its context (Ling and Ling, 2016). The aim of this study was to understand more about teachers’ relationship with technology. Since narratives are “interpretative devices, through which people represent themselves” (Lawler, 2002, p. 242), research that explores narratives should be interpretivist in nature (Trahar, 2006). This interpretive perspective also bears in mind that research in the social sciences is not primarily concerned with generalisation but with interpretation (Scott and Usher, 1996).

In addition, as has been discussed previously (see Section 2.6), teacher cognition is a term that encompasses complex sets of beliefs which are highly influenced by various contextual and emotional values (Borg, 2006). The social interaction between teachers themselves and with the context they work within plays an important role in shaping and reshaping teachers’ cognitions. We have seen that the individual beliefs which teachers hold about teaching are socially constructed and continuously mediated individually and mutually. Therefore, in addition to the ontological and epistemological assumptions, two main aspects are essential when deciding on the methodological choices for this study; the teacher cognition framework, and the socio cultural perspective. Through the teacher cognition framework, Borg (2006) suggests that researching teacher

cognition is undertaken using a wide range of instruments to better elicit teachers' thoughts and perspectives (Borg, 2006). The sociocultural perspective requires an understanding of the surrounding environment in which individuals perceive, understand and socially interact with others (Mahn and John-Steiner, 2002). Sociocultural theorists also claim that humans lead lived stories with several elements interacting together (Connelly and Clandinin, 2006).

3.4 Research methodology

Research methodology is defined as the various methods, techniques and strategies that are employed and the rationale underlying the use of such methods in order to investigate a phenomena (Mouton and Marais, 1988). The interpretive perspective highlighted above has methodological implications. For example, the interpretivist perspective views the social world as complex and that individuals interpret happenings and events differently (Richards, 2003). It also allows researchers to examine personal meanings that people have about their experiences and actions. One key aim of the interpretive approach is "to understand the subjective world of human experience" (Cohen et al., 2013, p. 21).

Quantitative research has been defined by Aliaga and Gunderson (2006) as the process of explaining phenomena by means of collecting numerical data and using mathematical methods to analyse the data. However, one limitation of using a quantitative research is its weakness to fully understand the context or setting in which individuals exist, because "the voices of participants are not directly heard in quantitative research" (Creswell and Clark, 2011, p. 12) and therefore have a limited opportunity to express their thoughts. I used the questionnaire (see Appendix C) to assist me in identifying particular participants for the qualitative stage (Tashakkori and Teddlie, 2003). The data obtained from the questionnaire only helped in sampling (Greene and Caracelli, 1997). The basis for using a questionnaire for sampling in this study will be discussed in section 3.8.1.

Furthermore, since this research attempts to investigate participants' perceptions of the impact of technology on their cognitions and instructional

practices, and the factors that contributed to it, both descriptive and interpretive data are essential. Informed by the research questions that guided this study and the philosophical assumptions, a qualitative research was used to conduct this study. Qualitative research is “pragmatic, interpretive, and grounded in the lived experiences of people” (Marshall and Rossman, 2014, p. 2). Marshall and Rossman (2014) argue that there are some characteristics of qualitative research such as its ability to focus on individual lived experiences. Furthermore, Marshall and Rossman (2014) state that one of the strengths of this approach is to enable researchers to explore and describe the context and setting while searching for “a deeper understanding of the participants’ lived experiences of the phenomenon under study” (Marshall and Rossman, 2014, p. 92). These qualities of qualitative research are important and closely linked to the investigation aimed by this study because of the following justifications:

- Teacher cognition as a concept is complex and is made up of unobservable constructs such as beliefs, assumptions and attitudes. “A key challenge for researchers has been to identify data collection strategies through which these phenomena [teacher cognition] can be elicited” (Borg, 2006, p. 167).
- The current research aimed at exploring teachers’ past and current experiences with technology. Teachers’ lived experiences are best explored through qualitative research methods (Marshall and Rossman, 2014).
- The research questions sought to explore teachers’ stories of their relationship with technology and this entailed that qualitative methods be used (Clandinin, 2006).
- The study also aimed at investigating teachers’ instructional practices and documenting their actions inside the classroom. Participants’ views, interpretations, explanations and justifications of events were important sources of data to me and therefore a qualitative interpretation and description of participants’ experiences was found to be more appropriate for this study than the quantitative one (Richards, 2003).

3.5 Narrative inquiry

Cook et al. (2008, p. 15) stated that the “issues of identity, affect and technology require further investigation” and one way of doing that is through “creating a space for tutors’ own stories, and giving a voice to their individual perspectives and beliefs” (Cousins and Bissar, 2012, p. 2). Given that the purpose of this research is to stimulate teachers to reflect on their experiences when using technology and how this may have influenced their cognitions, the choice of

methodology is based on the notion that stories would raise questions and unveil experiences in such a way that is “more resonant with our own experiences than any psychological, sociological, or any conventionally scientific rendering of it” (Sandelowski, 1994, p. 52). Therefore, a narrative inquiry approach will be used in this research to best elicit teachers’ own experiences with technology integration.

3.5.1 Defining narrative inquiry

A number of definitions exist in literature for narrative inquiry. For example, Polkinghorne (1995, p. 5) defines narrative inquiry as “a subset of qualitative research designs in which stories are used to describe human action”. Trahar states that “narrative research focuses on the qualitative experiences of the participants and the meanings given by them to those experiences” (Trahar, 2006, p. 203). A more comprehensive definition of narrative inquiry is provided by Connelly and Clandinin (2006) which highlights what a narrative is:

“Arguments for the development and use of narrative inquiry come out of a view of human experience in which humans, individually and socially, lead storied lives. People shape their daily lives by stories of who they and others are and as they interpret their past in terms of those stories. Story, in the current idiom, is a portal through which a person enters the world and by which his or her experience of the world is interpreted and made personally meaningful. Viewed this way, narrative is the phenomena studied in inquiry. Narrative inquiry, the study of experience as story, then, is first and foremost a way of thinking about experience. Narrative inquiry as a methodology entails a view of the phenomena. To use narrative inquiry methodology is to adopt a particular view of experience as phenomena under study” (Connelly and Clandinin, 2006, p. 477).

The emphasis on individuals’ experiences in narrative inquiry research is largely based on Dewey’s perspectives that emphasize experience as an essential way of understanding people (Clandinin et al., 2007). However, the use of narrative inquiry in this study is based on several reasons. First, as has been discussed

earlier, teacher cognition is a complex construct that is made up of beliefs and assumptions that can only be accessed indirectly (Borg, 2006). Therefore, narratives may assist in understanding those beliefs and show how cognitions have been impacted by the use of technology. In this case, a “narrative lets researchers get at information that people do not consciously know themselves” and that the “analysis of people’s stories allows deeply hidden assumptions to surface” (Duff and Bell, 2002, p. 209). Second, the importance of studying the impact of technology on teachers’ cognitions using narrative inquiry also stems from the fact that narrative inquiry is not about hearing a narrative told by a teacher, rather that it enables the researcher to visualize and relive teachers’ experiences narratively. “Experience happens narratively. Therefore, educational experience should be studied narratively” (Connelly and Clandinin, 2000, p. 19). Through teachers’ stories, it will be possible to deeply look into their views and perceptions of how they experienced the impact of technology on their cognitions and how the context reshaped their views about teaching.

Third, Connelly and Clandinin (2006) identified “three commonplaces of narrative inquiry-temporality, sociality, and place-which specify dimensions of an inquiry space” and which offer a conceptual framework when employing this method. However, even though it is possible to look at one or more commonplaces separately, for a narrative inquiry to be carried out, a “simultaneous exploration of all three commonplaces” is needed (Connelly and Clandinin, 2006, p. 479). The three commonplaces are thought to interact with each other to form a narrative. This framework is strongly linked to the construct of teacher cognition as becomes clear below.

1- First commonplace: Temporality

By temporality Connelly and Clandinin (2006) mean that events and people have a past, present and future and that through this transition in time, a narrative can be best understood. This links with the notion that teacher cognition is influenced by teachers’ past experiences, their current professional and personal conditions, and their own perceptions of how this may influence them as teachers in the future (Borg, 2006) (see Section 2.6). Addressing teachers’ cognitions from a temporal point of view matches with narrative

inquiry framework and will enable both teachers and the researcher to perceive the temporal element during data collection and analysis.

2- Second commonplace: Sociality

The second important commonplace in narrative inquiry framework is sociality. That is, inquirers should take into account the personal conditions of the study participants such as the “feelings, hopes desires, aesthetic reactions, and moral dispositions” (Connelly and Clandinin, 2006, p. 480), in addition to “the existential conditions, the environment, surrounding factors and forces, people and otherwise, that form each individual’s context” (Clandinin et al., 2007, p. 23). In fact, as has been discussed previously (see Section 2.6), teacher cognition is a term that encompasses complex sets of beliefs which are highly influenced by various contextual and emotional values (Borg, 2006). The sociality dimension is found in the interaction between teachers themselves and with the context they work within which plays an important role in shaping and reshaping teachers’ cognitions. The individual beliefs that teachers hold about teaching (personal conditions) are socially constructed and continuously mediated mutually in the surrounding context (existential conditions).

3- Third commonplace: Place

By place, Connelly and Clandinin (2006) mean that narrative inquirers need to specify a location where the events take place. The importance of place is that it “may change as the inquiry delves into temporality” (Connelly and Clandinin, 2006, p. 480) and hence it might influence the experience that the narrator is talking about. People’s perceptions and cognitions about life are inseparably linked with their experiences in a particular place or various places.

3.5.2 Narrative inquiry as a method

Several theories exist which frame the methods that researchers can use in narrative inquiry. The type of method largely depends on the researcher’s epistemological stance. For example, the generative method can include several methods of data collection depending on the research topic and research design (Clandinin, 2006) post-positivist, constructivist and critical

perspectives, as Table 3 demonstrates. In post-positivist perspective which views the truth as semi-stable, structured interviews and structured observations are used to collect data and the analysis is structured as well. However, since the current research attempts to co-construct a lived experience of some teachers, where “participants’ intentions and interpretations are as important as the researcher’s” (Clandinin, 2006, p. 151), a constructivist perspective method was used. Following the results of the questionnaire, participants were asked to write an autobiographical account of their relationship with technology. During the qualitative stage, semi-structured interviews were conducted to further explore participants’ stories and follow-up with some issues they highlighted in their autobiographies. Also, observations and field notes were collected to ensure that “the narratives are socially constructed from semi-structured interviews or conversational interactions” (Clandinin, 2006, p. 151).

Epistemological Perspective	Theoretical Position on Power, Relationship, and Identity	Methods
I. Post-Positivist: semi-stable truth in context	1. Researcher directly controls content 2. Identity of researcher is never considered in research design 3. Belief relationships 4. Power remains with researcher	a. Narrators are selected who represent the population b. Structured interviews or solicited narratives c. Structured observations and field notes d. Structured analyses; narrators give no feedback
II. Constructivist: unstable truth in context	1- Co-constructed to maintain intentions of narrators 2- Identity of	a. Narrators are selected who reflect the theoretical frame b. Semi-structured interviews and conversations

	<p>researcher is considered in research design if warranted</p> <p>3- Varying relationship time with narrators, depending on design</p> <p>4- Power is shared between researchers and narrators</p>	<p>c. Semi-structured observations and field notes</p> <p>d. Structured and open-ended analyses; narrators give feedback</p>
<p>5- Critical: no stable truth; temporal understandings situated in history and political relations</p>	<p>1- Direction of narrative shifts between narrators and researchers</p> <p>2- Identity of researcher is always considered in research design</p> <p>3- Usually long relationships</p> <p>4- Power tensions are made explicit</p>	<p>a. Usually, narrators are those who meet and talk for regular life events</p> <p>b. Open-ended conversations</p> <p>c. Open-ended observations and field notes</p> <p>d. Critical whole-text analyses by researchers and narrators; semi-structured analyses; narrators always give feedback</p>
<p>Table 3 Intersections of Epistemology, Theory, and Methods in Narrative Inquiry (Clandinin, 2006, p. 150).</p>		

3.5.3 Five analytic lenses to approach narratives

Chase (2007) proposes five analytic lenses through which narrative can be approached. First, narrative is a way of making meaning and understanding one's or others' actions, and also organizing events into a meaningful story. Chase argues that narratives not only communicate the narrator's view, but also express their "emotions, thoughts, and interpretations" (Chase, 2007, p. 65). Second, "narratives as verbal action", which embody the narrator's voice and should be treated as such. Third, narratives are constrained and enabled by

social resources and circumstances. Researchers should bear in mind the various social, organizational and cultural aspects. Fourth, narratives are socially situated interactive performances. The interaction with the audience influences narratives. The fifth lens is that “researchers view *themselves* as narrators as they develop interpretations and find ways in which to present or publish their ideas about the narratives they studied” (Chase, 2007, p. 66).

A case study was used to collect and analyse participants’ narratives and experiences in order to get rich narrative accounts of participants’ experiences as Etherington and Bridges (2011) suggest. The following is a discussion of what a case study is and how it was used in this study.

3.6 Case study

The limitation of quantitative research in exploring social phenomenon in more depth has led researchers to recognize case study as a design. Since the purpose of this research was to explore how technology integration influenced teachers’ practices, and the factors contributing to this, a case study approach was employed. To investigate such a phenomenon, an understanding of the essential contextual conditions is mandatory. A case study enabled me to obtain an holistic idea of real-life events with regards to the relationship between technology integration and teachers’ cognitions based on its “ability to deal with a full variety of evidence” (Yin, 2009, p. 11). A twofold definition of a case study is presented by Yin (2009) which emphasizes two parts; scope and data collection and analysis.

1- *“A case study is an empirical inquiry that*

- *Investigates a contemporary phenomenon in depth and within its real-life context, especially when*
- *The boundaries between phenomenon and context are not clearly evident.*

2- *The case study inquiry*

- *Copes with technically distinctive situation in which there will be many more variables of interest than data points, and as one result*
- *Relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result*

- *Benefits from the prior development of theoretical propositions to guide data collection and analysis*” (Yin, 2009, p. 18).

Flyvbjerg (2006) argues that well-chosen case studies can significantly contribute to knowledge in social sciences since case studies can yield context-dependent knowledge based on the “closeness of the case study to real-life situations and its multiple wealth of details” (Flyvbjerg, 2006, p. 223). Hence, I decided to choose cases that showed high level of technology integration to get rich knowledge about the relationship between technology use and teacher cognition. Also, cases that are carefully selected and which embody critical theoretical frameworks that approach a particular problem can contribute to scientific knowledge (Flyvbjerg, 2006). In addition, case studies provide proximity to reality and generate advanced understandings as a result of the in-depth observations they usually involve. Finally, and most importantly, case studies focus on the details and elements of a real life narrative which may be difficult to approach using scientific formulas. Cohen et al. (2013, p. 256) cite different advantages of using case studies. For example, case study data are “strong in reality” in that they yield real data about participants’ own experiences. Moreover, case studies attend to social situations and have the ability to represent participants’ viewpoints. In addition, case studies make use of multiple sources of data, observations, questionnaires and interviews to explore participants’ viewpoints and attitudes in relation to the phenomena investigated (Yin, 2013).

3.6.1 Multiple-case study design

Yin states that attending to a case study design makes a research stronger and easier to undertake (Yin, 2013). He differentiates between two major types of case studies; single-case study and multiple-case study. Yin states that while the single case study covers one case, a multiple case study can cover “multiple cases and then draw a single set of “cross-case” conclusions” Yin (2013, p. 20). In this research, a multiple-case study approach was used to allow for more analysis within and across the cases chosen. This type of case studies can yield more robust and reliable evidence even though it is

considered more time consuming. The potential of a multiple case study, as mentioned by Yin, is that it provides a replication logic in that the cases chosen for investigation either (a) predicts similar results, or (b) predicts contrasting results. I chose a multiple-case study design because it allowed me the opportunity to explore the different variables among every case and within all cases. A multiple-case study design is appropriate if “the focus is on the cases and their unique contexts” (Bryman and Bell, 2011, p. 63). Cohen et al. (2013) also add that case studies can enable researchers to gain a unique example of real people in real situations which can be valuable for social sciences studies. Therefore, Yin (2009) recommends that a case study design makes use of multiple research methods to help explore a phenomena in depth. The following section addresses the methods that were used in this study to collect data.

3.7 Participants

The target participants of this study were Omani teachers teaching English Language in the Centre for Preparatory Studies at SQU in Oman. The reason I chose Omani teachers was because no previous studies, to my own knowledge, have been conducted to investigate the impact of technology on teachers’ cognitions and instructional practices in Oman. The study was conducted in one location only; SQU. Over 200 instructors from around 30 countries work at the CPS including 50 Omani teachers (SQU, 2013). The questionnaire was distributed to all Omani teachers through the gatekeepers of the Centre for Preparatory Studies administration, via email. However, not all of those who responded to the questionnaire took part in the qualitative phase of the study. Purposeful sampling was used in this study to select five participants from the total number of teachers who responded to the questionnaire. Purposeful sampling is defined as “strategically selecting information-rich cases to study, cases that by their nature and substance will illuminate the inquiry question being investigated” (Patton, 2014, p. 265). Researchers choose the sample which they believe they will learn best from (Merriam, 2002). Merriam (2002) argues that to begin purposeful sampling, the researcher must first determine the selection criteria in choosing participants for the study. The

criteria for the selection of the participants in this study were: Omani teachers who demonstrated a high level of awareness of technology use and who integrated technology frequently in their teaching.

3.8 Data collection

3.8.1 The quantitative phase

The main and only aim of this phase was to identify the target participants. The data from the questionnaire was used to select participants (see Appendix C). This phase consisted of a self-report instrument designed for the purpose of this study. Whereas the purpose of section one of the questionnaire was to gain demographic information about participants, section two attempted to elicit teachers' self-reported technology competence using a 4-point Likert scale where teachers were asked to choose one choice for each item that best described their levels. Section three aimed to enable teachers to self-evaluate the levels of technology integration in their classes. The development of sections two and three was informed by the following:

- Reference to Foundation Programme English Language document and Centre for Preparatory Studies Staff Handbook (The Language Centre, 2012b; The Language Centre, 2012a).
- Review of other instruments conducted by similar studies (Brese and Carstens, 2009; Department of Education and Training Western Australia, 2008).

The use of questionnaire in this study is based on several reasons. First, it enabled me to collect data quickly and economically (Borg, 2006). Self-report instruments such as questionnaires are based on the assumption that beliefs, knowledge and attitudes can be rated through a series of questions that require participants' responses, which are then used as evidence of teachers' cognitions (Borg, 2006). Second, it helped me to collect data without my presence as a researcher (Cohen et al., 2013) as I was located in the UK, whereas the target participants were situated in Oman. Third, since one aim of stage one was to identify participants for the qualitative stage, the questionnaire served as an introduction to those who later volunteered for stage two. Finally, questionnaires are considered "an effective tool for obtaining information on a variety of topics such as feelings, attitudes, behaviours, beliefs" (Gideon, 2012,

p. 92). The questionnaire was administered via the internet using a web-based survey. Web-based surveys are advisable because they have the potential to reach a larger number of participants (Cohen et al., 2013) without the need for my presence. One disadvantage of web-based surveys is sample frame (Fleming and Bowden, 2009). Problems with sample frame can occur in web-based surveys when some participants are excluded, and are potential target participants, or included by mistake in the survey (Couper, 2000). To solve this issue, the CPS gatekeepers have been notified to send the questionnaire to Omani teachers only. In addition, the participants' informed consent forms (see Appendix B) and the participants' information sheets (see Appendix L) clearly stated that one criterion for the selection of the participants in the study was being Omani.

3.8.2 The qualitative phase

The purpose of this phase was to explore the stories of five Omani teachers and how they perceived technology as impacting their teacher cognitions and instructional practices. Based on the results of the questionnaire, five participants were selected to take part in phase two. Stake (2013) states that a multi-case study starts with identifying the concept that binds cases together. Selection of the participants was based on the following criteria: Omani teachers who demonstrated a high level of awareness of technology use. Therefore, five participants were selected based on their stated frequency of technology integration. The reason that teachers who reported an awareness and frequent use of technology were chosen is because they are most likely to have been influenced by technology integration than others (Sang et al., 2010; Pedersen, 2006). I chose five teachers to ensure that I had enough data, even if someone decided to withdraw. This phase consisted of five methods of data collection namely, autobiographical accounts "Me and Technology", semi-structured interviews, classroom observations, post observation interviews, and final semi-structured interviews to tie ideas and themes together.

3.8.2.1 Autobiographical accounts "Me and Technology".

"Autobiographical accounts are a form of reflective writing which examine the writer's own professional and broader life experiences" (Borg, 2006, p. 275).

However, although the writing and analysis of autobiographical accounts “can provide insights into the connections between prior learning experience and current beliefs and practices”, few studies have included them in the study of teacher cognition (Borg, 2006, p. 259). In addition, autobiographies give teachers “voice” (Diamond, 1993). According to Pavlenko (2007), autobiographies can offer three important contributions. First, they offer an insight into participants’ inner worlds which may otherwise be unapproachable through other experimental methodologies. Second, they emphasize connections between the learning processes and phenomena to be investigated. Third, they are an important source of information in sociolinguistic research. In the current study, however, teachers were asked to write an autobiographical account about their encounter with technology as learners and as teachers of the English language (see Appendix D). These accounts were guided by some broad questions such as “when was your first encounter with technology as a learner? What technologies do you still remember? Was it a positive or negative experience? Why?”.

In the current study, one value of the use of autobiographical accounts was to provide a starting point to the exploration of how teachers’ beliefs and practices about technology reflect their previous experiences as learners and teachers of English. Teachers’ autobiographical accounts helped to provide me with a provisional image of Omani teachers’ beliefs and assumptions with regards to the impact of technology on their cognition, which were then followed up through subsequent interviews. In addition, the autobiographical accounts served as a window to teachers’ professional and academic backgrounds and stimulated them to think about the topic. They also allowed me as a researcher to learn about the rationale underpinning their teaching actions, decisions and interpretations of their beliefs and classroom practices in relation to technology integration. What is more important, though, is the fact that the teachers’ “Me and Technology” autobiographies had the potential to capture their experiences and to present a deeper understanding of how they viewed their relationship with technology and how their previous experiences and context helped reshape their cognitions rather than using numbers and statistics to do so (Carter, 1993). The themes that emerged from the analysis of the

autobiographies were used as prompts during the semi-structured interviews where teachers talked about their life experiences in relation to technology use in more detail.

Riessman (2008) presents two ways of representing a narrative conversation based on distinct views about language and communication. The first embodies a dialogical storytelling by the narrator and the researcher whereas the second represents an autobiographical account narrated independently of social interaction. In the first, the “self” is co-constructed and produced based on how the narrator wants to be known and with a social interaction from the part of the researcher. The interaction between both the narrator and researcher influences the narration and should be taken into account when interpreting the text. In the second, the “self” is produced independently of interaction and the emphasis is on the narrators’ own narrative. In other words, an autobiographical account “emerges *“full blown”* from the “self” of the narrator, rather than in conversation between a teller and a particular listener/questioner” (Riessman, 2008, p. 58). Both considerations were taken into account when designing the instruments of this study. The autobiographical accounts sought to present a “reflected self” that “exists independently of social interaction” (Riessman, 2008, p. 29). Hence, teachers were given the opportunity to write their narratives of the relationship with technology on their own and they sent them to the researcher. The initial semi-structured interviews, however, aimed at representing the narration from a “co-constructed self” perspective. In other words, I used the participants’ autobiographical accounts to further explore more events that they cited and allowed them the chance to elaborate on some of the events in their autobiographies.

All the autobiographical accounts were received via email and the preliminary analysis immediately started after receiving them. Polkinghorne differentiates between two types of narrative analysis; analysis of narratives and narrative analysis. In the first type, analysis of narratives, “researchers collect stories as data and analyse them with paradigmatic processes” which results in “descriptions of themes that hold across the stories” (Polkinghorne, 1995, p. 12). In the second type, though, “researchers collect descriptions of events and happenings and synthesize or configure them by means of a plot into a story or

stories” (Polkinghorne, 1995, p. 12). In this study, I used the first type. I analysed the autobiographical accounts (participants’ collected stories) thematically to identify themes that hold across each case.

3.8.2.2 Initial semi-structured interviews

Interviews are a “flexible tool for data collection, enabling multi-sensory channels to be used: verbal, non-verbal, spoken and heard” (Cohen et al., 2013, p. 249). Semi-structured interviews gather data about different aspects such as assumptions and beliefs using open-ended questions (Cohen et al., 2013). Generally, three main types of interviews exist in research; structured interviews where researchers are confined to a definite set of questions, semi-structured interviews where researchers make use of a loosely defined series of questions and the unstructured interviews where researchers have the freedom to generate questions during the interviews (Punch, 2013; Cohen et al., 2013; Borg, 2006). In this study, the initial semi-structured interviews were used to develop a relationship between the researcher and the participants and to make the interview experience a flexible conversation rather than a formal talk dominated by me as a researcher. In addition, they allowed the participants the chance to speak about their stories of life and narrate what happened with regards to the use of technology more freely. In fact, the less structure a narrative interview has, “the more effective it will be in achieving the goal of getting the person’s own story in the way, form, and style that the individual wants to tell it in” (Atkinson, 1998, p. 41). In addition, the flexibility afforded by semi-structured interviews enabled follow-up questions to be asked according to the progress of the interview which eventually provided “an individual interview a distinctive *“personality”* (Barkhuizen et al., 2013, p. 17). The themes that emerged from the autobiographical accounts were used as prompts during the interviews. Other areas of relevance were teachers’ early experiences, professional coursework, instructional practices and the context within which teachers’ work. These were informed by the teacher cognition framework (see Section 2.6). The questions used were basically open-ended questions using prompts such as “tell me about”, with particular links to the autobiographical accounts which provided a starting point.

Furthermore, semi-structured interviews provided an opportunity to further explore, validate and elaborate on participants' stories of their relationship with technology. Unlike structured interviews which are likely to involve questions that are based on a specific framework, semi-structured interviews gave me more space for elicitation depending on how participants responded and viewed their experiences. The interviews invited each participant to further add more details and elaborate on their stories in their own meaning, and "in a way more true to the respondent's natural thought and conversational process; it does not force the respondent into categorizations without meaning to her" (Strickland, 1994, p. 28).

Moreover, based on the analysis of autobiographical accounts provided by the participants, I generated some broad questions which helped me to further explore some of the themes which I felt needed more explanation (Appendix G). Some of the questions that were included in every initial interview differed from one case to another based on their narratives and based on the flow of the interviews. The interviews included topics about teachers' relationships with technology as learners and then as teachers (For an example of an initial interview, see Appendix H).

3.8.2.3 Classroom observation

In qualitative research, observation is considered an important method for collecting rich data (Cohen et al., 2013), especially in studies of teacher cognition (Borg, 2006). Observation has "a central role to play in the study of language teacher cognition by providing a concrete descriptive basis in relation to what teachers know, think and believe can be examined" (Borg, 2006, p. 231). A key feature of observation is that it offers the researcher the opportunity to gather "first-hand 'live' data" (Cohen et al., 2017). I used observation as an instrument because I wanted an opportunity "to gather 'live' data from naturally occurring social situations" (Cohen et al., 2013, p. 456). I was able to observe teachers during their real teaching and to compare what happened in their classrooms with what their stories of experience narrated.

Some limitations have been cited against the use of classroom observations. For example, people may change their way of behaving as a result of being

observed, observations are filtered through the researchers' lens, and observations are time-consuming (Sapsford and Jupp, 2006; Dörnyei, 2007). Therefore, I tried to establish trust between myself and the participants and explained the process and procedures of the observations to minimise stress (McKenney and Reeves, 2013). I also encouraged teachers to act naturally and sat at the back of classroom in order to cause minimum distraction to the flow of the lesson.

According to Cohen et al. (2013), there are two types of observations: participant and non-participant observations. In the first, researchers engage in the activities involved and are considered one of the group. Participant observations were criticized for being subjective and biased because observers might lose their perspective and become direct players in the investigation context (Cohen et al., 2017). On the other hand, non-participant observers do not engage in the events but mainly sit at the back of the classroom taking notes by means of a pre-set observational schedule (Cohen et al., 2013) In particular, I used non-participant observations in this study because this type of observations, where researchers only make notes of what takes place in the classroom without interacting with teachers or students, is preferred in teacher cognition research (Borg, 2006). As my role in this phase was to document teachers' instructional practices with regards to technology integration, I did not interfere in any way in the flow of the lesson. I also adopted a non-structured observation schedule to take notes without a preconceived list of structured points to observe (see Appendix F). Borg clearly argues that there is "no 'correct' figure to aim for in making decisions about the number of observations which are required in a study of language teacher cognition" (Borg, 2006, p. 246). Consequently, a total of two observations for each teacher were conducted in classes where teachers were expected to integrate technology in their lessons. I chose two for various reasons; to be able to get rich data and to have manageable data for analysis. Moreover, one observation may not be enough to capture teachers' instructional practices about technology because teachers may not use technology in all lessons. Therefore, I decided that two observations would enable me to obtain sufficient information about the teachers' practices. Added to this is the fact that teachers have busy timetables

and other jobs to do, and therefore, I felt that two observations were appropriate for me, as a researcher, and for them as teachers and participants in this study.

It was not possible to video-record the classroom observations, mainly for cultural and personal reasons given that the majority of teachers who agreed to participate in the qualitative phase were female teachers (4 out of 5). Female teachers in our culture do not usually agree to be video recorded. Therefore, during the observations, I used open note-taking forms where I documented notes about the lesson, classroom, teacher, teaching strategies used and the relationship between the teacher and students with specific emphasis on the use of technology and student-centred strategies. The notes tracked what took place during the classes in a narrative way without judging any actions (see Appendix K for a sample of classroom observation notes). However, teachers later had the opportunity to talk in more depth about the events and actions that took place during the observations in the follow-up interviews that were designed for this purpose. I used the observation notes as a reference when I felt that some of the teachers' views during interviews were unclear to me, and also to remind them or ask them about certain actions that took place during the observations.

Nevertheless, observations alone cannot provide sufficient insight into participants' beliefs and actions. Post-observation interviews were required to explore teachers' interpretations of their actions during the observations.

3.8.2.4 Post observation interviews

In this study, post-observation interviews were used to elicit teachers' thinking and viewpoints about the observed lessons using the observational notes collected by the researcher. The observation notes were used to stimulate teachers' thinking about their actions and decisions during the observations in a relatively free and open-ended manner to allow teachers the chance to talk freely about their actions and to express their perceptions and insights about their actions (Borg, 2006, p. 209). The interviews contributed largely to exploring the "aspects of cognition that lie behind the participants' decisions and actions" (Barnard and Burns, 2012, p. 145).

I conducted one interview following every classroom observation. During the interview, I used the recommendations made by Mackey and Gass (2013) which include the collection of data soon after the observation so that participants are more capable of commenting on the events. Another recommendation is giving participants simple instructions that provide them general guidelines about the procedure about the conducting of the interview rather than detailed instructions which might limit or otherwise direct the teachers' thoughts. I chose semi-structured interviews to allow teachers the chance to take the lead and comment verbally on the events that took place during the observations in more detail about their decisions and actions at various points during the lessons.

As much as possible, interviews were arranged to be held on the same day of the visit except in a few cases where participants' timetables were too busy. The interviews took place in the same classrooms of the visits to ensure a mental and emotional connection to the educational setting where teaching and learning took place. It was also a chance to encourage the teacher to talk about some technology devices that were utilized during the visit in addition to talking them through the lesson observed. Some participants talked with ease about their lessons when prompted by questions, whereas others were less talkative and expressed themselves using limited words. More prompts were used to get them "talk". The interviews were very useful in gaining more detail about teachers' actions with regards to technology use as well as other aspects of their teaching.

3.8.2.5 Final interviews

The final data collection method was a single semi-structured interview with every case individually. In this interview, I tried to tie all the ideas and thoughts emerging from each teacher together and follow up on any area for which I felt needed more clarification. This was a good chance for me to ask teachers about any event/idea that they talked about in the autobiographical account, or that had happened during the observation, or elicited during the post observation interviews. Another aim of the final interview was to elicit the factors that teachers perceived as affecting their relationship with technology.

3.9 Data analysis

3.9.1 Questionnaire data analysis

The questionnaire was distributed to all 50 Omani teachers at the CPS resulting in 27 responses only. The response rate is 54%. The responses were analysed and assigned numerical values through the process of coding. Cohen et al. define coding as the process of “assigning a code number to each answer to a survey question” Cohen et al. (2013, p. 348). I used SPSS software to analyse data and to formulate statistics which were useful in choosing the prospective participants for phase two. The results of the first section that sought for the teachers’ background information were analysed by SPSS in order to generate a general idea about the teachers. Then frequency distribution analysis was conducted to check how many respondents answered the questions. Table 4 demonstrates demographic information and statistics of the total teachers who responded to the questionnaire. Data from the questionnaire were analysed to choose the sample to take part in the second phase of the research. I only chose Omani teachers who showed advanced awareness of the technology competencies and who reported frequent use of technology. This selection was based on those who achieved the highest measurements in the questionnaire and were willing to take part in the qualitative phase. Not all teachers who responded to the questionnaire expressed their willingness to participate, therefore, they were excluded. A total of five teachers met the criteria: Omani teachers with advanced self-perceived levels of technology proficiency, frequently (or above) used technology and were willing to take part in the qualitative research.

Item	Choices	No.	%
Gender	Male	6	22.2 %
	Female	21	77.7%
Age	Less than 25 years	4	14.8%
	25-35 years	20	74%

	Above 35 years	3	11.1%
Teaching experience	1-5 years	4	14.8%
	6-10 years	6	22.2%
	11-15 years	12	44.4%
	16-20 years	4	14.8%
	20 + years	1	3.7%
Position	Assistant professor	-	0%
	Language lecturer	4	14.8%
	Assistant language lecturer	14	51.8%
	Senior language lecturer	7	25.9%
	Language instructor	2	7.4%
	Demonstrator	-	0%
Self-reported level of technology proficiency	Beginner	-	0%
	Average	6	22.2 %
	Advanced	21	77.7%
Self-reported frequency of technology integration	Not at all	-	0%
	Rarely	-	0%
	Occasionally	-	0%
	Frequently	22	81.4%
	Almost always	3	11.1%
	All the time	2	7.4%

Table 4 Demographic information of the questionnaire responses

It is important to note that the statistics of the questionnaire were not used in any way other than to help select the participants for phase two. The main aim

was to purposefully select a sample. The five Omani teachers who were selected to participate in the qualitative phase are shown below in **Table 5**.

Participant	Gender	Age	Teaching experience	Position	Level of technology proficiency	How often integrate technology
Muna	Female	25-35	6 to 10	Language Instructor	Advanced	Frequently
Arwa	Female	25-35	7 to 10	Language Instructor	Advanced	Frequently
Tasneem	Female	35+	16 to 20	Assistant Language Instructor	Advanced	Almost always
Basma	Female	35+	16 to 20	Assistant Language Instructor	Advanced	Frequently
Rashid	Male	25-35	6 to 10	Senior Language Instructor	Advanced	Almost always

Table 5 demographic information about the five participants

Soon after the participants were selected, they were contacted via email. Participants were requested to write their autobiographical accounts and were provided with a “Me and Technology” form. All five participants returned the completed form containing their narratives to me, as per the time frame given to them.

3.9.2 Qualitative data analysis

Qualitative data analysis has been defined as “working with the data, organising them, breaking them into manageable units, coding them, synthesizing them, and searching for patterns” (Bogdan and Biklen, 2007, p. 145). The key aim of qualitative data analysis in a case study is to look for patterns, themes and concepts that provide links between them (Yin, 2013) in relation to the research

questions and theoretical framework. Data analysis was immediately initiated after transcribing the data. The transcription phase was very useful in allowing me the chance to “get closer” to the participants and to “draw a picture” of their relationship with technology. Data transcription is not a simple procedure (Lapadat and Lindsay, 1999). Lapadat and Lindsay (1999, p. 82) argue that transcription is “theory laden” and is “an important component of the analysis”. When researchers transcribe data, they get closer to the data and interpret it. There were two decisions that I made before the transcription process. First, I decided to transcribe the data myself to ensure that I was able to get close to the teachers’ stories and information, and to start thinking about data analytically. In literature, it is recommended that researchers carry out the transcription themselves (Lapadat and Lindsay, 1999). Second, I chose to transcribe the full data sets in order to preserve the integrity of the interviews and to avoid missing out any important detail or theme.

Nvivo10 was used to store, organize and analyse data as recommended by UK Data Archive. Table 6 provides an overview of the data collected during the qualitative phase, all of which were uploaded to Nvivo. Since all Omani teachers who worked in the CPS at the time of the study, including those who participated in the qualitative phase, could speak English fluently, all the interviews were conducted in the English Language. Therefore, there was no need for translation.

Participant	Muna	Arwa	Rashid	Tasneem	Basma
Autobiographical account	√	√	√	√	√
Initial interview	27.38	27.15	49.45	47.10	27.25
Classroom observation one	Two hours				
Post observation	21.45	24.07	23.35	38.32	21.11

interview One					
Classroom observation two	Two hours				
Post observation interview two	11	13	15.44	17.10	Via email
Final interview	16.55	12.58	24.56	23.40	Via email
Table 6 Data sets collected from the five participants					

First, all data sets were uploaded to the software. All references to participants, previous institutions (such as schools) and other information which might otherwise lead to recognizing participants were anonymized. The data from all sets were compared to make sure they complemented each other. For example, data from autobiographical accounts supported data gathered through the initial interviews. Thematic analysis coding is suggested to analyse multiple case studies (Flick, 2014). I conducted a thematic analysis approach in which I used “detailed readings of raw data to derive concepts, themes, or a model through interpretations made from the raw data” (Thomas, 2006, p. 238). Thematic analysis involves careful reading and re-reading (Rice and Ezzy, 1999) of the data sets. Braun and Clarke (2006, p. 79) defined thematic analysis as a “method for identifying, analysing and reporting patterns (themes) within data”. Themes that captured patterned meanings were developed in relation to the research questions and the teacher cognition framework. One key consideration to developing a particular theme was on “whether it captures something important in relation to the overall research question” (Braun and Clarke, 2006, p. 82).

In the thematic analysis of the narratives, the emphasis was on “the told” – the events and cognitions to which language refers (the content of speech)” (Riessman, 2008, p. 58). After I received the autobiographical accounts, I read each of them for several times in order to acquire an idea about each of the participants. My focus was not to identify themes or codes as much as to explore their narratives as a whole. This process helped me to identify issues, events, characters and general images of teachers’ memories concerning their relationship with technology which I later used as hints and prompts for the

initial semi-structured interviews. The initial analysis of the narratives enabled me to identify areas to focus on during the initial interviews (see example in Appendix G). So during this initial analysis of the narratives, I attempted to identify the meanings and events conveyed with more attention given to the particular incidents than the ordinary ones (Stake, 2013). A thematic analysis approach was then used to analyse the narratives with the help of Nvivo (see Table 7). Questioning and interpreting the particularities of language used in the texts was not a major focus when analysing data, rather the attention was given to the thematic meaning which the texts reported since “in thematic analysis, content is the exclusive focus” (Riessman, 2008, p. 53). The use of thematic analysis in analysing autobiographies, furthermore, helped to identify a meaningful pattern of the events shared by participants (Riessman, 2008). The thematic approach was also useful in identifying themes across all the narratives for cross-case findings.

Data source	Data	Code	Category	Theme
Arwa Autobiographical account	“It was amazing how happy and excited I used to feel when I saw the net got finally connected. I mainly used it to navigate educational forums especially the Omani MOE [Ministry of Education] Forum” (AAA, 24-26).	Navigating educational forums	Use of technology to communicate with the world	Arwa's early experiences with technology
Arwa initial	“In school, I had	Using	Use of	

interview	<i>students who I had been with for ages so I knew what they knew. I was one of the best students in school so I would not learn much from my peers” (All, 168-170).</i>	educational forums for academic purposes	technology to communicate with the world	
Table 7 Sample of autobiographical accounts thematic analysis				

During the thematic analysis, I used a hybrid approach of both inductive and deductive thematic analysis. The use of an inductive and deductive hybrid approach involves “the use of integrated data-driven codes with theory-driven ones based on the tenets of social phenomenology” (Fereday and Muir-Cochrane, 2006, p. 80). The deductive approach to thematic analysis usually uses a template derived from literature (Willig, 2013). From a deductive perspective, the teacher cognition framework provided general main headings to situate the codes and themes within. Thomas (2006) stated that an important step when analysing data is the creation of categories which are defined and identified by the research questions. “The upper level or more general categories are likely to be derived from the research aims. The lower level or specific categories will be derived from multiple readings of the raw data” (Thomas, 2006, p. 5). The research questions and the main components of the teacher cognition framework served as a reference to me when analysing, and later presenting individual cases of, data. For example, the following categories were present in mind when interpreting and analysing the individual cases:

- Early experiences with technology
- Cognitions about technology and teacher education
- Cognitions about technology and professional coursework

- Instructional practices in relation to technology use
- The contextual factors that affect technology use

From an inductive perspective, I used a data-driven approach which allowed identifying the principal themes which emerged from the analysis of the texts. The inductive approach states that the codes and themes that emerge from the analysis are firmly grounded on the data (Willig, 2013). During the analysis of the data, different codes and themes emerged in each case (see Appendix I) which were put under the main themes highlighted above. I also looked for themes and categories (Elo and Kyngäs, 2008) within every case separately and also across all five participating cases (Creswell, 2008) to explore the commonalities and differences shared between the cases (see Appendix J). Other main themes also emerged in some cases, for instance, cognitions about technology and higher education when I noticed that such themes were important to the relevant case. Boyatzis argues that a key stage in inductive analysis involves “sensing themes- that is, recognising the codable moment” (Boyatzis, 1998, p. 11). During the inductive thematic analysis, the following procedures suggested by Thomas (2006) were used:

- 1- *Preparation of raw data files.*
- 2- *Close reading of text*
- 3- *Creation of categories*
- 4- *Overlapping coding and uncoded text*
- 5- *Continuing revision and refinement of category system* (Thomas, 2006, p. 5).

Although these steps provided a general outline to systematically guide the analysis, the process was not a strictly linear one but rather movements between steps took place recursively as needed (Thomas, 2006; Braun and Clarke, 2006). I tended to move forward and backwards within data to compare and search for codes and themes. All data sets such as the autobiographical accounts, interviews and observation schedules were coded. **Table 8** demonstrates a sample of the coding procedure. The data was read, reread and analysed for codes such as “designing projects using technology” which was further added to the category “technology for academic purposes”. The overarching theme informed by the teacher cognition framework and the research questions “technology and teacher education” constituted an umbrella under which the two categories were fitted.

Data	code	Category	Theme
<p>I remember my first presentation, we were using PowerPoint, it was like the first semester here at SQU. I remember my American teacher asking me, "Where did you get the skills? Did you do this? Who taught you to do this?"</p>	<p>Using technology for learning</p>	<p>Technology for academic purposes</p>	<p>Technology and teacher education</p>
<p>During my studies, I remember taking a course on educational technology where I was asked to design learning activities using PowerPoint following specific guidelines. It was a very successful project where I designed listening activities to teach a number of letter sounds.</p>	<p>Designing projects using technology</p>		
<p>Here at SQU we have that exposure to availability of computer labs. It wasn't very, very</p>	<p>Limited access to technology</p>	<p>Availability of technology</p>	

<p>strong as it is now. For example, we did not have WIFI as we do now. Also the computer labs were very restricted, very limited.</p>			
<p>Table 8 Sample of coding procedure</p>			

3.9.3 Presentation of the findings

The findings were then presented in two formats; individual case and cross-case findings. The importance of presenting findings as individual cases is based on the fact that every individual case is unique (Stake, 2013). Another advantage is that the individual case presentation of findings provides a wealth of contextual richness of the individuals. In the individual case findings chapter, the findings were presented and organized according to the teacher cognition framework. First, a short profile of each participant is provided. Then the findings of each participant’s early experiences with technology and schooling are presented. Next, participant’s cognitions about technology and teacher education, cognition about teacher professional coursework and higher education, classroom instructional practices based on the classroom observations, the perceived impact of technology by each participant and finally their contextual factors affecting each participant’s decision to integrate technology. Each case was presented in a separate section to preserve the coherence and integrity of each participant (Cohen et al., 2013). The emphasis in the individual case findings was on revealing the relationship between each of the five teachers’ cognitions and the use of technology to allow different stories of teachers’ relationship with technology to emerge as a stand-alone

case. Ayres et al. (2003) state that the aspects of an experience that are unique to one individual can provide valuable interpretations of the individual's story

However, the cross-case findings chapter organized the findings according to the key themes that emerged from the analysis conducted within the cases. One justification for this is that "in the course of their analyses, qualitative researchers must distinguish between information relevant to all participants and those aspects of the experience that are exclusive to particular informants" (Ayres et al., 2003, p. 871). To do this, I presented the main themes that helped to compare all the cases together in order to provide a deeper understanding of the cases and to reach to some commonalities among the themes.

3.10 Research trustworthiness

The following section provides a description of the procedures that were taken into account in order to establish trustworthiness of the research.

3.10.1 Dependability

Dependability means that if the research were "to be carried out on a similar group of respondents in a similar context (however defined), then similar results would be found" (Cohen et al., 2013, p. 146). However, in this research where teachers' narratives were used as a key source of data, it is difficult to assume that the instruments used will return the same findings if they were utilized in another context. "For narrative, it can be neither expected nor assumed that the outcomes from one narrative or a collection of stories will consistently return the same views or outcomes" (Webster and Mertova, 2007, p. 93). The focus in this study was on individuals' experiences, life stories, perceptions and interpretations. While the current research elicited multiple interpretations and realities of the investigation, a similar study in a different institution may yield yet different results. However, to ensure dependability is achieved Shenton (2004) suggested some recommendations which were taken into account when conducting the current study, for example, providing a description of the research design and its implementation and operational detail of data gathering.

3.10.2 **Triangulation**

Cohen et al. defined triangulation as “the use of two or more methods of data collection in the study of some aspect of human behaviour” (Cohen et al., 2013, p. 141). The reliance on one method of data collection may bias the results or findings. In case studies, triangulation can be achieved through the use various methods of data collection (Yin, 2013) (for example classroom observations, interviews .etc.). Triangulation is useful in corroborating data and validating findings (Creswell, 2009). In this study, in addition to the questionnaire that was administered to select participants, autobiographical accounts were also used. Moreover, semi-structured interviews and classroom observations were utilized which helped to validate participants’ views and opinions. For example, the major themes that emerged from the autobiographical accounts were further triangulated by the initial interviews. Moreover, the notes collected during observations (see Appendix K) provided data that was further explored during the post observation interviews. Likewise, teachers’ beliefs about how they integrate technology in their teaching were triangulated using the classroom observations.

3.10.3 **Generalizability**

Generalizability refers to the “view that the theory generated may be useful in understanding other similar situations” (Cohen et al., 2013, p. 135). My research cannot claim generalizability of findings for different reasons. First, the start of my research is based on my own experience and the desire to know how other teachers experienced their relationship with technology, whether or not technology has had any impact on their cognition and instructional practices and if yes, how. Second, the use of narrative inquiry as an approach does not allow for generalizations because every teacher has a different lived experience, hence a completely different story, and this makes generalization impossible. Narrative inquiry studies look for deep exploration and explanation of a phenomenon using small sample size, and therefore generalizability is not possible (Lapan et al., 2011). Third, since the current study is a case study, it is difficult to assume that it represents all other cases. The real value of a case study is not in generalizability, but rather the provision of an account or setting that is illuminating (Maxwell, 2012).

3.11 Ethical considerations

This was a qualitative research involving a number of participants' stories of lives, personal reflections and opinions of their relationship with technology use. Therefore, it was important to ensure that participants were adequately notified with the type of study they were going to participate in. Silverman (2000) argues that during a research, researchers are dealing with participants' private lives and space. Furthermore, Creswell (2009) states that researchers are obliged to respect the participants' rights, needs and values. Consequently, the following is an exploration of some of the ethical considerations I took into account when conducting this study.

3.11.1 Informed consent

Diener and Crandall define informed consent as "the procedures in which individuals choose whether to participate in an investigation after being informed of facts that would be likely to influence their decisions" (Diener and Crandall, 1978, p. 57). Participation in the research was entirely voluntary. The questionnaire sent to the Omani teachers at the CPS via email through the institution gatekeepers contained a page that provided informed consent with information about the research and the researcher. Only teachers who agreed with the informed consent were able to complete the online questionnaire (see Appendix C). The purposes and aims of the research were explained to the participants. At the end of the questionnaire, participants were asked to volunteer to take part in the observations and interviews. It was explained to them through the participant information sheet (see Appendix L0) that the qualitative phase would involve the writing of an autobiographical account, classroom observations and interviews. Participants who agreed to participate in the second phase were further provided with an information sheet explaining all details about the research. They were also asked to sign an informed consent to take part in the observation and interviews (see Appendix B).

3.11.2 Confidentiality

Confidentiality "means that although researchers know who has provided the information, or are able to identify participants from the information given, they will in no way make the connection known publicly; the boundaries surrounding

the shared secret will be protected” (Cohen et al., 2013, p. 65). Participants who decided to take part in the qualitative phase were asked for contact details, for instance, their email address. All email addresses were removed from the data after communications with participants ended. Since the qualitative data concerned individual cases and hence might involve personal information about participants, and to ensure that all participants remain anonymous, pseudonyms were used (Cohen et al., 2013). Participants were referred to using different names (pseudonyms) so that they are not identifiable in any way. Moreover, to ensure participants’ privacy, I transcribed the data myself, and no one had access to the data. I have also contacted the Research Ethics Committee at the University of Leeds to ensure that my research complied with the Code of Ethics in both institutions after the modifications of using narrative inquiry. I obtained their approval to conduct the research (see Appendix A). I have not saved any of the data anywhere, including my own laptop, except in my account on the University of Leeds drive.

3.12 The role of the researcher

The researcher cannot be fully separated from the social world that they are investigating (Hammersley, 1983). Researchers act as instruments in the process of collecting and analysing data (Miles et al., 2013). Without their awareness, researchers bring to the investigations their own preconceptions that might influence data analysis (Charmaz, 2014). Cohen et al. state that “researchers are in the world and of the world. They bring their own biographies to the research situation” (Cohen et al., 2013, p. 171). Given that I was largely motivated to do this research based on my own personal reflections about how technology impacted my cognitions and instructional practices (see Section 1.1), I endeavoured to not allow my own beliefs and conceptions to affect the data collection and analysis. For example, I analysed the data deductively and inductively with reference to the framework and the research questions trying to be as professionally neutral as possible. The reason I did that was to base the analysis on the theoretical framework rather than just on my own interpretations of the data. Also, I used an inductive approach to allow the themes to emerge freely with the least possible interference from my side.

Before starting my study, I worked as an English language supervisor in the Ministry of Education, Oman. My job required me to visit teachers at schools and report on their performance. I was conscious that my job, as a supervisor, did not overlap with my role, as a researcher, when conducting the classroom observations and the post-observation interviews. The task of an educational supervisor involves evaluating and assessing teachers' performance using descriptive and numerical items. It was important for me to bear in mind the distinction between both roles. Therefore, at the start of every observation I reminded myself of the task I was going to undertake, observing the teacher for the sake of the research only. The open note-taking observation schedule was particularly useful to me because it gave me more freedom to record the events according to the research area. Also, I was surprised that one of the teachers became very interested when I introduced myself as an educational supervisor. She started asking me questions about my job (see Section 3.13). I immediately explained to her that I was not there to assess or evaluate her in anyway. From that incident on, I avoided introducing myself as an educational supervisor to minimize the influence that this could cause on participants.

3.13 Researcher diary

“Researchers are frequently encouraged to keep their own diary as a history of a research project” (Hammond and Wellington, 2013, p. 51). During the data collection, and while I was in Oman, I decided to write some of the observations and feelings about how the process was going. Unfortunately, I now regret that I did not do this from as early as the start of my PhD journey. I now realize that the researcher diary is an important additional tool that can further provide insight into the different stages of the research and how the researcher interacts with events. It can also “be treated as an additional source of documentary data” (Hammond and Wellington, 2013, p. 51). This is a short excerpt from my diary:

- The journey of data collection has been a relatively tough one. I had to contact participants via e mail and wait for their reply patiently. The thought I had had that participants would enthusiastically value my

research and look at it as an imperative project was not accurately right. A researcher ought to assume that participants will not be fully fascinated by any research. They are usually so engaged with their own work and tied to their busy schedules that they may not have time to “enjoy” the feeling of contribution to any research project, particularly one that demands large portions of their own time. I also noticed that the written consents that precedes the participation in any research may not be enough to convince participants to take part in the research with their full attention. Perhaps a short oral conversation about the value of the research, whenever possible, is vital. A researcher should have patience and understanding of the situation from a participant’s point of view. There were times when I and participants spent time trying to decide on a day/date for a classroom visit but in vain. I decided that a visit to the venue of the research would solve this problem so I went to every participant’s office and waited. It took me two days to meet all five participants and agree on interviews and visits.

The first difficulty we faced was finding a place to conduct the initial interviews. I asked participants to book rooms for this purpose in advance. We managed to conduct most of the interviews in quiet rooms/computer laboratories which were booked in advance, except for two incidents where the participants informed me late of their inability to book rooms for various reasons. We had to conduct these meetings in their own offices which were luckily unoccupied at that time. During one interview, and while introducing myself as an educational supervisor and researcher, I noticed that the participant asked me some questions about my job as a supervisor. I explained to that participant that the observations will not seek to assess or evaluate their teaching in any way and that it was mainly to document their relationship with technology and how technology affects teaching during the classes. I also explained that their employer would not receive any reports about the classes and that as participants will remain anonymous. Even though this information was clearly mentioned in the consent form, I felt the need to state it again verbally. Since the first interviews were about participants’ autobiographical accounts of their relationship with technology, now and then (Me and Technology), I noticed that they enjoyed talking about their past experiences with technology. I was lightly concerned about getting participants to “talk” and thought of several ways to get them to “say it all” but it turned out that I should have also thought about how to “stop” them! By this, I mean to keep them from going off topic and to focus on what was being discussed.

Each participant was visited twice, and each visit was followed by an interview. The classroom visits were the most challenging part in data

collection. I know this based on my own experience as an educational supervisor. Perhaps because teachers do not usually welcome having guests attend their own classes which they consider their “own world”. Approaching teachers for a visit should be done carefully and smoothly. Teachers should be clearly informed about the aim of the visit, the outcome of the visit, the actions of the visitor and the type of information to be gathered during the visit. I believe that it is their right to know about all of the above and this is what I did. I also asked them about their expectations of me during the visit in order to get an understanding of how to act in a way that would not alarm the teachers or force them to change their way of teaching. I even asked them about where they preferred me to sit during my visits, even though all of them left that to my own choice. Although I did this verbally (preparing teachers for the classroom visits), in hindsight I wish I had done this in writing. I recommend that teachers are given a form stating the researcher role and asking them about their own expectations in advance.

I usually arrived before every class at least one hour in advance, waited in my car until it was 20 minutes prior to the start of the lesson and then headed to the class. I was always there 15 minutes before the start of every single class that I planned to visit. This is mainly because I had a tight timetable and my stay in Oman was limited, and therefore, I had no option of wasting any time. However, there were two incidents which were remarkably interesting. The first was when I was waiting for the teacher to arrive in a long corridor where I kept observing tens of students laughing, smiling or looking worried going to their different classes. The teacher never showed up. The teacher, being sick that day, did not come to work and did not contact me to let me know this. For cultural reasons, some females chose not to provide their mobile numbers to men. She chose email as a way of communication. I immediately checked my email and I had not received any notification of her absence. The only thing I did was to completely forget about this incident and book another appointment for another visit. As a researcher, you should never blame teachers or try to upset them, even when such incidents occur. The second incident was when I was waiting for another teacher to arrive for a classroom visit and when the teacher arrived, she told me she was sick and that I should not expect her to teach as normal. I politely asked if she wanted me to visit her again on another day but

she insisted that we carry on with the original plan. The lesson turned out to be very good and I very much enjoyed it.

3.14 Summary

In the methodology chapter, I have presented the aim and purposes of this study as well as the research questions that guided this study. I have also discussed the philosophical assumptions underpinning the methodological choices of methods with reference to narrative inquiry. The case study design was also addressed in detail along with the instruments that were utilized to collect the data. I have also demonstrated how data analysis was conducted and the process involved. Issues about the quality of the research and the ethical considerations were also documented. I have concluded the chapter with a description of my role as a researcher and finally an excerpt from my diary as a researcher.

4 Chapter four: Individual case findings

In the following chapter, I present a descriptive analysis of the five cases individually. Each case is presented in light of the teacher cognition framework suggested by Borg (2015), and which informed the current study (see Section 2.6). First, an overview of the teachers' early experiences with technology is presented, followed by teachers' cognitions about technology and teacher education, teachers' cognitions about technology and higher education and teacher cognitions about technology and classroom instructional practices. Then, based on the analysis of teachers' relationships with technology and their instructional practices, an investigation of how technology possibly influenced each teacher's cognitions and instructional practices will be demonstrated. Finally, a discussion of the contextual factors that affect every teachers' use of technology will be presented. A summary will follow to summarize every case.

Example of the data labelling: AAA (Arwa Autobiographical Account), AI (Arwa Initial Interview), APOI1 (Arwa Post-Observation Interview 1), APOI2 (Arwa Post-Observation Interview 2), AFI (Arwa Final Interview).

4.1 Arwa findings

4.1.1 Arwa's profile

At the time of the study, Arwa was in her early thirties and was working as a language instructor in the Centre for Preparatory Studies at SQU. She had been teaching English Language for six years. Arwa basically teaches students in the Intensive Foundation Programme. Upon finishing the foundation courses, her students would join different colleges at SQU to pursue their undergraduate degrees (see Section 1.2). There are 6 different levels in the foundation programme and Arwa had taught them all. At the time of the study, Arwa was teaching Level 1 and 2; which are the lowest levels across the programme. Arwa did her schooling in General Education System schools in Oman. She then joined SQU for her undergraduate degree in English Language and was appointed at the Centre for Preparatory Studies as a teaching assistant. She holds a Master's degree in Curriculum Studies from the United States and her

research interests include curriculum design and blended learning. According to the questionnaire, Arwa's level of proficiency in technology is advanced and she stated that she used technology frequently in her teaching.

4.1.2 Arwa's early experiences with technology

4.1.2.1 Eagerness to learn

Arwa's early experience with technology was remarkable. Her awareness of the prospects of technology was limited simply because there was no technology in her elementary school. She said in her autobiographical account: "As a school student I was not really interested in using technology or, more precisely, I was not aware of its potential since computers were scarce" (AAA, 14-15). However, at home, she was more advantaged as she grew up in a family where she had the chance to see a computer in action at a very early age. This happened when she was about 11 years old at Grade 5. Her relationship with technology started then and shaped her cognition about technology. Her passion towards technology is revealed in her description of the first computer to arrive at home as a "magical machine". As a child, she thought technology was magical. Despite not being allowed to use the computer brought by her brother, Arwa was apparently captivated by the computer and how her brother used it competently as she stated:

"The first time I got the chance to see this magical machine in reality was when I was a fifth grader when my elder brother brought home a brand new desktop computer. I was not able to use it, though. I was just attentively watching my brother dealing with this extraordinary device elegantly and skilfully" (AAA, 15-19).

Arwa's experience of watching her brother use the "magical" device drew her attention to its potential, but she wasn't able to explore its world closely. She always had the desire to use it to satisfy her curiosity. Although her eagerness to figure out how the computer worked increased, still her brother would not allow her the chance to do so, as she reported in the interview:

“When I saw this for the first time, it was like magic for me so I liked it and I was eager to try it out to see how it worked but my brother did not allow me because it was something expensive at that time” (All, 51-54).

This only made her more determined to watch her brother from a distance. She became more and more connected to what she thought was a “magical” device. Her dream came true a few years later when her sister bought another computer and brought it home. This time, Arwa had the privilege to be able to use it.

“I still remember that experience when my brother bought his first computer. It was like the holy device at that time because we kept hearing of this device computer, computer. When I saw this for the first time, it was like magic for me so I liked it and I was eager to try it out to see how it worked but my brother did not allow me because it was something expensive at that time. It was a precious thing, and I was a kid so he wasn’t sure that I would be able to work with that. So I just was watching it from far away. I could not approach it but later my sister bought a new one and I could actually use it” (All, 49-57).

Arwa’s sister was working as a teacher at the time and she used the computer to prepare some tasks for her students. Arwa’s eagerness to learn about the computer grew more intense as she watched her sister use the computer to produce printed documents. Her admiration of the new device and her interest in what her sister was doing when using it may have inspired her to imitate her sister. She spent times observing her sister as she had done with her brother previously. Arwa reported that she used programs such as Microsoft Word and PowerPoint when her sister granted her permission to use the computer. She also recalled that she used it to search the internet for images and pictures and took them to school to show to her teacher and classmates.

“Like, for example, we had a topic about animals in English class so I went to Google, I searched animals, I got lots of fancy, good, colourful pictures, I printed them out and I showed them to my peers in class” (All, 81-84).

Interestingly, the example Arwa gave when recalling her early academic use of technology was about English Language, and she later became a teacher of English Language. This was probably due to a liking that she may have developed towards English Language and hence decided to use technology in her English class as she reported. This opportunity of using the computer evolved into a feeling of privilege that Arwa had which made her value technology and realize how helpful it could be. Arwa's act of using technology for academic purposes featured her first encounter with technology. She learned that by observing her sister, who was a teacher at that time, and by means of using the computer.

4.1.2.2 **Disinterest in technology at school**

Having had no technology at school until then, Arwa's initiative to use technology for academic purposes developed into a downturn when finally computers were introduced at her school while she was in Grade 11 (17 years old). This happened when Information Technology (IT) was introduced in schools as part of the curriculum and Arwa had to study it as a compulsory subject. Computer laboratories were made available, as a result, and students had the chance to use them.

“They introduced what they called the computer subject at that time, IT subject and we had a computer lab where our IT teachers took us to the lab and we started learning. So that was my first encounter with technology in school as part of our school experience” (All, 97-100).

Unexpectedly, Arwa was not particularly excited when IT, as a subject, was introduced. Her answer to my question clearly illustrated that.

Mahmood: Were you thrilled?

Arwa: No.

Mahmood: No?! Why not?

Arwa: At that time I felt that I was way above the level they were teaching us in school. It was basic things, Microsoft Word, Excel, Access, and by that

time because I started using the computer when I was in Grade 5, so you can see (All, 102-111).

Contrary to what one would expect, Arwa became disinterested in IT because her level was way above that of her peers. This could be an indication that Arwa's level in using technology may have improved noticeably from the first time she saw a computer when she was 11 years old, until technology became a taught subject when she was 17. "Starting from Grade 11, IT was integrated in to the school curriculum with basic computer skills and Microsoft office programs which I was by then totally good at! (AAA, 27-29). Arwa may have exerted some effort to learn how to use the computer which explained her reluctance to enjoy studying the IT subject at school. "And I know that this is very easy for me, what we do in school, so I just ignored the whole thing and focused on other subjects" (All, 132-134). Therefore, her attention diverted onto other subjects. However, a closer look at Arwa's clarifications when asked to justify her disinterest showed that her relationship with technology had probably evolved to a different stage. Arwa was perhaps looking for a chance to use technology rather than learn how to use it, which she already was able to do. Much of her interest at that time was on finding practical ways to incorporate technology to her own advantage, rather than studying "just the basic things in computer" (All, 122). Arwa was looking for more; she was actually willing "to open the internet, navigate the different websites and do interesting stuff" (All, 123-124). Her enthusiasm went beyond learning how to use technology into putting what she learned into practice. However, her teacher did not allow her to do so, as she mentioned in the interview. Her evaluation of the situation was largely caused by her teacher's refusal to allow her to use technology the way she yearned for. Arwa may have realized how technology could provide her with the opportunity to communicate with others so she started to take the initiative once more. This time, though, she headed towards a wider audience.

4.1.2.3 **Communicating with the world**

In Arwa's memory, her experience with IT as a subject at school was passionless. This feeling was probably caused by two reasons. First, her level in technology was way above that of her classmates and the materials taught

were far below her expectations. Second, she was looking for real occasions to employ technology. Hence, Arwa became extremely happy when the internet was provided at her school. She saw this as a precious opportunity to seek for more support from others, and also to use technology more fruitfully by communicating with personnel from beyond her local context.

“It was amazing how happy and excited I used to feel when I saw the net got finally connected. I mainly used it to navigate educational forums especially the Omani MOE [Ministry of Education] Forum” (AAA, 24-26).

I asked Arwa about the reasons behind her “excitement” to use the forums as she stated in her autobiographical account. Arwa explained that her attempt to contact other people through technology was based on a need to learn more from her own point of view. She mentioned that at school she was doing very well and was considered among the top achievers.

“In school, I had students who I had been with for ages so I knew what they knew. I was one of the best students in school so I would not learn much from my peers” (All, 168-170).

Her feeling of being talented may have motivated her to seek opportunities to learn independently via technology. She wanted to communicate with others beyond her place of learning to further enhance her academic performance. Therefore, she used technology to get answers for practice tests and to contact other students from different parts of the country. Arwa, resorting to communicating via technology with others, may have thought she would learn more than what she was offered in terms of the content.

“But when I used the forum and contacted students from other regions, I could learn a lot from them like different things, new things, new stuff they had learned from their teachers so we shared with each other. So I contacted people to get more experience. And even we got in contact with teachers who are in the forum so we had experienced people we could consult and get valuable information from them online” (All, 171-176).

Arwa viewed her experience of contacting other students as successful in that she learned “different things, new things” and “new stuff” which she obviously exchanged with other people from outside her learning community; teachers

and students. She also recalled that her aim was to “get more experience” which she viewed as valuable and beneficial. This was an important experience for Arwa because it made her value technology as a window through which she could achieve her learning needs. She stated in the interview that this experience, in particular, made her aware of the potentials of technology. *“I actually started valuing the importance of technology more and more because it opened the horizons for me”* (All, 167-168). However, one could wonder if her relationship would witness any change later on during her teacher preparation education.

4.1.3 Arwa’s cognition about technology and teacher education

4.1.3.1 Reflective usage of technology

During her teacher education at SQU, Arwa continued to use technology for academic purposes. She continued to view technology as a means to contact others, either for educational or recreational reasons. She recalled that she studied an Educational Technology module which was oriented to using technology in teaching. She reported that she learned various technologies, but was able to particularly remember how she created Web Quests.

“During my undergraduate studies, I continued to use Microsoft Office for the same purposes: making word documents and PowerPoint presentations. I took an educational technology class as one of the requirements. One of the things I learned and can remember is how to create a Web Quest. I was also a frequent user of Hotmail and Messenger. I used them to keep in contact with family members and friends inside and outside Oman. I used the internet to browse lots of websites and forums for educational purposes and for entertainment” (AAA, 31-37).

Her inclination to recall the use of Web Quests may be attributed to the positive influence this experience has had on her. “I remember how we created Web Quests... I mean I liked the idea of using enquiry activities through internet” (All, 195-196). This memory of a technology tool she used during her undergraduate study probably demonstrates an evaluative reflection of technology. She recalled that she preferred a specific technology and was able to justify why.

Arwa's experience of using technology in her assignments made her recognize the importance of technology in assisting her learning especially that the type of assignments were more complicated. "University life, the assignments tend to be more complicated and it's more demanding. You need to do lots of work using the Internet" (All, 180-181). Arwa believed that through technology she could improve her performance further and simplify the tasks she was asked to do. However, this time she was reflecting and thinking more about them.

4.1.3.2 **Becoming a critical thinker**

Arwa labelled her experience with technology during her undergraduate study with critical thinking and creativity. Her attitude towards technology use was one which promoted creativity in that she could excel with the work she presented.

"I feel that I have become more critical thinker. I also became more creative because I had lots of resources online for me to choose from, and with the assignments I could stand out" (All, 185-187).

Arwa's claims of becoming a critical thinker were seemingly grounded on her own reflections of technology. She believed that having the ability to choose from the endless resources made available to her through technology was a major factor promoting creativity and criticality in her. Her own reflection demonstrated that she was thinking deeply about her use of technology at that stage of her academic life. She had to have reasons for choosing particular resources from amongst the endless options that existed. Arwa also related her academic excellence to her ability to incorporate valuable resources to produce unique and creative assignments that made her "shine" and "stand out" amongst her colleagues.

"I could shine because I had the valuable resources and digital things online. I could incorporate them into the assignment, I could do something unique and creative and this was what happened with some of the assignments" (All, 187-190).

Arwa's sense of accomplishment as a student signified her own ability to "incorporate them" into her work, which shows that she valued the skills and abilities she had then. What Arwa did not realize, then, was the fact that there

was far more to learn about technology, and which she later came to know about during her master study.

4.1.4 Arwa's cognition about technology and higher education

4.1.4.1 Delving into technology

After working as a teaching assistant for two years at the Centre for Preparatory Studies in SQU, Arwa left for her master study in the USA. During that period, Arwa reported that her attitude about technology had witnessed a further change. Driven by a strong personal interest in technology, Arwa had adequate time to "enjoy" immersing herself into technology passionately, as she clearly stated in the interview "I felt at that time, that I had some extra time for myself to enjoy using technology because this is, as I said earlier, a personal interest" (All, 208-210). She spent a great deal of time experimenting with other various technological tools and also socializing with others (For instance, on Facebook, MOOCs, online seminars, and webinars) for the purpose of learning from them.

"I have indulged myself into the world of Facebook where I can always find room to socialize and learn. I have also participated in many MOOCs, online conferences and webinars which have exposed me to various educational tools that I can use with my students" (AAA, 44-47).

Arwa was seemingly using technology for a purposeful learning to develop herself professionally. Her engagement in different technological tools (For instance, Facebook, MOOCs, online conferences, and webinars) to achieve the same purpose probably demonstrates a growing commitment and consciousness. However, apparently Arwa kept her focus on how to carefully select technologies to benefit her students, and she did so through trying them out in real learning contexts.

Arwa also became an active contributor to the online body of knowledge by publishing her ideas and thoughts over the internet. "I have also published papers on using comics and infographics in language classes and on the topic of social identity in online language courses" (AAA, 47-48). Arwa moved from being a passive user of technology into an active contributor where she shared her reflections about her uses of technology in online courses. What is noteworthy here is that Arwa's contributions were seemingly related to using

technology in language classes, and the topic she recalled was largely associated with social identities in online courses. A possible motive to this may have been her remarkable experience with such online courses such as MOOCs (Massive Open Online Courses) and how they influenced her identity.

4.1.4.2 MOOCs

Arwa related her turning point to technology to her experience with MOOCs. She seemed to have appreciated the idea of learning collaboratively in small groups where experiences of the participants might have been different, but their specialization was similar, such as English Language teachers. According to Arwa, the topic or focus of the discussions that took place online was about “how to use technology in language classes” specifically. This topic had been an interest of hers since becoming an English Language teacher. She recalled her experience with MOOCs positively when she commented, “these Massive Open Online Courses are basically online courses where English language teachers met and participated in one course about how to use technology in language classes” (All, 215-217).

In a different interview, Arwa consistently reconfirmed her supportive view of how online communities were helpful to her.

“I have learned a lot from these [online courses] and I have discovered that online courses are really helpful. You meet thousands of teachers from different parts of the world and those people come with different experiences. They share the same interests as you so you feel like you learn from them” (AFI, 102-105).

She reported that she learned a good deal because she was able to meet other teachers whose experiences and nationalities varied but fundamentally had similar interests. Her reflection of this sort of communication indicated that she learned through sharing and collaborating with people.

4.1.4.3 Turning point

According to Arwa, her experience of studying her master degree in the USA and the time she spent experimenting technologies have had a huge shift in her cognition about technology. In her own words, “the time when I was doing my

Masters was the turning point and a huge shift towards technology!" (AAA, 39-40). Following this shift, she became:

“...completely aware of the great educational potentials that technology can offer and the power we can harness from using it in our language classes starting from the smart phones that have fabulously emerged to endless options of web 2.0 tools and social networking sites” (AAA, 40-43).

Such a realization of the importance of technology and its potentials was largely due to experiential learning. “Because in these online courses, I got to know lots of resources, lots of digital tools that can be used in my language class so I remember I was very thrilled” (All, 220).

According to Arwa, three main reasons contributed to her shift to technology. First, inner motivation: “because this is, as I said earlier, a personal interest” (All, 210), and in another time she reported “I like navigating the websites, getting to know new resources online” (All, 210-211). Second, the sort of training she got during her master study was relevant to her own interest and her context as a language teacher. “These Massive Open Online Courses are basically online courses where English language teachers met and participated in one course about how to use technology in language classes” (All, 215-217). These opportunities that she had to make contact with other peers from around the world may have also influenced the shift towards technology. Third, the availability of time to experiment with technology was useful from Arwa’s point of view as she stated: “I had some extra time for myself to enjoy using technology” (All, 209-210). Nonetheless, Arwa’s turning point seemingly had remarkable impressions on her teaching, as will be explained below, according to a comparison that she made before and after what she called a shift towards technology.

4.1.5 Arwa’s classroom instructional practices in relation to technology

The following is an analysis of Arwa’s classroom instructional practices during two classroom observations that were conducted to order to observe her classroom practices. Two post-observation interviews were conducted to talk

Arwa through the observations. The analysis is based on the themes that emerged from her data.

4.1.5.1 **Technology for fun**

One of the salient themes in Arwa's data was using technology for fun. There was a consistent link between her use of technology and fun. She cited this in so many occasions and used it as a major justification to using technology in class. In both observations, Arwa incorporated activities for fun using technology. For example, Arwa used games to add the fun aspect to her classes. During the first observation, Arwa used an educational game called Kahoot. Kahoot enables teachers to create a fun learning game made from a series of multiple choice questions with the use of videos, images and diagrams. I asked her about why she used Kahoot. Arwa replied:

“I used Kahoot. This is a game based quiz builder. It can create quizzes using games. And I think first of all this is something fun for students to use games, what they call gamification” (APOI, 154-156).

When asked why she chose to use a fun game in particular to present that activity, Arwa not only associated with her students, but to herself as well. Her decision to use technology for fun was also based on her own desire to enjoy the moment. She believed that the game she used was also exciting for her. “I think the game was very exciting for students and for me” (APOI, 172). Arwa's love of technology and her experience with it may have had a role in this because she enjoyed technology in general.

Arwa's plan to use technology in such a way was also driven by her own understanding of her students' levels and capacities. She might have thought that her students were not performing well or that they were not focused enough. “You know with this particular group of students, I feel that they get bored immediately, whatever you do with them” (AFI, 132-134). Hence, she wanted to make learning more fun for them to help them focus and feel more passionate about leaning. She seemed to have this as an issue with her students as she mentioned that she used technology for fun as a kind of change. “With the first two [activities], I used the paper one, the traditional way of doing it and we need this kind of change with the students, just for fun” (APOI, 280-282). Arwa's inclination to integrate technology in such a way that makes leaning fun made her start her own mini projects. She decided to incorporate materials that were not part of the syllabus. Her main aim of doing this was to merely add a dose of amusement. “This is, actually, I can call it a

mini project. It's not part of the syllabus or students have to do it but we are doing this for fun" (APOI2, 24-25).

Arwa valued the learning environment that emerged as a result of using technology for fun in her class. During the lesson observation, students interacted and expressed their interest in their own way and without complications so I decided to ask her about her thoughts. Arwa explained that she enjoyed seeing her students act "naturally" in her class because that was what she thought they, herself and students, needed. "It was fun. I like it. I think we need these moments where students show their interest whichever way was because they did that naturally to show their interest" (APOI, 305-307). Arwa did not wait long to see the result of this strategy. She soon started noticing a progress in students' involvement in the classes. "Students are very occupied with learning. They like it. They're involved and engaged in every single part of it, and I think this is what all teachers need to see when they use technology" (All, 348-350). Using technology for fun was one strategy which Arwa adopted to amuse her students and herself and to accommodate her students' needs and routes to learning.

4.1.5.2 Authenticity of materials

Arwa's tendency to resort to the internet to search for authentic materials is largely due to her distrust of textbooks. In an activity where Arwa used some materials from the internet as a follow up activity, I noticed that she distributed a task to students which was not part of the textbook. When asked during the interview, she stressed that the activity she used was from the internet and was "more authentic" than the one available in the textbook. She thought that the activity was more relevant to students' expectations. Actually, to make it a real-life activity, Arwa brought the activity from a real forecast program.

Arwa: "I got it from the Internet. It wasn't part of the book. It's like a follow up activity because they had a similar one in the book but this is more authentic because it is weather focused. I got it from the forecast program so students can have an authentic thing like real life weather forecast" (APOI, 89-93).

When she was further asked to justify her choice, she replied that it contained lots of information and was related to what students had already studied. She

also emphasized the point of authenticity to help students engage in a real-life situation.

Mahmood: Why did you choose this picture in particular?

Arwa: Because it has lots of information. It's a comprehensive thing. All the information we went through in the classroom in unit 2 was covered on that picture; weather, rain, lots of things" (APOI, 95-99).

We have noticed that Arwa strongly accentuated the importance of using authentic technological materials by linking it to students' motivation. In her thinking, using real-life activities would break the routine and raise students' motivation. She did not want to add to the "lack of motivation they already have" and hence was more committed to using technology for authentic materials.

"If you just bring a textbook to the class, "Turn the page, this activity, turn the page. This is an extra activity, go and do it," it would not help much. The students are used to this and it will add to the lack of motivation they already have. So when I use technology, when I show them pictures, it makes more real to them" (APOI, 77-82).

In another observation, Arwa also performed a technological activity using a website called linoit.com, and encouraged her students to share their ideas through the website to make it look more realistic to them. Her stated purpose was to get them to experience the idea of sharing their views with real people; in this case their classmates. "So people can really feel they share ideas on the web. Instead of writing them on paper, you can write them somewhere on the Internet and they can share" (APOI, 87-89). The impression I got while observing the class was that students were publishing their thoughts via the internet with other classmates and that they could receive immediate feedback from them. They used their mobile phones to undertake this activity.

4.1.5.3 Alternative plans

Despite Arwa's intimate relationship with technology, she did not trust technology completely. She repeatedly quoted her concerns about the availability of the technology that she had planned to use such as being unable to access the materials she wanted to. She even perceived that some teachers avoided using technology because they did not want to feel embarrassed if it failed them in class. "With some teachers, I have noticed that this might affect them because usually we say we do not want to use technology because it

makes us feel embarrassed in the classroom sometimes. It puts us in an embarrassing situation” (APOI1, 49-52). Arwa, however, had her own way of overcoming this shortcoming by being prepared with another plan in case the technology failed her. “We should have Plan B always because it always happens like something gets stuck in computers” (APOI1, 47-49). During the first observation, Arwa struggled with an activity where she was trying to demonstrate a picture and edit it using a special application. However, I noticed that she spent some time trying to solve the problem. She looked a bit restless and hectic. I asked her during the interview what had happened at that moment. “I was trying to enlarge a photo but it seems there was a problem with the desktop in my classroom because of Microsoft so it did not work well” (APOI1, 14-16). She was supposed to “play” with and edit the picture for a certain purpose. I was interested to know if this incident affected her so I asked her about her thinking at that moment and whether that incident caused her to change her plans. Arwa confidently replied that it did not affect her lesson. “No. I believe that you can never trust technology. We should have plan B” (APOI1, 47). Arwa’s alternative plan was to continue using the picture without employing the “edits” that she had planned to do. “I decided just to continue with it just to show them the picture for the purpose of helping students” (APOI1, 31-32).

Looking at her data, Arwa’s lengthy experience with technology made her aware of its shortcomings and made her develop her own strategy of dealing with that. She became more confident with using technology and her solution was to have alternative plans if the technology failed her, simply because she does not fully trust technology. “I need this plan B. So because of this, I never get disappointed when technology does not work because you need to realise that technology is just...I mean you shouldn’t trust technology 100%” (AFI, 160-162).

4.1.5.4 Creating technology-related materials

During both observations, Arwa used activities which were created by her using digital technologies and the internet. For example, she brought her students an online game that contained a reading comprehension quiz which she had already created using a special quiz builder website. Arwa asked her students to read the text online and then to answer the questions using their own smart phones.

“It was a reading comprehension activity so students with their partners discuss a new reading text, try to understand it and be ready for reading comprehension questions. The reading comprehension questions will come in the form of a game

where students need not just to answer the questions correctly but to be fast also” (APOI1, 161-165).

I asked Arwa if she created the quiz herself and she confirmed that she did. Arwa’s rationale for taking such an initiative was her dissatisfaction with the course book materials in addition to making learning more fun. She was not totally convinced with the textbook content alone, so she used technology to create her own activities which she felt were more authentic to the learning aims. “Sometimes I bring the questions, reading text from another question and I create the questions because those questions they have in the book I’m not so happy with the questions so I create my own” (APOI1, 270-272).

In another class that I observed, Arwa used another activity that she created herself using another website called linoit.com. Arwa prepared the activity in advance and provided her students with a QR code that they had to scan to reach the activity that she had prepared for them. Arwa’s creation of such an activity was to enable students to “share ideas at the same time”, and that “they can see what they are doing on the spot, helping their writing, handwriting skills, so I think it’s a combination of a lot of skills” (APOI2, 118-119). Arwa was trying to support her students’ fluency, proficiency and language acquisition through technology. After all, Arwa’s aim was to teach them about both; English Language and technology. “So I’m happy actually helping them learn something and it’s the language with technology together and this is what actually I want to see in my students; developing both” (178-180).

However, Arwa realized that technology was not always supportive for learning in all contexts. She knew that there were instances when technology could be an impediment to learning. If technology could cause students to waste their time or if it would make learning meaningless, Arwa prohibited its use (for instance, mobile phones) in her classes. She had a clear mind about when and why to use technology, and when and why to not use it. For example, even though she had just finished an activity that involved the use of mobile phones, she asked her students to keep them away. I asked her about that during the interview.

Mahmood: “Alright. In the Minute 27, you prohibited the use of mobiles. You asked your students not to use mobile phones to look up new words. What were you thinking?”

Arwa: That was with the same activity, scanning activity. I just wanted to show them that with scanning, you do not have

to check the meaning of a word, you need just...they saw, for example, the word issued. Go to the text and look at issued and make a comparison. It's just to teach them more what scanning means. When you do a scanning activity, you do not have to look up the single word when you just have the ability to match words.

Mahmood: So you thought at this particular moment, technology was not to be used.

Arwa: It's not helpful at this stage. It is helpful of course for students but it would prohibit the acquisition of a new reading or linguistic strategy, which is scanning.

Mahmood: What makes you think it will do what you said?

Arwa: Because it's the easiest way for them since every now and then, they take their phone and look up the word. It's easy for them to do that. But I think they can do it without using the mobile phone" (APOI1, 106-129).

Arwa's decision to forbid the use of technology in this task was not a random action. Rather, she evaluated the situation and thought that using technology would hinder the acquisition of an essential reading skill that students were expected to master. She also had confidence that her students were able to do it without technology and, hence, there was no need for it. Technology, from Arwa's point of view, was used only when it served a certain purpose and when students' needs demanded so. It was a tool to reinforce and support learning, but not to precede it though. Key to Arwa, as the data demonstrated, was the importance of using technology only when it met her students' needs and the curriculum goals.

4.1.5.5 Independent learning

One of the key themes that appeared in Arwa's data was students' independent learning. She recalled that one major aim for reusing a particular activity where technology was employed was its potential to help students learn independently. Seeing that the activity achieved the aim of learning individually, she decided to use it again, of course with a different material. "I used it before and it helps students learn individually so I said why not use it again on my students" (APOI1, 158-159). Arwa's assumption that such activities enhanced

independent learning with her students was based on her own observation of the improvements her students had experienced in class. “I could see the potential of it to help students improve their own writing skills, their critical thinking skills, interaction with their peers” (All, 464-466). Her emphasis was on helping her students improve their writing skills, critical thinking and interaction according to their own level and pace. She also thought that one way of individualizing learning with her students was through allowing them the opportunity to learn tasks by doing. Again, her own assessment of this was observing them doing things by themselves without referring to her as teacher. “I could see that soon as they could learn something by doing, they did it themselves” (APOI1, 385-387).

Arwa felt reassured seeing her students learn independently. “It also gave me a sense of confidence that my students are busy doing, you know, something useful” (APOI2, 169-170). She noticed that they were motivated to learn as well as engaged. This motivation and engagement from the part of her students gave her confidence that they were “better at being more independent” (APOI2, 166). When asked how she assumed that her students were engaged, she linked students’ motivation to engagement.

Mahmood: “What makes you think they were engaged?”

Arwa: “I can see that. They’re talking with their friends, “Quickly, let’s do it. What’s that?” So they want to be ready because they know that there is a game afterwards. So I feel yeah it helps me to increase their level of motivation and so I know students are engaged with the activity” (APOI1, 207-212).

4.1.5.6 Different classroom management

From Arwa’s point of view, when she used technology, she had to manage the class differently. For example, when I asked her about her role in an activity where she had used technology, she replied that she needed to manage the class differently compared to a traditional class where no technology was utilized. She expressed her concerns of keeping students focused on task while at the same time observing their performance. “So I need to manage the class differently than traditional classes. I should observe their work and at the same time I need to remind them every now and then about looking back to the text” (APOI1, 173-176). Arwa’s concerns about the need to manage the class

differently when using technology were legitimate. They seem to have evolved from her own experience. For instance, during the post-observation interview, I asked Arwa if she thought there were any negative aspects of her lesson. I had already noted what I considered a noisy reaction from the students, particularly the boys, who looked slightly distracted. Her answer indicated clearly that she was not happy with her students' reaction that day. Given the chance to use their mobile phones to perform an activity, they used them as distractors.

Mahmood: "In your opinion, what could be seen as a negative aspect of today's integration of technology in your class if any, of course?"

Arwa: Of course there are many. The first thing is that students playing with their phones are doing other things at the same time" (APOI2, 82-86).

I wanted to know if her statement was based on a general assumption or a reality that she observed, and asked her if she saw it happen in class. Confidently enough, Arwa confirmed to me that she saw it and that she, seemingly, knew a couple of students who did it.

Mahmood: Did you see that yourself or you just think they are?

Arwa: I know, I know there are a couple of students who are doing this, especially the good ones. They can do it immediately in one or two minutes and then they will switch to WhatsApp or Facebook" (APOI2, 188-192).

In another incident where Arwa used a game, some of the girls were shouting loudly, so she had to calm them down a few times. When I asked her about that, she confirmed that she asked them to "clam down" because the students forgot the element of learning and just wanted to win the game. However, Arwa justified that the students sometimes acted naturally and that it was acceptable by her. Arwa also reported that she needed to think of the time element as an important factor when using technology.

Mahmood: "In general, when you plan to use technology, does it require you to think differently?"

Arwa: Sometimes yes. I think you need also to think of time, the time available for this task because some teachers just want to use fancy things in the class. “Let’s bring lots of pictures and videos for students.” But if you look at that small task, it might fulfil or meet all the goals or the objectives just by using that one. You need to put the other factors in mind; time, level of students’ interest, objective” (All, 427-435).

4.1.6 The impact of technology on Arwa’s cognition and instructional practices

The following themes emerged from the analysis of Arwa’s post-observation interviews and the classroom observations conducted.

4.1.6.1 From ignorance to exploration

Looking at the data, Arwa’s experience with technology had apparent influences on her as a teacher. From a state of being ignorant about the potentials of technology in teaching, she started to explore the world of technology. “I feel that in the first two years of my teaching experience I was ignorant about the importance of technology” (All, 243-244). She became aware of not only the type of technologies she could use as a teacher, and which she apparently did not know about previously, but also how to use them in language teaching. In fact, she realized that teaching English Language and technology go together perfectly and that both support each other. “I feel that as a language teacher, I need to know a lot about technology because the nature of teaching English actually requires using technology in the classroom” (All, 245-248). This realization is reaffirmed in another location when she said “I feel that as an English language teacher, it’s not just a choice. It’s a must to know about technology” (All, 255-256). Arwa’s new perception that technology is an integral part of teaching English Language and that teachers “must” know about technology was an influential one. It set her off in an exploration journey to discover and experiment resources and technologies that could assist her in teaching. “So after this turning point, I feel that I needed to dig deeper and look for more resources, I need to know more about technology” (All, 250-251). Interestingly, Arwa’s tendency to experiment with various technological options as a teacher might be rooted in her own experience as a learner. For example, during her master study, she spent a lot of time experimenting with different technologies, which supported her to learn and excel (see Section 1.5). She obviously recalled how engaged with exploring technology she was during her

study and how helpful to her learning that experience was. “I have indulged myself into the world of Facebook where I can always find room to socialize and learn” (AAA, 44-45).

Furthermore, Arwa’s exploration and experimentation of technologies that could serve her purpose as a teacher may have developed into successful attempts to design her own. For example, during both of Arwa’s observations, she utilized technology to create instructional materials that were supportive of her students’ needs and expectations. She designed those activities using the internet and with the help of some apps to make learning more authentic (see Section 1.6). It was not unusual for Arwa to do so as she, according to her autobiography and initial interview, had already contributed with some of her own contributions during her master study. Even earlier, she was exposed to creating a Web Quest during her undergraduate study. “One of the things I learned and can remember is how to create a Web Quest” (AAA, 33-34). A memory which seems to have an influence on Arwa because she actually liked the idea of creating Web Quests. “I remember how we created Web Quests... I mean I liked the idea of using enquiry activities through internet” (All, 195-196).

4.1.6.2 New perspectives about teaching

According to Arwa, her choice of technology became more decisive and purposeful. She started observing her students closely to choose what technologies suited them. Her students have become the core element in choosing the technologies in class and she was aware that some of them were “digital natives” as she called them and hence this should be taken into account. “We call this new generation the digital natives because they’re very interested so I used more technologies for them” (All, 262-264). Arwa was not thinking about the class as a whole, she was thinking about the individual cases that she had in her class. For example, she had in mind students’ backgrounds and paid attention to the differences in terms of their technological skills. All of these made her see a difference in her students’ reaction to the use of technology, which probably motivated her more. “So I can see the difference in their eyes, in their feelings, their reactions when I give them like an online game or use a fancy presentation or other kind of stuff” (All, 268-271). Arwa’s evaluations were based on students’ reactions as she stated. Her mechanism of measuring the success of technology use was not the mere use of it, rather she sought to see the outcomes in her students’ reactions.

Even her stated aims for choosing a particular technology-related learning program was based on an attempt to provide them with a stress-free learning

environment. In her classes, Arwa stressed the importance of creating stress-free environment by allowing students express their feelings and thoughts (APOI1). In addition, Arwa's tendency to use technology for socializing during her school and undergraduate studies (AAA and All) is clearly reflected in her desire to get her students to learn English through using technology to socialize. "I am looking forward to using Edmodo with my students this semester to help them socialize and learn in English in a relaxing environment" (AAA, 51-52). This could be seen as a significant indication that she was attempting to apply a technique that successfully worked with her in the past. She made this clear when she said "and again if you look at students, students are very interested in technology. After all, that's how I felt when I was a student" (All, 334-336). Arwa was definitely making links to her own past experiences with technology.

4.1.6.3 Evaluating technology use

Arwa tended to observe students' reactions and this was her way of evaluating whether her technology use was successful or not. She saw the difference in her students' eyes, feelings and reactions as she stated in the interview. At times, when her students did not respond or when her evaluation through her students returned with negative reactions, she felt frustrated. Arwa had expectations of how her students should respond and if they did not respond in that way, she became frustrated.

Mahmood: Do you usually find using technology in teaching enjoyable on your part as a teacher?

Arwa: Yes, but sometimes it's frustrating.

Mahmood: In what way?

Arwa: When students do not respond properly; they do not respond the way I expected.

Mahmood: Does it matter if students respond or not?

Arwa: Of course. For me, the way I evaluate the technology I use is the students' reaction, if they enjoy it or not (All, 288-301).

When asked whether students' responses mattered to her or not, Arwa very clearly gave high importance to students' responses. In fact, on another

occasion, Arwa confirmed that she considered students' involvement and engagement in the activity as a way of evaluating technology and learning.

“So I can see that there is something special, something interesting going on in the classroom. Students are very occupied with learning. They like it. They're involved and engaged in every single part of it, and I think this is what all teachers need to see when they use technology” (All, 347-350).

Arwa's senses of observing her students have become so sharp that she managed to assess their involvement in learning when technology was utilized.

4.1.6.4 **Thinking differently**

Moreover, Arwa seemed to have developed a different way of thinking about her lessons. For example, she was no longer restricted to the textbook as was the case before. She became more open to other choices. During her observations for example, we have seen that she was consistently exploring for real-life activities using technology. When I asked her why she decided to get an activity from outside the book she said “They had a similar one in the book but this is more authentic because it is weather focused” (APO11, 90-91).

Also, during planning, she analysed the activities to select whatever served the aims and would meet her students' needs. Arwa skipped some of the activities if she felt they were boring and replaced them with others using additional resources. She spent more time preparing for her lessons than she did before, looking for resources that attracted her students and would provide more interactive materials.

“In the past I feel that I was stuck with the textbook. I had to follow the textbook because I had no other options. But with technology, sometimes I skip some activities when I feel that they are boring and they do not provide students with the required language they need. So I go online and find endless options of resources where I can use one of them, bring them to the classroom, students can see, can watch, can interact, and they get it” (436-442).

Arwa drew a comparison between her role as a teacher before and after what she called a *turning point* as a result of using technology. From sticking to the textbook to skipping some activities, from having no other options to finding endless options of resources at her disposal, and from following guidelines that may not meet students' expectations to using interactive interesting activities.

"It's more interesting. I like the colours. As a teacher I can just ask them to take a sheet of paper and write on it but the colours and the pictures, it's more useful to them. Students can integrate lots of things there; pictures and photos based on their own ideas" (APOI2, 125-128)

When asked about the reasons behind using a particular technological app during a classroom observation, the teacher expressed her thoughts interestingly. She was aware that using a pen and paper would save her a lot of time, but she wanted a more personalized way of completing the task. She wanted more colours and more pictures to make it more useful and to allow students the opportunity to integrate more options "based on their own ideas". The teacher viewed technology as a means to meet students' differentiated ways of thinking more so than the paper could provide them.

4.1.6.5 Teacher image

Arwa vividly recalled an interesting event that occurred when she was very young, while still at school. In this memory, she tended to resort to technology (computer & internet at home) to seek further support and to further expand her chances of learning. This was the case when she was at school and found some useful resources related to her studies to show to her teachers and peers (see Section 1.3). She enjoyed the feeling of achievement. This memory, where technology played an important role in providing her the opportunity to shine and to grow more independent, seems to have its own influence on her during her career. Arwa seems to have developed a sense of independence and a desire to learn more, even when her surrounding context was not supportive enough or lacked the ability to do so. Arwa, in her identity as a teacher, is more independent and open to other choices and options. She is not the kind of teacher who would submit to whatever is available to her as a teacher, but she would rather exert effort to renovate her teaching and use technology, for example, even when the textbook did not encourage her to do so. "But again the teacher should not just rely on the textbook whether it would encourage them to use technology or not" (All, 424-425). She also sees technology as a medium to make activities and tasks richer and deeper as she stated "I think technology would help you go further with this activity" (All, 409-410).

In addition, Arwa's experience of using technology to contact other students and teachers from other regions when she was at school was also an influential one. Her main aim was to get more "experience" from other students because she felt that she could no longer benefit from her peers, since she had been with them for a long period of time and she knew what they knew (All). Technology afforded her a window to further compare her knowledge with others in other parts of the country. She also contacted other teachers and consulted them about issues relating to her studies. This experience had probably made Arwa value the fact that expertise may exist outside her context and that reaching out to that expertise and benefiting from it can be achieved through technology use. "So I contacted people to get more experience. And even we got in contact with teachers who are in the forum so we had experienced people we could consult and get valuable information from them online." (All, 172-175). Her experience of using technology to seek additional support and expertise from experts has had a positive impact on her image as a teacher. She continued to do this after she became a teacher by using a variety of resources and exchanging ideas and thoughts with other experts and professionals in the field of language teaching. She believes that technology can make teachers more creative, perhaps as technology made her more creative when she was a student.

4.1.7 Arwa's cognition about technology and the contextual factors

The most salient themes that emerged from the analysis of Arwa's of data in terms of the most effective factors that motivated or demotivated her to use technology were personal interest, peer pressure, training, learners' attitude and availability of technology. Below is a description of each one of them.

4.1.7.1 Personal interest

An extremely influential factor that motivated Arwa to use technology in her teaching was her own personal interest in it. Arwa's relationship with technology was built on her own interest since the first moment she saw a computer at home. Even when she was a student, Arwa had that intimate affection and love for technology. She continued to look at technology as favourable tool for learning and teaching. "I had some extra time for myself to enjoy using technology because this is, as I said earlier, a personal interest. I like navigating the websites, getting to know new resources online" (All, 209-211). Arwa, having been so interested in technology throughout, assumed that her students would also feel the same. "Students are very interested in technology. After all, that's how I felt when I was a student" (All, 336). Hence, her interest in technology use slowly became an essential part of her identity as a teacher.

Technology integration has become one of her firm beliefs in her teaching philosophy. When asked about the possible factors that motivated or demotivated her to use technology, she considered her own interest in technology as the first factor to encourage her. “First my own belief about the potential of using technology in the classroom” (AFI, 11). In her autobiography, Arwa stressed that using technology was significant to her.

“Using technology in my EFL classes is one of the firm beliefs that constitutes a big portion of my teaching philosophy and which has influenced my teaching practices. This belief has strengthened over the years because of my exposure to various electronic devices, online courses, professional development sessions, readings and personal experiences that have emphasized the importance and effectiveness of using various digital resources with the new generation” (AAA, 7-12).

Furthermore, Arwa’s belief about the significance of technology is viewed by her as a necessity, not just a luxury, especially when it comes to English Language teaching. From her point of view, it is a “must” for teachers of the English language to know about technology, not an option. “My belief, I feel that as an English language teacher, it’s not just a choice. It’s a must to know about technology” (All, 255-256). Perhaps that was why she repeatedly portrayed technology use as integral when she was asked to describe technology as a medium of teaching. “It’s essential. I think it’s an integral thing. It’s very important” (All, 305).

4.1.7.2 Peer pressure

Another factor that emerged from Arwa’s data was the influence of her colleagues. Arwa viewed her colleagues’ practices with technology as a pressure to do the same. The competitive atmosphere that existed at the Centre for Preparatory Studies may have promoted her to continue using technology to be seen as a good teacher. “The other thing is something competitive. The good teachers in the Language Centre always use technology. That makes me in that competition” (AFI, 16-17). Arwa thought that by using technology in her teaching, she would be amongst the “good teachers”. Arwa’s desire to become one of the top teachers at the Centre for Preparatory Studies has motivated her to use technology. She could see the potential of technology through observing her fellow teachers who were constantly and professionally using it in their teaching.

“I do not know if it’s correct to call it peer pressure but it is actually peer pressure the idea of having top teachers, good teachers who are well known here in the Language Centre for that they are really good teachers. If you see their approaches in teaching, you will see that they focus on technology. And I agree. I totally agree but this would actually boost my enthusiasm and excitement to use technology more and more. And the more I mingle with those teachers, the more I feel that I need to use technology because they use it in an amazing way so they show me the potential of using it so they encourage me and I try to use more and different tools” (AFI, 22-29).

To follow this up, I asked Arwa if anyone crossed her mind when she was speaking about the top teachers who used technology well and she replied positively. Arwa had some teachers present in her mind which explained why she considered peer pressure to be an important factor. However, there were other teachers in her surrounding who would not use technology in their classes. “I know teachers that have never ever used technology. They have a phobia for technology. They do not want to use technology” (AFI, 55-56). Needless to say, these had seemingly no impact on her.

4.1.7.3 Training

Training was another factor that Arwa thought crucial to motivate her to use technology. Arwa recalled how a training course for an application called Edmodo was able to convince her to use it with her own students after realizing its potential. “I had a training course in Oxford in the summer and we talked about Edmodo and we used Edmodo ourselves in the training course so I took it from a learner’s point of view” (All, 452-454). The influence of the technology-related training which Arwa joined in Oxford about Edmodo was clear in that she had plans to use it with her learners. “I am looking forward to using Edmodo with my students this semester to help them socialize and learn in English in a relaxing environment” (AAA, 51-52). Arwa’s decision to incorporate a particular technological application which she knew nothing about before that course was due to her practical engagement with it in a hands-on workshop. She became skilled in it and was able to perceive its usefulness to her students. “I could see

the potential of it to help students improve their writing skills, their critical thinking skills, interaction with their peers” (All, 455-457).

During one of the post-observation interviews, I asked Arwa about why she chose to incorporate a particular website in her lesson. Her answer showed her positive reaction to technology-related training and further confirmed the vital role that this training had on her. “Actually I learned about this website recently. I took a one week training course here at the Language Centre two weeks ago and it’s on integrating technology into teaching” (APOI2, 105-107). In a matter of two weeks, Arwa had applied what she had learned. Arwa was able to give a deep reflection about the results of using that website as a learning tool and how her students reacted to it.

Even though one of Arwa’s motives to join certified technology-related training courses had been to get promoted (AFI), she later changed her mind. Seeing that she learnt a great deal of information and skills about technology use, her motive became to basically learn from them. She was longing for more and so joined various online courses offered by other institutions. “I have discovered that online courses are really helpful. You meet thousands of teachers from different parts of the world and those people come with different experiences. They share the same interests as you so you feel like you learn from them. And it’s really very interesting and when I go to class, I have tried to implement many of these ideas” (AFI, 102-106). This was not the first time for Arwa to value contacting others from outside her context and feel excited about exchanging expertise with them, as she had already been through a similar experience when she was a student.

4.1.7.4 Learners’ attitude

Leaners’ attitudes towards Arwa’s use of technology constitutes another major factor that inspired her to proceed employing technology in her classes. She obviously associated her decision to continue using technology with their reaction to it. “Their reaction I think is a very important factor in helping me with whether to continue with this or not” (AFI, 11-112). In fact, her students’ attitudes towards technology made her frustrated when their response was not positive enough. When I asked her if that mattered to her, she replied “Of course. For me, the way I evaluate the technology I use is the students’ reaction, if they enjoy it or not” (All, 301). Her way of evaluating her students’ attitude was through observing their reactions in class. “So I can see the difference in their eyes, in their feelings, their reactions when I give them like an

online game or use a fancy presentation or other kind of stuff” (All, 268-271). It was not sufficient enough for Arwa to monitor her students to enjoy, or else dislike, using technology. Asking students directly about their experience with technology was another fundamental way for Arwa to discover their impressions about it. “I know they like it because at the end I ask them, “Do you find this interesting? Do you like this?” and they say, “Yes, Miss, it’s very interesting. We used it.” (AFI, 117-119).

4.1.7.5 Availability and accessibility

When asked if there were any other factors that she considered essential in her use of technology, Arwa replied:

“Yeah. I get sometimes frustrated when we do not have enough resources here at the Language Centre. I’m happy we have the desktops and LCD but we can have interactive whiteboard. We do not have it. We get now all course books have with them the DVD with the interactive book. The interactive book does not work properly on computers, on desktops. You need the interactive whiteboard” (AFI, 167-171).

Arwa’s answer embodied her feeling of frustration when she did not have enough resources to use. Arwa wanted to have an interactive whiteboard to take full advantage of the DVDs that she had. She also mentioned the slow internet connection and how negatively it affected her. During the post-observation interviews, Arwa reported that she had to change her plans because of the unavailability of the internet or because she was not able to access the websites that she had planned to use.

4.1.8 Summary

Arwa’s relationship with technology advanced remarkably. Her journey with technology began early when she was still a child at school. From the first moments Arwa saw technology, she became fond of it and became increasingly attached to it. She was keen to get to know it and try it, even though she did not really have the opportunity to do so. Arwa realized the significance of communicating with the world using technology, which later had an influence on her technology use as a teacher. Her reflective use of technology during her

undergraduate study led her to become a more critical thinker as she mentioned. Her use of technology in her classrooms was marked with a tendency to use technology for fun, using authentic materials, having alternative plans, creating technology-related materials, independent learning and different classroom management styles. The factors which Arwa thought were influential when using technology were her personal interest, peer pressure, training, learners' attitudes and availability of technology. In conclusion, Arwa's final reflection was: "I can see a good impact on me, on my students, on my colleagues so it's really a good thing and I'm happy that I'm on this path." (AFI, 194-197).

4.2 Basma's findings

4.2.1 Basma's profile

When this study took place, Basma was in her late 30s and had worked as an English Language teacher for more than 17 years. She worked as an assistant language lecturer in the Centre for Preparatory Studies at SQU. Basma held a master degree in English for Specific Purposes (ESP). According to the survey, Basma's level of proficiency in technology is advanced and she stated that she used technology frequently in her teaching.

4.2.2 Basma's early experiences with technology

Basma's very limited exposure to technology during her early school days is clearly articulated in her autobiography and during the interview. According to her autobiographical account, Basma had no contact with technology at school during her early years of education. Basma stated that her school did not have any means of technology, apart from tape recorders, which English language teachers might have used then for listening tasks. This was later confirmed during the initial interview when I asked her if she could recall any contact with technology during her time at school and she replied: "I do not think we had any contact with computers, nor overhead projectors, nothing, no, not until 1994" (BII, 48-49). Therefore, Basma had nothing to say about her relationship with technology because there was none. Her first encounter with technology took place after she joined SQU for her undergraduate study in 1994.

4.2.3 Basma's cognitions about technology and teacher education

Basma's first acquaintance with technology occurred when she joined SQU in 1994. This was her first time using computers. As part of her undergraduate study, Basma enrolled in a computer skills module where she was introduced to computers. However, her experience was still very limited as she only learned basic computer skills. "We had to study one of the university requirements. That

was our first experiment with files, saving, Microsoft Word, yes, basic things in computer” (BII, 57-59). Basma repeatedly affirmed that her use of computers during her university time was restricted to the Word program, which she used to type up her assignments. Basma’s recollection of her experience does not involve any attempts to experiment with computers as a new device or any interest in exploring its potential. Looking at her data, she seemed to have used computers only for the sake of completing the module. She clearly stated that she used computers solely to type up her assignments.

“But again during the study, we did not get to use more than Word so we were typing some of the assignments and that was it. We also in terms of internet, I do not think there was an encounter with internet at that time” (BII, 64-66).

Even when I asked her if computers had played any role on her experience as a learner during her undergraduate study, Basma replied: “not so much actually, no. Only in terms of typing and that was it” (BII, 95). In Basma’s data, there is no sign of any special interest in technology, particularly computers which were just introduced as an innovation at that time. Basma, furthermore, did not recall using the internet during that period either. However, she used the library technological resources to improve her English Language. For example, she spent hours listening to educational materials and watching movies that were accessible to her at the library. Basma appeared to be more passionate about her experience with the library’s technological resources than with computers. “I think this is how my level in English improved” (BII, 106-107).

4.2.4 Basma’s cognitions about technology and higher education

4.2.4.1 Personal use of technology

In Basma’s recollection of her master study, she recalled her first encounter with the internet. Basma was doing her master degree in the UK, and out of a personal need to educate herself about important aspects of her pregnancy at that time, she resorted to technology. She wanted to know more about pregnancy and having a baby and therefore her relationship with technology grew stronger as she reported below.

“I used the internet out of need then because what I remember is being pregnant and wanting to know things about pregnancy and having a baby, so I had a very friendly relationship with the

internet then. I was waiting for the emails that are sent weekly to tell me about my baby. And since it was my first baby so I was very much motivated. I think my love started with the internet then” (BII, 217-222).

Driven by her personal need, Basma realized the importance of the internet, and which is when her “love started with the internet”. Technology, according to Basma, was not a key element in her master study and hence she only used computers to produce assignments for the modules.

4.2.5 Basma’s classroom instructional practices in relation to technology

The following is an analysis of Basma’s classroom instructional practice during two classroom observations. The analysis is based on the themes that emerged from her data.

4.2.5.1 Limited technology usage

Despite Basma’s viewpoint of technology integration, her actual use of technology was limited in the class. For example, Basma stated that “technology can help me make learning more suitable for my students’ and match their levels” (BII, 195-196). However, a key observation from Basma’s classroom sessions was the limited use of technology in both classroom observations. Mainly, Basma used technology for three purposes; to play a listening task and to project some questions on the projector, and to record sentences using the WhatsApp instant messaging application. For example, during the first lesson, which was a listening and grammar activity, Basma used the computer to play a recording while students were supposed to answer some questions. Towards the end of the lesson, the teacher asked her students to record six sentences using the grammatical rules that they had learned during the lesson and send them via WhatsApp to her. Students, who seemed lightly puzzled and took some time to understand their role, started to record their sentences. They sent their recordings to the teacher. When asked during the post lesson interview if she sent her feedback through WhatsApp, Basma confirmed that she usually replied to students with voice recordings via WhatsApp using the same method.

During the second lesson observation, the teacher used technology for a listening task. In one instance, she tried to access the internet to navigate the British Broadcasting Corporation (BBC) website, but failed to do so due to slow internet connection. Unable to open the website, the teacher looked at me with a smile and then said: “This is the problem of technology!”. When asked about her feelings at that moment, Basma replied: “I have faced it in the past and

many people do, we cannot trust technology 100% for anything could happen” (BPOI2, 39-40).

4.2.5.2 Technology for technology sake

Based on the classroom observations conducted to observe Basma’s instructional practices in relation to technology use, there was a tendency to use technology in a very basic way. Basma seemed to have used technology just for the sake of using it, to prove to herself and her students that she wasn’t an “old style teacher who does not use technology” (BII, 288). Basma, having been criticized by her students for not using technology frequently (BII, 281), may have been deeply affected by their comments, hence “there was more exposure to internet and technology and computers and Turnitin and things like these” (BII, 297-299). This influence was apparent in Basma’s identity whenever she talked about herself. For example, when I asked her about her justifications for using technology in her classes, she replied: “I’m not an old school so I love trying new things” (BII, 188). Basma justified her use of technology through proving to herself that she was not an old school teacher. She used technology to prove that she was otherwise. There was no mention of students, curriculum or any other educational purposes that she wanted to achieve from using technology apart from not being an old school teacher. Even when she talked about her colleagues, she thought that some of them were “old school” who feared using technology. “And I know some people who are old school who are just ... they have a phobia towards computer and technology and internet” (BII, 263-265). Seemingly, Basma did not want to be one of them. In the initial interview, she also gave a strong justification that students considered a teacher to be advanced if she used technology and “if you do not, they consider you as somebody who is not very well equipped or who is not very well aware of what’s going on in the world” (BII, 422-423). This provides another indication that she was trying to prove herself to be a modern teacher who used technology frequently.

Basma’s view of technology use was based on personal motives where her image as a teacher was perhaps more essential to her than attending to her students’ levels and interests. This egocentric rationalisation of technology use may have caused her to use technology in her classrooms without a clear purpose. This happened, for example, during the first class when she used the computer for a listening task, but where technology was used only for playing the recording loudly. Even when the teacher asked students to record themselves using WhatsApp, the instructions were not clear and students missed the main goal of the task. During the second observation, again the computer was used to play a recording. Students were not really involved in any technological tool or task and the projector was utilized to merely project the questions. Basma did not seem to have evaluated the technological tools

available to her in order to determine which would best support her students' learning. Perhaps she was more concerned with making technology "present" in her classes but with no clear purpose.

4.2.6 The impact of technology on Basma's cognition and instructional practices

The following theme emerged from the analysis of Basma's post-observation interviews and the classroom observations.

4.2.6.1 Untrustworthiness of technology

Looking at Basma's data, she referred to technology as *untrusted* in many incidents. This description of technology kept appearing recurrently in her conversations about technology. For example, when Basma failed to open a website during the second observation, she immediately said "This is the problem of technology" and when I asked her about her feelings she replied: "I have faced it in the past and many people do, we cannot trust technology 100% for anything could happen" (BPOI2, 39-40). Basma was right. She had probably expected the failure of technology and therefore had prepared an alternative plan. Basma also confirmed that she liked "technology but won't trust it totally!" (BPOI, 54) which explained why she was lightly reluctant to use it more extensively in her classes. To Basma, technology was apparently just another alternative way of doing things. She did not seem to be very enthusiastic about using technology in her teaching, despite what she said about it in the questionnaire.

All in all, when looking at Basma's data, including her autobiographical account, the initial interview, the classroom observations, the post observation interviews and the final interview, she did not appear to be largely influenced by technology. The teaching beliefs she expressed during the study duration were not largely linked to technology and her instructional practices showed minimum influence of technology on her decision-making skills. Technology was used inadequately and whenever it was there, it lacked clear purpose or rationale.

4.2.7 Basma's cognition about technology and the contextual factors

The most salient themes that emerged from the analysis of Basma's data in terms of the effective factors that motivated or demotivated her to use technology were her colleagues and pressure from her students.

4.2.7.1 **Colleagues**

One factor that Basma viewed as affecting her technology use was her own colleagues. She thought that she was motivated to use technology when her colleagues shared their positive results of their practices with her. This had probably made her more appreciative of technology. For example, when asked how her colleagues motivated or demotivated her, she replied: “Somehow yes, by sharing the positive results of their practice, and even by applying what they have used” (BFI, 25-26).

4.2.7.2 **Student pressure**

Basma was motivated by her students to use technology. Having used far less technology than her students had expected, one of her students told her that she was “an old style teacher”. He thought that his teacher was old school because she did not use much technology in her teaching. Basma, shocked by her student’s comment, explained to him that it was a writing activity and that “because of the nature of the subject I’m doing with you now which is writing, it’s very unlikely that I will use any form of very advanced technology”, (BII, 293-295).

Basma stated that this experience deeply affected her and made her reconsider her own teaching style and the level of technology used in her teaching.

“But it actually it hit me because I was like what?! Am I not doing my job the right way? He seemed to be somebody who was used to very much technology in the classroom” (BII, 301-303).

On another occasion, Basma rearticulated her students’ influence on her when she indicated that students nowadays are more linked to technology and may criticize teachers if they fail to use technology in a way that satisfies them.

“They actually are very familiar with technology considering the time they are in, they get more enthusiastic while using it, they benefit more than using traditional teaching methods, and they even criticize us if technology is not used” (BFI, 35-38).

4.2.8 Summary

Basma's limited exposure to technology during her own school days seemed to have limited influence on her cognition and instructional practices as a teacher. Likewise, most of her learning during her teacher education study did not involve extensive use of technology apart from typing up her assignments. According to her autobiography and the initial interview, Basma did not demonstrate significant interest in technology, either because technology was scarce or because she did not realize how useful technology could be to her. When she went to the UK for her master degree, Basma's relationship with technology grew stronger as she started discovering how useful technology could be to her from a personal perspective. She was prompted to use the internet to satisfy a personal need. As a teacher, Basma did not appear to be a frequent user of technology, as seen during the classroom observations, which was why some of her students criticized her. Even when she used technology, it was not based on a clear rationale. Finally, Basma's colleagues and her students seemed to be the two major factors that influenced her to use technology.

4.3 Muna

4.3.1 Muna's profile

Muna did her schooling both inside and outside of Oman. She studied Grades 2, 3 and 4 in Jordan during her stay there with her family. Nevertheless, she completed the rest of the grades in Omani schools. Muna joined SQU in 2003 where she undertook her undergraduate study in Teaching English to Speakers of Other Languages (TESOL). She holds a master degree in Learning Science and Technology from Sydney, Australia. Muna teaches students on the Intensive Foundation Programme. Upon finishing the foundation course, her students would join different colleges at SQU to pursue their undergraduate degrees (see Section 1.2). There are six different levels, where the sixth level is the highest and 1 is the lowest, and Muna was teaching Level 5 when this study took place. At the time of the study, Muna was in her mid-30s and had worked in the Centre for Preparatory Studies at SQU as a language instructor for about 10 years. As per the questionnaire, Muna believed that her level of proficiency in technology was advanced and she stated that she used technology frequently in her teaching.

4.3.2 Muna's early experiences with technology

4.3.2.1 Studying abroad

Muna's early experience with technology was outside Oman. She had her first encounter with technology when she was in Jordan accompanying her family. During her stay there, she went to a private Jordanian school and completed Grades 2, 3 and 4. During that period, Muna recalled that she was "lucky to be actually enrolled in one of the best schools back in Jordan. They had these IT classes; IT lessons where we were exposed to the Paint Program for example and other things." (MII, 56-59). This granted her the opportunity to use various software programs such as Paint, to draw shapes and create other items, which was her first encounter with technology.

4.3.2.2 Making contact with the world

Muna had no contact with technology after she left the private Jordanian school at Grade 4 and returned to Oman, until her father bought a computer and allowed her to use it. She viewed this opportunity as an influential one where she managed to make contact with the world using the internet. Muna knew about the other communities outside of her own when she stayed in Jordan for a few years and was looking forward to communicating with other people from outside her close environment, and therefore, one of her objectives when she got a computer was to contact people. She was so thrilled to be able to connect

with the world and started communicating with friends who shared similar interests with her. Moreover, Muna started participating in the Omani Sabla (renowned discussion forum in Oman) to discuss a wide range of local issues with different members of the forum who usually had different backgrounds and qualifications. Muna found this experience very rewarding, as it broadened her view of the world and life.

“I started using Hotmail and Messenger, emailing and chatting with friends and people who share interests with me. I was also greatly involved in participating in the Omani Sabla discussion forum. It was rewarding to get to discuss local issues with Omani members. It broadened the way I viewed the world and life” (MAA, 13-17).

When asked about why she felt communicating with others online was rewarding, Muna explained that she used the internet anonymously. To do that, Muna used a nickname instead of her real name to avoid being recognized by others. Therefore, she was able to express her views more freely and without feeling reserved. “My account was anonymous. I did not write my actual name so that was a bonus in a way that I had my freedom to express myself” (MII, 82-84). She viewed her ability to write anonymously as a bonus point. Muna’s feeling of being deterred to speak in a free manner was due to the cultural norms that exist in her society. She thought that she had no freedom to speak face-to-face about certain topics. “I think in our society we do not have that freedom face-to-face to say whatever we want. We are very reserved in reality” (MII, 84-86). Therefore, she found herself more capable of speaking freely away from the society restrictions that may have otherwise hindered her from speaking her mind. She apparently did that to escape her reality which she viewed as “reserved”. Muna resorted to technology because she felt that it would provide her the means by which to communicate freely with others. “When it comes to online interaction, I had that freedom to express myself and I continued doing this until the first year here at university before I got very busy with studies” (MII, 86-88). Muna, having enjoyed the sensation of free online interaction with the outside world, continued to communicate with others using different technologies until she joined the university.

Muna had this experience at a very early stage when she was still in Grades 10 to 12 (15 to 17 years old). Her personal observation of how the society confined her freedom of speech took place when she was still a school student. This led her to realise the potential that technology could offer her, in order to overcome the societal barrier and to reach out to others from around the world. This experience eventually made her value the prospects that technology could

afford her as a student and an individual as she expressed eloquently when asked about her relationship with technology as a student. She explained that she “maybe became that kind of student who is more aware of how technology can help” (MII, 181-182).

4.3.3 Muna’s cognition about technology and teacher education

4.3.3.1 Independency and maturity

During her teacher education at SQU, Muna had a different type of contact with technology. Although she stopped using online interaction in discussion forums, she continued to use technology for academic purposes. Her decision to abandon discussion forums was essentially based on a conception that she developed, that the type of topics that were discussed did not match her criteria, namely politeness and seriousness.

“I think everyone agreed. Lots of people agreed that the direction of the topics started to be very impolite or not serious. People do not take it very seriously so that’s why I think some people started leaving the forum and other people took over and it did not have the self-appreciation as before” (MII, 121-125).

Muna seemed to have had a clear purpose when using technology, and whenever that purpose was at stake, she would look for other options to achieve it. In her autobiographical account, Muna explained that she stopped posting in online discussions and instead she continued to contact her close friends and family. She also subscribed in several “interest mailing groups” that were popular at the time to get informative and educational emails. This shift from participating in general online discussion forums into more specific interest groups could be viewed as a sign of maturity in terms of technology use. She left discussion forums which are very public platforms and usually fit in a wide spectrum of topics, with members who come from extremely different backgrounds and capabilities. She decided to go for a more purposeful way of communication, interest mailing groups, where participants were more focused and may have similar interests and capabilities.

Another significant experience that Muna had with technology was a course on educational technology that she joined during her teacher education study at SQU. In her account, Muna seems to have enjoyed this experience where she had the opportunity to design some activities using technology for the purpose of teaching.

“During my studies, I remember taking a course on educational technology where I was asked to design learning activities using PowerPoint following specific guidelines. It was a very successful project where I designed listening activities to teach a number of letter sounds and they included audio files which I recorded myself” (MAA, 22-26).

Overall, Muna’s relationship with technology during SQU study “developed” as she described it. She grew more independent in terms of what technology to use and more self-determined in terms of how to use it. For example, from a student who would just do whatever she was told to do, she became into a more independent student, as she clearly clarified when asked about her relationship with technology. “Before it was more like doing what I was asked to do”, into becoming “that kind of student who is more aware of how technology can help. I’m the kind of student who would like to continue being interested in what I learn” (MII, 181-183).

4.3.4 Muna’s cognition about technology and higher education

4.3.4.1 Learning by doing

In Muna’s recollection of her master degree study, she referred to it as an “interesting program” in “Learning Science and Technology”. During her study, she learned about several theories in relation to the use of technology in learning and was introduced to Web 0.2 tools for the first time which left her amazed at their potential for teaching. She was also exposed to a range of e-learning applications and used them practically. The most influential aspect Muna recalled about this course was the fact that they had to apply what they learned practically. For instance, she managed to observe her tutors teach following the same theories that were taught in the course.

“What was interesting was that whatever theories we learn or we have in our courses, they are the same theories that our professors used to teach us. So we did not just read about what education technology is all about but we also went through the whole process” (MII, 229-232).

Moreover, as a student, she was granted the chance to be involved in applying the pedagogical theories underpinning technology use in reality. This, seemingly, was a successful experience from Muna’s point of view because it incorporated a pedagogical use of technology to support teaching aims. That is

why Muna, upon returning to teaching after her master degree, immediately changed her mind about some of the technological applications she used to employ in her teaching.

“The program was designed around the key features of e-learning where students interact and attend a lot of classes online. The program introduced me to Web 0.2 tools which I then used with my students at SQU. I slowly decreased my use of Moodle and found Web 0.2 tools richer and more user-friendly” (MAA, 31-36).

4.3.5 Muna’s classroom instructional practices in relation to technology

The following is an analysis of Muna’s classroom instructional practices during two classroom observations that were conducted to observe her classroom practices. Two post-observation interviews were conducted to talk Muna through the observations. The analysis is based on the themes that emerged from the analysis of her data.

4.3.5.1 Collaborative learning

One of the key themes that emerged from Muna’s classroom observations was using technology to support collaborative learning. She cited the objective of promoting collaborative learning among her students when using technology in both observations. In her view, collaborative learning is a group-based learning activity in which technology serves as a tool and where students work together to tackle a task. Muna, during the observations, planned to use an application called Titanpad, which helps students work on one document simultaneously. When asked to justify her choice of this application as a way to promote collaborative learning she replied:

“It’ s more of a collaborative writing tool so each group would go into the website, write their name and then they would write chunks of writing and everybody will see. There are so many ways to use Titanpad. It was very successful” (MII, 459-462).

Muna’s use of technology, particularly the Titanpad website, was also justified by her desire to help her students gain a communal learning experience where they could share experiences as she clearly stated: “So it’s more of practice

together and sharing experiences and having collective kind of work together” (MPOI1, 21-23). Muna’s justification of using technology to stimulate collaboration among students is also reaffirmed in various occasions in her data which probably shows how important this aspect was to her. For example, in the final interview, she explained how Titanpad can actually stimulate students’ motivation and create competitive environment.

“There is an element of collaboration, of seeing what others are doing, like let’s imagine the TitanPad thing, if every pair is actually writing them on paper, that’s it, full stop, how rich would that actually be? But when they’re on TitanPad, they’re not only adding their own but reading others” (MFI, 120-127).

During the second observation, I noticed that she was busy working on the computer and her movement around the class was less frequent. I asked Muna about her role during such an activity where technology played an important part. Muna explained that she had “to see everybody’s work at the same time and keeping track of what they are doing and giving comments, real time comments for them” (MPOI2, 96-97). Muna utilized Titanpad to provide immediate feedback to students about their writing and to give them guiding comments. When asked if she thought attending to students synchronously in class was challenging to her, Muna replied that she did not want to leave anyone behind as this would make them feel bad. In fact, Muna viewed this experience as rewarding because it enabled her to observe her students work live in front of her. “It’s rewarding to me because if I see them doing it, first of all I see their effort in front of me, visible in front of me” (MPOI2, 119-120).

4.3.5.2 Learner-centred approach

Muna’s tendency to use technology in her classes was also based on the aim of achieving a more learner-centred approach of teaching. In her own words during the initial interview, Muna thought that technology could promote learner centred approaches. “I think technology encourages teachers to be more learner cantered with activities” (MII, 394-395). She used an application called Kahoot which allows students to take control of their learning. Muna further explained what she meant by a learner-centred approach when she said “So whenever they answer a question, they enter the answer here and I just see it

on the board so every learner is having an input rather than one learner giving the answer for the whole group” (MII, 398-400). She was keen to allow her students equal opportunities to participate in the task rather than sit back and be totally dependent on good achievers. During the first observation, Muna sent different copies of the activity that she did in class to students. She did this to save time and to accommodate the different of levels she had in class. During the interview, I asked her about this and she explained that she sent the different copies depending on the levels of her students.

Muna: “I send different copies to different students according to their levels.

Mahmood: Can you explain this?

Muna: “If I feel some students are weak or not up to the level, I edit and send them different copies to suit their levels. Also, this helps to improve all students according to their levels” (MPOI1, 130-137).

In the second observation, Muna used Titanpad to get students to write sentences with correct grammar. She put students into pairs and asked them to evaluate their work based on others’ work. Muna’s action to pair students up while using Titanpad was basically due to two reasons; to give them the chance to work as a team and to be responsible for what they produce. She wanted her students discuss the examples to participate with and revise the grammar used in them. Moreover, it was a chance for students to reflect and evaluate themselves before getting the teacher’s comment.

“Also pairing them up gives them that chance to discuss what example to come up with and discuss the grammar used in each so they evaluate and reflect on their writing before I start giving comments” (MPOI2, 113-115).

4.3.5.3 Drawbacks of technology in Muna’s classes

During both of Muna’s observations, she was faced with technical problems where technology failed her or was about to. In the first observation, there was a sudden power cut just when she was expecting to use the computer to display students’ work. Muna did not have alternative paper copies of the work to be discussed and had planned to use the projector to do so. During the post-observation interview and with reference to the observation notes, I asked her about her thinking at that moment.

Mahmood: “At Minute 23, the electricity went off. Of course this is out of your hands...What was your thinking then?”

Muna: I did not know it was Minute 23. [Laugh]. I did not know. Yes, it was ... I mean, really at that time I was hoping it will come back because normally here at SQU, it does not ... I mean it does not happen often. And if it happens, it does not stay for long” (MPOI1, 138-144).

Muna’s other option was to postpone the activity to the next lesson if the electricity remained off. “I thought like if this does not happen, then the only way is to postpone this and just finish class early and postpone this stage to the next lesson” (MPOI1, 155-156). I could see that Muna was trying to occupy students with an additional ad hoc activity until the electricity came back on. When asked about that period of time, Muna explained: “It was more of keeping things smooth for the students to keep them following the book” (MPOI1, 170-172). Luckily, the internet came back after ten minutes which made Muna feel very happy to continue the task.

This incident, though unexpectedly frustrating, was viewed positively by Muna. Wanting to further understand the effect of such failures on her as a teacher, I asked her about her feelings regarding this incident. Muna thought that she was able to handle the class well in the absence of the electricity which as a result, caused disturbance to her plan. She believed that this incident did not completely stop the lesson because she used a blended learning approach. However, this contradicts her previous thought about finishing her lesson earlier if the electricity did not come back on again in time.

“And I think maybe that’s the advantage of blended learning when you do not highly or fully depend on technology during the lesson. It’s more flexible for you like if something happens, then the whole lesson is not disturbed or not stopped. You can just go on with other things until electricity comes back until you are able to do what you are supposed to do” (MPOI1, 175-179)

During the second observation, Muna also faced an issue with logging in to Titanpad with several unsuccessful attempts. She appeared a bit restless but continued to try. The lesson took place in a computer laboratory where all students had individual computers. When I asked Muna about this, she expressed her feelings of frustration. Having booked a computer laboratory to guarantee every possible advantage of technology availability and quality, Muna felt disappointed at the fact that she still had to deal with failures in technology. This even caused her embarrassment in front of her students.

Mahmood: So there was a moment when you were trying to log in to the TitanPad and it did not work. Could you tell me what your thoughts were at that moment?

Muna: When it did not work?

Mahmood: Yes.

Muna: Well, I have been feeling frustrated, especially by the Internet connection here at SQU, and it's getting even worse and worse. So I do not know. It is frustrating to me and quite embarrassing because in front of students I would plan for this and why are we in the lab then. The point of it is to use technology, to use computers. So at the moment I'm trying to get used to this problem so I know like well, it's not working right now. Hopefully it will be working in 5, 10 minutes, (MPOI2, 35-47).

Muna's frustration was also caused by the fact that she had no alternative plans as she clearly stated in the post observation interview. She wondered about what other plans could possibly have been thought of when the main aim of the lesson was to use Titanpad as an application in a computer laboratory. However, both incidents led Muna to reconsider her planning practices. For example, Muna expressed her determination to have alternative plans in the future. "But maybe in future I need to do this" (MPOI2, 65).

4.3.6 The impact of technology on Muna's cognition and instructional practices

The following themes emerged from the analysis of Muna's post-observation interviews.

4.3.6.1 More responsible learners

Looking at Muna's data, she appeared to have been using technology in such a way that promoted autonomy amongst her students. For example, she allowed her students the opportunity to vote on how they wanted the learning goal to be achieved. She asked them to choose the best ways to achieve the tasks and followed their choice. "I asked them to vote: Do you want to do it the traditional way as we did it last time or we use Titanpad for this purpose? They almost like, all of them except one student voted for the Titanpad way" (MPOI, 29-31). Giving students the chance to decide on such a matter that related to their own learning may have made them feel more responsible for their learning and

made the class more democratic. This was recalled by Muna herself when she observed how enthusiastically they reacted during the lesson “They voted for the technology, for the full technology thing and I have seen how they felt enthusiastic in that lesson” (MPOI1, 296-298). In another instance, Muna reported that she resorted to seeking her students’ opinion on whether to continue using online discussion forums or not. Muna had already experimented using discussion forums with her students before in order to discuss the topics relating to their study and found it a successful experience from her point of view.

“And teachers say students do not like discussion forums, they do not contribute. Why? I used it with my students and it went very well so the problem is how we set it up, how we introduce it to students” (MII, 424-427).

In spite of the fact that Muna had had a positive experience with the use of discussion forums when she was a school student, she did not impose the idea on her students. Rather, she opted to consult them and involve them in this decision. Muna felt rewarded and was thrilled to apply her students’ suggestions despite the challenges she, as a teacher, faced. “So it was interesting to me to see that everybody wanted to use that even though we did have a lot of challenges like Titanpad would suddenly stop working. And time would be wasted just to try to re-open, register and so on” (MPOI1, 298-300). Involving her students and gaining their feedback about the use of technology was viewed by Muna as a pleasure that she enjoyed.

4.3.6.2 Reliance on technology

As a teacher, Muna has seemingly developed a reliance on technology. For example, Muna stated in the initial interview that she rarely used the whiteboard to write comments or explanations. She would spend weeks without using the whiteboard, and when I asked her how she managed this, she replied that she used the projector and the Microsoft Word application as a replacement for the whiteboard. Muna thought that using the whiteboard to write comments or show content was a waste of time.

Muna: And by the way, I mean I barely use the white board now. Like ... I would spend weeks without even touching the white board.

Mahmood: Why is that? How do you manage?

Muna: All on ... I mean, because my ... I mean on the board, what do we do? Most of the time just writing like words, distributing, giving content. And this is easily done by Microsoft Word. And because the book is on the computer, so I would just do everything on the computer because it's there. Why would I just ... why would I use the white board while I can use the computer and save time and effort." (MPO11, 120-130).

Muna's justification for not using the whiteboard to write comments or explanations was that "our handwriting is not always very neat and tidy" (MII, 355-356). She might have lost her self-confidence in terms of writing on the whiteboard. Moreover, having the electronic copy of the course book readily accessible from all classes may have motivated her to rely on it rather than exerting any effort on writing materials again on the whiteboard.

4.3.6.3 Shared knowledge attitude

Another apparent influence on Muna's cognition and instructional practices of technology was her realization of a shared knowledge philosophy between herself and her students. She realized that the availability of technology in her class at a high level could make knowledge easily accessible by her students. In other words, her students, having mobile phones and being allowed to use them in her class, could obtain knowledge very easily. In one incident during the first observation, Muna tried to write the word "racism" on the whiteboard several times but failed to spell it correctly. Feeling unable to recall how the word was spelled at that moment and having all students watch her, Muna turned around to her students and asked them to look it up on their mobile phones. Muna realized that it was easy for her students to use their mobiles to check the word, so she felt that she had "better ask them to". Students instantly looked at their mobile phones to find out how to spell the word for Muna.

"For example racism, like I know how to spell it. Of course I do, but kind of like at that time it did not click in my mind. So I do not hide like if I make a mistake, I tell them I do not know it. Check it for me please with your mobiles. I know they will easily check it on their devices so it is better I ask them to" (MPO11, 251-254).

Muna did not feel superior to her students nor did she feel that she possessed all the knowledge. In the above example, it is clear that, knowing that technology existed heavily in her class, she avoided the embarrassment of being spotted as mistaken by her students. Rather she involved them by asking them to use technology to check the word “racism”. She articulated this attitude of a shared knowledge with her students more clearly during the second observation interview. Muna confirmed that she usually received valuable suggestions from her students on how to handle technology in her class and considered this as rewarding. She acknowledged that she learned from her students.

“And I think students, especially the guys, are very good with technology they would give solutions, technological solutions to handle something wherever there is a problem. So it has been rewarding and again these students interacting with it and they’re very much into it. I even get suggestions from them so it is rewarding and I feel like I’m learning from them too” (MPOI2, 147-152).

The students’ advanced level in technology and the high availability of technology in Muna’s classes may have influenced Muna to develop a more shared-knowledge attitude with her students and be open to students’ contributions.

4.3.7 Muna’s cognition about technology and the contextual factors

The most salient themes that emerged from Muna’s analysis of data in terms of the most effective factors that motivated or demotivated her to use technology were technology infrastructure, busy schedule, institutional policy and special-interest groups.

4.3.7.1 Technology infrastructure

When asked about the factors that affected her to integrate technology in her classes, Muna stated that internet access and software availability were the main factors that affected her. The availability of technology was a main issue for Muna, and she spoke about this in almost every interview. For example, Muna was frustrated when she could not book the laboratory for her lesson. “The problem here at SQU is that you do not always have a chance to book a lab. They’re very busy and if you want to book it up through A&R Admission and Registration deanship, you have to go through certain procedures and this

might take time to happen” (MPOI1, 61-64). She complained about the long procedures that she had to go through to book the laboratory, which clearly affected her ability to use technology as she probably had wished. During the second observation, Muna was upset when she kept attempting to access a website she had planned to use (Titanpad) but failed to connect due to the poor internet network. When asked about this incident, she reported that she had experienced this before and that it was getting worse.

“Well, I have been feeling frustrated, especially by the Internet connection here at SQU, and it’s getting even worse and worse. So I do not know. It is frustrating to me and quite embarrassing because in front of students” (MPOI2, 42-45).

Muna felt embarrassed in front of her students as it took a long time to open a website or download a video. This caused Muna to consider internet access as the number one factor affecting her use of technology in class as she vividly reported in the final interview.

“The number one factor is the quality of Internet service provided at SQU, and even the computers. Sometimes there is software that I would like to use but it’s not installed, and if I want to install anything, I have to have an administrator account and it’s a long procedure” (MFI, 12-14).

Muna was also disappointed at the fact that she needed an administrator account whenever she wanted to install a new program or software that could be educationally useful to her students. She thought that such complications inhibited her from using technology in her teaching. An example she recalled was the use of Moodle. She stopped using Moodle for a while because she thought it was not rich enough or user-friendly. She then decided to use it again when she discovered that Moodle did have certain features and that it was not Moodle’s fault but how it was introduced by the CPS to them as teachers. Muna explained the reason that she started using Moodle again by saying, “I do not think it’s about Moodle itself, it’s about maybe how this place, how the Centre for Preparatory Studies is using it. They’re using the very basic one to one” (MII, 412-414). However, at the time of study, Muna had just been appointed as an Online Students Support Coordinator, a position that would allow her more administrator rights over the technologies provided to teachers and students. She spoke about this delightfully and articulated some of her future plans in

addressing an issue that had long frustrated her. “So I’m hoping that through this position I can introduce new things in Moodle” (MII, 442-443).

4.3.7.2 **Busy schedule**

Another factor that Muna mentioned briefly during the final interview was her busy schedule. Muna complained that she faced difficulties using technology with a full schedule and a curriculum that she had to strictly follow. “Number two, which is also big, is the pacing schedule, the curriculum we have to follow and the pacing schedules we have to also strictly follow. These can’t always be done through technology” (MFI, 18-20). Muna was sometimes reluctant to use technology because she did not have enough time. She realized that using technology was not a matter of urgency and that it needed time for preparation. For example, although Muna loved using technology in her classes, she sometimes hesitated to do so because of time constraints.

“I would love to use it always but it takes a lot of time. For example, Moodle... it’s not just about doing it in class but you need to develop content there for students beforehand” (MII, 245-247).

4.3.7.3 **Institutional policy**

The institution’s policy was another theme that emerged in Muna’s interviews when she talked about using technology in classes. Even though Muna stated several times that technology has been a passion for her (MAA) and a habit (MPOI2), she was still looking for some sort of policy to “force” (MII) her to use it. She felt that her self-commitment to the use of technology in class needed an external factor and a clear policy put forward by the institution. Throughout the meetings and observations, Muna appeared to be sceptical about her use of technology. She kept asking herself questions about how far she wanted to go with technology, and whether or not what she was doing was enough or even right. “The big question I always ask myself is why I’m doing this. How far do I want to go with technology?” (MFI, 190-191). What Muna referred to as a “big question” could be viewed as an indication of how negatively the absence of clear policies could affect teachers. The lack of a policy that motivated teachers to use technology and provided them with necessary feedback may have caused Muna to question the validity of continuing technology use, and could probably lead her to stop or reduce its use. According to Muna, the absence of a clear and precise policy from her institution was a major reason of the uncertainty she experienced.

“Muna: To be honest, I use a lot of things like new apps and softwares but I always question, is this the best way to do it? Like is there a better way? Is my positive feeling about it is right or wrong? I do not have that kind of feedback. I do not get any, you know, any support, any kind of thing that would say that this is the right way to do it or is there a better way to do it.

Mahmood: What sort of feedback you are looking for?

Muna: Even from the organization, from peers here...” (MPOI1, 307-315).

Muna vividly expressed her feelings when she said that there did not exist a clear policy about technology use in her institution. She thought that one major factor to motivate her to use technology was the foundation of a clear policy that highlights how technology can be used.

“Unfortunately we do not have a very clear policy here that forces us to use technology. Here it’s optional, and because of that I do not always use it” (MII, 243-245).

4.3.7.4 Special-interest groups

An important factor that Muna cited frequently during the final interview was the foundation of special groups where teachers have similar or same interests related to technology use. Muna’s recognition of the importance of interest groups dates back to her teacher education stage when she was a student at SQU. It was then that she realized how beneficial interest groups were to her. Her passion to share her ideas and thoughts with those who shared the same interests seemed to have grown with her. “The problem is here at the Language Centre we do not have closed groups or groups which get together with similar interests and share ideas” (MFI, 32-34). Although Muna viewed the absence of interest groups as “demotivating”, she insisted that it would not stop her from continuing what she was doing. However, Muna continued, “it would make a big difference if the LC creates something like this and gives us an opportunity to get together and exchange ideas on a regular basis” (MFI, 48-50).

In fact, when training a group of teachers who shared a liking of mobile learning took place, Muna felt very happy to attend. She reported that the experience was a rich one to her.

“But this actually happened two to three weeks ago when we had training on mobile learning so all those teachers who are interested in educational technology were there. And it was a rich experience for me to get together with these teachers and exchange ideas” (MFI, 34-37).

4.3.8 Summary

In light of the theoretical framework that informed this study and based on the themes that emerged from the analysis of Muna's data, her early experience with technology was an interrupted yet rich one. She had her first encounter with technology when she was in Jordan with her family where she was privileged to study some technological programs at school. After a few years of a break away from technology, she resumed her journey with technology in the Omani schools. The next stage was marked by an exceptional involvement in communication and interaction using technology with others from outside her surroundings. During her teacher education, Muna grew more independent and mature in relation to technology use. The time when she did her master degree was influential because she had the opportunity to apply what she had learned practically.

Muna's instructional practices were influenced by her experiences with technology in that she appeared to use more collaborative learning and a learner-centred approach. Her way of teaching was also aimed at making her students more responsible learners by using technology to do so. Her teaching way was also influenced by technology in that she seemed to embrace a more shared-knowledge approach. In other words, Muna believed that she was not the main source of knowledge and this was reflected in her practice inside the classroom. Finally, Muna felt that using handwriting, for instance, a waste of time.

In terms of her cognition about the factors that affect her when using technology in teaching, Muna seemed to have encountered several issues related to the technological infrastructure. This was a prominent theme from Muna's point of view. For example, she frequently complained about the internet network access, and this was seen in both observations. Muna also felt powerless when it came to downloading or installing the new software programmes that she felt

she needed because she did not have an administrator account. She wanted more control and privileges over the technological choices available to her. Another factor that Muna felt was discouraging was the busy schedule that hindered her from using technology the way she desired. The third important factor was the absence of a clear institutional policy that regulated and measured technology use. She viewed this as a demotivating aspect and longed for a clear policy to be in place in her institution. The last factor that was evident in Muna's interviews was the importance of having special-interest groups where she could share her ideas, thoughts and experiences with her colleagues who had the same and similar interests.

4.4 Rashid analysis

4.4.1 Rashid's profile

At the time of the study, Rashid was in his early 30s and worked as a Senior Language Instructor in the Centre for Preparatory Studies at SQU. He taught English Language for seven years on the Intensive Foundation Programme. He was teaching course FPEL120 which is for beginners, for students who were placed on Level 1 after they finished school. He had taught across the different courses at the CPS at SQU. According to the questionnaire, Rashid's level of proficiency in technology is advanced and he stated that he used technology almost always in his teaching.

4.4.2 Rashid's early experiences with technology

4.4.2.1 Knowing of technology

Rashid's early experience with technology was very limited one. At school, Rashid did not have any direct exposure to technology because his school had none. However, he heard about technology through two main incidents that happened to him during his school days. The first was when his friend brought an Atlas electronic translator which he used to look up words and to translate them from and to Arabic. Rashid admired the idea of having such a device and thought that it was the main reason why his friend's English Language had improved. Rashid regretted not having a translator device at the time. "We had something but unfortunately I did not have it, my friend had it. It was a translator" (R11, 92-93). This example indicates that although Rashid did not personally possess this technology, or have the chance to use it, he actually did want to have this device himself.

The second incident demonstrates that Rashid heard about technology through his sister who was studying at a higher education College. Rashid's sister had

access to computers and to the internet, and used to talk about the internet with her brother, Rashid. “But as I told you, I used to hear from her. She used to bring like...I heard that there was something called e-mail, an account. I did not have an account but she had an account” (RII, 129-132). Rashid became more fascinated about technology and the internet the more his sister talked about it and the more he “*heard*” or watched “channels speaking about websites” (RII, 116). This made him more excited about getting to know technology, or at least to see what it could do. He asked his sister to bring him “extra information” about his school topics. “This was 1998 and I was in this school and I was enthusiastic to see something from internet” (RII, 112-114). Rashid’s ability to recall this memory shows how passionate he was at that time about using technology.

With both incidents in mind, where Rashid was introduced to technology but had no real occasion to use it, he joined SQU for his teacher education training.

4.4.3 Rashid’s cognition about technology and teacher education

4.4.3.1 Discovery stage

Driven by an early passion to discover what technology was and what it could offer him, Rashid set off on a discovery quest. Rashid articulated his feelings very clearly when he said that he had “a passion to discover these things” (RII, 143) and hence “the first thing I wanted to discover when I came to university was how to create an [email] account” (RII, 138-139). Rashid had a strong desire to send emails to his sister, brothers and friends. Therefore, he asked one of his friends to show him how to create an email account. Rashid cited communicating with native speakers, particularly his teachers, as a reason to create an email account. Rashid’s inclination to use technology for communicating was probably based on his desire to improve his speaking skills in the English Language by communicating with his teachers and friends using English Language. Despite the fact that he was new to technology, Rashid’s declared rationale for experimenting with technology was mainly based on a learning purpose. For example, he talked about his feelings when other students used technology for chatting only.

“Although the idea of chatting was dominant at that time and students maybe misused the computers because they used them for chatting and others got angry because they had research, they had reports to write” (RII, 198-201).

As an undergraduate student, Rashid noticed that the majority of students misused the internet by wasting their time chatting for hours. The limited availability of technology represented in the small number of computer laboratories that were provided at SQU made it quite challenging to find a computer to use. Rashid felt disappointed when having to stand in a queue “for the sake of having a chance to use these computers” (R11, 187-188). However, he was determined to use technology and so he waited for his turn. I asked whether his use of technology was part of the course or an extra activity. Rashid answered that he was still experimenting with technology for his own personal use at that time, which might reflect how keen he was during his undergraduate study to wait for a long time as he stated.

4.4.3.2 Creativity stage

Rashid’s attempts with technology increased as he continued to use technology more frequently in his learning. Teachers started to employ more technology in their classes particularly PowerPoint. I asked Rashid if he could recall his experience with technology in class and his response was noteworthy. Rashid labelled teachers who did not use technology as “so traditional”.

“Not all teachers used technology, some of them were so traditional. They did not use any kind of technology. They just came to the class, used the whiteboard and that was it, and the book” (R11, 221-223).

Rashid’s perspective of teachers as traditional was based on his personal enthusiasm to use technology and delve into it more. This was clear in his answer to my question when asked why he chose to call them traditional teachers. He was expecting his teachers to use technology more widely in their teaching which some of them obviously did not.

Mahmood: “Why do you call them traditional?”

Rashid: Well, I feel all students wanted to see technology and everybody was enthusiastic to use it and these teachers used books only” (R11, 225-227).

On the other hand, there were “other” teachers who used technology more often and even required their students to create a PowerPoint presentation as part of

their studies. Rashid's impression of the PowerPoint presentation was very positive that he thought that it enhanced creativity with students.

4.4.4 Rashid's classroom instructional practices in relation to technology

The following is an analysis of Rashid's classroom practices during two classroom observations that were conducted to observe his classroom practices in relation to technology use. Two post-observation interviews were conducted to talk Rashid through the observations. The analysis is based on the themes that emerged from his data.

4.4.4.1 Technology for self-assessment

An important theme that emerged from the analysis of Rashid's classes was the use of technology for a reflective practice. In both classes, Rashid used activities where his students were given the opportunity to self-evaluate their performance. For example, students were asked to record themselves using their own mobile phones while talking about a topic of their choice making use of the grammatical rules they had already learned. Rashid's use of technology in this instance indicated a focus on students' self-evaluation as a skill for development. When I asked Rashid about the aims of the lesson I observed, he mentioned using the grammatical rules in a speaking activity as a learning aim.

“And the last one [learning aim] was a practice, applying the theory, the grammar, the rules, what they have learned from the rules that were in the book like the verb to, be, and. So they had to speak out” (RPO1, 40-43).

I asked him about the role that technology was planned to play in his lesson, and one of the points he mentioned was “I also planned to use their mobiles to record their speaking and to listen to it later” (RPO1, 54-55). This indicates that his integration of technology was purposeful and planned to achieve the lesson's aims. His role during the class was to observe his students only. Students did most of the work themselves, such as choosing the topic to speak about, recording each other and evaluating themselves during the class. They were also asked to self-reflect on their recordings when they went home. In other words, students took major responsibility for what they did. Rashid emphasized the importance of students' responsibility for what they did when he was talking about one of his students, “He went out, he was recorded, he watched it, he evaluated himself” (RPO1, 237-238).

In fact, when I asked Rashid about what students were required to do after they had recorded themselves, he replied: “They go back to it, they watch it and they look at their mistakes” (RPOI1, 289-290) which indicates a more learner-centred approach to learning where students had a bigger role about their learning. Furthermore, during the second observation, Rashid allowed his students to use an application they had recommended even though it was “a new thing to try in the classroom” (RPOI2, 41) and asked them to “manage” the whole activity, and meanwhile Rashid was supervising the class in general. I asked Rashid about his role to see if he was clear about his job during that activity.

Rashid: Of course my role was... I gave the students the stage to go out and as, let's say, moderating the session. Also to direct students on what to do, to select students, new students, to encourage them, to approve what is right, what is wrong? I ask the students to tell their mistakes but the teacher's role was to control the class and also see if there's something wrong. If the sound is not clear, I ask the students to repeat the recording so to check” (RPOI2, 95-100).

His response might indicate that he was aware of his role which was to moderate the class and keep it well-managed.

4.4.4.2 **Culture and privacy**

Looking at Rashid's data, one key theme that emerged recurrently was culture. The influence of the cultural aspect was present in Rashid's data, especially when he talked about female students. From his point of view, it was not possible to add male and female students to any group in social media applications for cultural reasons. It is not an accepted norm culturally to mix male and female students, and therefore Rashid wanted to enable his female students to keep their phone numbers private, whenever social applications were used.

“First of all, if you want to use these apps, you should consider culture. In some classes we have male and female students in one class so it's very hard to have them in one group because especially if you use WhatsApp, they will use their private phone numbers” (RII, 448-451).

Rashid used technology in a way where his female students' privacy was ensured by using BBM (BlackBerry Messenger). Since BBM uses a code and not the user phone number, Rashid chose it to communicate with his students.

He seemed to have realized the sensitivity of this issue and was looking for a way to manoeuvre around it.

“Having this technology actually helped me to keep in contact with students privately but without knowing their private numbers, for example, because female students do not want to share their numbers with other...even with teachers. So having that BBM actually you can have it for a short time or for that course and after that I delete it” (R11, 451-456).

Rashid believed that technology provided him with the means to acknowledge the cultural norms by keeping a private and segregated contact with and between students. Rashid summed up the idea in his statement: “You are a teacher. You need to think about cultural backgrounds of the students. You cannot just come and jump and teach those students” (235-236). This viewpoint was evidently reflected in his decision to use technology and how to use it in his classes.

4.4.5 The impact of technology on Rashid’s cognition and instructional practices

4.4.5.1 Shift to smart devices

Rashid’s experience with technology seemed to have progressed interestingly. From a state where he saw technology through the eyes of other people, for example, his friends and his sister, during school days to eagerly experimenting with technology during his undergraduate study. As a teacher, he actively used technology, computers for instance, except for smart devices like mobile phones which he thought were “distractive more than constructive” (R11, 291).

“When I became a teacher in 2006 and later on 2007, I actually was somehow against using mobile phones in the classroom” (R11, 284-286).

However, from an opponent to an advocate, Rashid changed sides.

“So nowadays I ask students to install different apps which are a must to have them in my class” (R11, 523-524).

When I asked him to justify the switch to the use of mobile devices after he had been against them, Rashid replied that students nowadays are obsessed with mobiles and that they are essential parts of their lives. He also cited Prensky (2001) who talked about digital natives and he repeated some of his quotations. Rashid realized that the use of mobile phones would facilitate students' learning. However, even though Rashid allowed his students to use their mobile phones, he did not feel safe enough to allow them to access the internet until later when he thought it was useful for his students to use the internet during the class.

“I asked them first to use offline dictionaries so that I could feel safe that they're not using the Internet or they're not chatting, not accessing other things” (R11, 366-369).

From his point of view, these changes have made Rashid more connected to his students. When I asked him about the effect of using smart devices on his relationship with his students, Rashid explained that his relationship greatly improved. Rashid felt “closer” to his students with the use of technology and more “accessible” to them.

“I could create an environment outside the classroom to use English outside the classroom for the sake of students and for the sake of the course” (R11, 474-476).

He also thought the use of smart devices enabled him to use authentic communication activities that are often lacking in the language classroom.

4.4.5.2 Teacher identity

As early as his university days, Rashid drew a comparison between traditional teachers, those who never or rarely used technology when teaching, and other teachers who used it more frequently. Rashid's early conception as a student seemed to have influenced him as a teacher. As a teacher, Rashid was keen to appear as a modern teacher who smartly uses technology in his teaching.

“So as a creative teacher, I do not want to praise myself but it's one of my principles actually to improve my teaching. I felt I had reached a point that I had to give it a second thought” (R11, 324-327).

At the beginning, Rashid assumed that the use of smart devices would lead to less control over his classes and therefore viewed it as a potential threat to his authority as a teacher. He was thinking of altering his image by changing his

self-presentation of his identity as a teacher. To do that, he switched to using smart devices in his classroom.

When Rashid used communication applications, he felt very pleased with himself and even imagined that his students would never accuse him of being “old fashioned” because they could not contact him, for instance. Rashid did not want his students to feel that he did not belong to their generation, rather he wanted them to feel he was close to them.

Rashid: “They do not say, “My teacher is old fashioned so it’s very difficult to contact him” (RII, 413-414).

Rashid: “So he is away from us. He is different from us. He is not from our generation (RII, 419-420).

Clearly, Rashid did not want this “imaginary” scenario to take place in reality.

4.4.6 Rashid’s cognition about technology and the contextual factors

The most salient themes that emerged from Rashid’s analysis of data in terms of the most effective factors that motivated or demotivated him to use technology were personal context, colleagues and training. Below is a description of each one of them.

4.4.6.1 Context

An extremely influential factor that kept appearing in Rashid’s data was culture. Rashid seemed to have been affected by culture in everything he did in relation to technology use. As far as technology was concerned, Rashid thought that culture influenced even the choice of application that he used in the classroom. For example, Rashid used BBM because he did not want male and female students to share their phone numbers with each other.

“For example, I may record my male students giving a speech. Under social or cultural aspects, maybe I would not be able to use this for my female students. See? The context will be a factor here” (RFI, 327-329).

This was definitely an important criterion that influenced Rashid not only when deciding whether to use technology or not, but also to decide on the type of

technology he preferred to use. Moreover, he used technology during the observed classes in a way that promoted privacy and confidentiality when he asked students to record themselves using their own mobile phones. “The first time I did it, some students said, “No, we do not want others to record us. We can use our own.” So from that time I asked them to just use their own mobiles” (RPOI1, 210-213). Rashid’s quick response to students’ feedback indicates his keenness to value the culture of the students when technology was used.

4.4.6.2 Colleagues

Another factor that emerged from Rashid’s data was the influence of his colleagues. However, not all of Rashid’s colleagues were able to influence him; only those who looked at technology use positively. Rashid recalled two examples of some of his colleagues who influenced him positively. One of his colleagues persuaded him to use Microsoft Word to explain lessons to his students rather than writing on the Whiteboard directly. Rashid thought that this was good advice and he started to use it inspired by his colleague. In another example, though, one of his colleagues shared an application which Rashid used in his class but did not eventually like it.

4.4.6.3 Training

One factor which Rashid thought was important for him to integrate technology in his classes was training. Rashid believed that the more the training courses offered by the CPS were new and creative, the more he was interested in them and in applying them in his classes. From Rashid’s interview, he constantly aimed for new ways to integrate technology. “So whenever I attend something, my goal is what’s new there, what new things that this person will bring to us” (RFI, 142-143). I asked Rashid about the possible role that such training has played and he replied that they “opened” his mind to new things. Rashid did not attend this training without reflecting on it. He actually had an inclination to evaluate and reflect on the training he received and whether or not it matched his needs. “And the way she explained was like it was very attractive but when I used it, it did not help me in my classroom. I felt like that one was not suitable for my classroom” (RFI, 91-93). Even though the teacher who shared the application talked about it attractively, when put into practice, Rashid found that it wasn’t suitable for his class. This may have led Rashid to come to the conclusion that “there are some things that you need to share with others and evaluate, reflect on it by yourself” (RFI, 88-89).

4.4.7 Summary

Rashid’s journey with technology started when he heard about it through his friends and his sister without having a real contact with it during his school days. He developed a sense of desire to get to know about technology more closely which resulted in an interest to discover its potentials as soon as he joined SQU

for his teacher education undergraduate study. Rashid gradually became more interested and creative in using technology the more he used it for learning and social purposes. As a teacher, he was keen not to be seen as a “traditional” teacher who did not use technology in his teaching but rather did his best to appear as a modern teacher who was close to his students’ generation. However, for certain reasons, he was against the use of mobile phones because he thought they were more distractive than constructive. Rashid, then, switched sides and became a strong advocate of using mobile phones inside the classroom, and this was reflected in the lessons observed. Rashid’s identity and his self-image as a teacher is promoted when he uses technology and feels that his students see him as a modern teacher; close to them and their thinking. Finally, the context, colleagues and training were the influential factors that motivated Rashid to use technology and integrate it into his teaching.

4.5 Tasneem

4.5.1 Tasneem's profile

At the time of the study, Tasneem was in her late 30s and had worked as an Assistant Language Lecturer at the Centre for Preparatory Studies at SQU. She has been working there for 16 years. She teaches students English Language in the Intensive Foundation Programme. Tasneem finished her high school in the General Education System and joined SQU for her undergraduate study in English Language. When she graduated from SQU, she was immediately appointed to the Centre for Preparatory Studies at SQU in 1997. In 2002, she did her master degree in TESOL studies (Teaching English to Speakers of Other Languages) According to the questionnaire, Tasneem's self-reported level of proficiency in technology is advanced and she stated that she uses technology almost always in her teaching.

4.5.2 Tasneem's early experiences with technology

4.5.2.1 No contact with technology

Tasneem had no contact with technology during her school days, apart for the tape recorders which were mainly used by the teachers of English language in listening classes. This is clearly articulated in her autobiographical account and in the initial interview. For example, Tasneem stated that her first introduction to technology was during her undergraduate study at SQU. "As a learner my real introduction to technology was at university" (TAA, 11). The reason that she did not have any contact with technology was because during the early 1980s, schools did not have technological facilities in Oman. Her school was no different from this situation as she stated in the interview: "Of course, as a student in a school at that time, we're talking about between early 80s and early 90s, there wasn't really that much use of technology" (TII, 27-29). Even when I asked more questions to help her remember if there was any contact with technology, Tasneem did not recall anything.

4.5.3 Tasneem's cognition about technology and teacher education

4.5.3.1 Uneasy start

During her teacher education at SQU, Tasneem had a unique experience with technology. Having had no contact during her school days, her first exposure to technology during her undergraduate study was "scary" as she described in the interview. As soon as she joined SQU, she joined a computer course which was a compulsory requirement as part of her teacher education course. She was fascinated by the computer.

“As a learner my real introduction to technology was at university. I did a computer course as part of my first year requirements. The novelty of the computer, as a device, and the tasks it enabled me to do was more like magic to me” (TAA, 11-13).

Tasneem’s feelings about using the computer were contradictory. On one hand, she was excited to use the computer and described it as “magic”. On the other hand, she was scared and anxious because it was a totally new experience to her. Her exploration attempts of the new device were not free from stress and anxiety. For example, when I asked her about her feelings when she first used a computer, she replied: “It was difficult. It was new. It was kind of nerve wracking especially in the beginning. But then it worked okay” (TII, 98-99). This was mainly because she did not have any experience with technology beforehand, as she reported. “I mean that was the first time so imagine somebody coming from school who really, the only technology she was exposed to was a tape recorder” (TII, 90-92). Another reason why this experience with technology was “scary” from Tasneem’s point of view was the fact that she was always concerned she would press the wrong button by mistake and would erase everything, because she used technology in a testing situation.

4.5.3.2 Independent learning experience

Despite her conflicting feelings about her first encounter with technology, Tasneem reported that she continued to use technology to record herself as part of her courses. She used different language learning programmes such as Compact Discs CDs, computer programs, language programs and computer games. One aspect that kept recurrently appearing in her data was her self-motivation to use technology independently as is clear from the following excerpts.

“At some stage I think it was interesting like for you just to go there all by yourself” (TII, 100-101)

“There were certain programs like CD-ROM if you remember that one, it’s more like a grammar CD and software. And so we were practicing the language practice” (TII, 171-173)

“There were all these softwares, the computer games, language games and certain language programs. They were part of the computers. We were going there to practice” (TII, 177-179)

“I mean I remember I was going like every day I was there in the computer lab. No, we were just using it not for typing anything. It was basically just the games, the computer, the language games just to practice, yes, practice vocab and practice grammar and for improving my listening, yes. That’s what I was doing in there. Every day I was there” (TII, 200-204)

The above quotations indicate that Tasneem was rather autonomous in using technology to improve her skills and that her undergraduate study period was characterized by a determination to explore the potential opportunities that technology could offer her. Tasneem spent hours practicing her language using the available technology and computer laboratories, in some cases, independently to improve her grammar and vocabulary even when this was not part of her course. This has had its influence on Tasneem in later stages when she became a teacher as will be discussed in Section 4.5.5 below. She also valued the contribution of technology in her learning experience and thought that it affected her learning positively.

“We were doing grammar and vocabulary exercises through technology. It was definitely a major part of my learning experience. It did affect my learning positively” (TII, 221-223).

The conclusion reached by Tasneem which affirmed that her learning was influenced positively by the use of technology is no wonder at all. From her point of view, it was a natural and expected result of her long and numerous self-determined attempts to use technology for the sake of learning.

4.5.4 Tasneem’s classroom instructional practices in relation to technology

The following is an analysis of Tasneem’s classroom practices during two classroom observations. Two post-observation interviews were conducted to talk Tasneem through the observations. The analysis is based on the themes that emerged from her data.

4.5.4.1 Finding her way as a teacher

Tasneem was appointed as a language instructor at the Centre for Preparatory Studies soon after she graduated from SQU. During the first few years, Tasneem did not use technology much in her teaching because she was busy adjusting herself to the new environment where she had to teach male students in addition to females. Tasneem reported that this “was kind of a challenge because obviously when we did the teaching practice in the fourth year, I did it in all-girls schools. And so I was not really exposed to teaching males” (TII, 261-264). According to Tasneem, she gave little attention to technology use because it was more about proving to herself and others that she “could” teach (TII). Even when she used technology, Tasneem cited reasons like “luxury” and “excitement”.

Tasneem’s limited use of technology did not continue for long. Soon, she started to incorporate more technology into her teaching especially with the increasing availability of computers at the CPS. “As the years passed by the use of technology in my classroom was no longer a mere option used for the purpose of adding a dose of excitement to my teaching. It has become inevitable” (TAA, 27-29). She also began to realize the importance of technology use as a method of teaching.

4.5.4.2 The use of smart phones

During both observations, Tasneem tended to use mobile learning on different occasions. For example, during the first observation, where the lesson was about the use of English to describe things in the students’ daily lives, she played a game with her students. She asked them to write sentences about their daily lives and asked them to send the sentences via WhatsApp to her own mobile. She explained that she would write only the first five sentences she received on via WhatsApp on the whiteboard. Students quickly started typing sentences on their mobiles. Tasneem, during this activity, felt that she achieved the aim of using mobiles for an educational purpose, as she explained when I asked her to justify her use of WhatsApp in particular.

In another activity, she asked her students to record themselves speaking about their daily routines using the correct verb tense. Students again took their phones and started recording their voices and sent them to Tasneem.

4.5.4.3 Technology does not give direction

From Tasneem’s point of view, technology does not give her direction. In other words, it does not impose choices on her or direct her teaching. Rather, she

uses technology to enhance what she does in class. Tasneem does not like the idea of losing control over her classes. She simply wants to use technology as an enhancer while still being in charge of her classroom.

“I’m still in charge of classroom because technology does not really give me direction. I use it to enhance what I want to do” (TPOI1, 95-97).

In both observations, it was noticed that whenever technology was used, Tasneem made it clear to students when to start using it and when to stop. She had rules to follow so that she did not lose control over her classes, or that technology played a negative role in the students’ learning, as she reported: “There are certain rules that you have to put of course” (TII, 521-522). To Tasneem, technology was there to achieve a certain purpose with a clear plan. Once that purpose is achieved, “I’m done with it. I’m happy with it. Thank you very much technology. Let’s move on” (TPOI1, 133-134).

4.5.5 The impact of technology on Tasneem’s cognition and instructional practices

The following themes emerged from the analysis of Tasneem’s data.

4.5.5.1 Learning outside classrooms

Tasneem’s tendency to use technology to promote independent learning in her class is largely based on her previous experience with technology and how it has helped her learn autonomously outside her classes during her undergraduate study (see Section 4.5.3.2). As she reported in the initial interview, Tasneem spent many hours using technology to improve her language independently outside of her classes. As a teacher, this has become a priority to her to encourage her students to use technology outside the classroom for the purpose of learning. From her perspective, she sees technology as an important tool that provides options of learning to students, both inside and outside the classroom.

“I mean, not necessarily in the classroom but even outside. It saves us time. It gives us options” (TPOI1, 487-488).

“Technology opened up independent learning. Learning is not only in the classroom” (TII, 712-713).

Tasneem thought that using technology outside the classroom has developed the relationship with her students and allowed them the opportunity to use

English Language with her. In addition, Tasneem stated that she sometimes sent her students materials as a preparation for the class although this did not happen in any of the observed classes. Her inclination to send materials before the class could be seen as an indication of how Tasneem viewed the importance of students independently learning. According to her, she also created a WhatsApp group, which included all her students, as a way of communicating with them and as a technique of practising English Language. In addition to this, Tasneem emphasized the significance of using Moodle as an outside-classroom independent way of learning.

“Moodle, lots of times actually it’s primarily used to encourage students to use the English in their own time. It’s one way to get students independent. And so we use Moodle in several ways. We use it for the students. Of course, there is a lot of materials available for them to use outside so they do have reading and listening and grammar tasks and vocabulary tasks” (TFI, 152-156).

4.5.5.2 Teaching in the way she learned

Tasneem’s journey with technology has also influenced her way of teaching. In her current teaching, she has tried to copy the same strategies that she found successful as a learner. For example, Tasneem used mobile phones to ask her students to record themselves for the purpose of improving their language. She thought that such an opportunity would help students develop their fluency and pronunciation. When asked her why she assumed such a strategy would help students, she replied:

“That’s something actually I did as a student when I was...I mean I was not recording on a mobile phone. I was recording in a recorder. That’s one of the things that I did as a learner” (TPO11, 420-422).

“Now, sometimes I would just talk basically. I would be talking about any topic like maybe myself. And I would be recording myself, so I’m not reading. I’m just speaking to the recording. There were times when I would record one of the movies that I was watching. Then I would listen again to the pronunciation because I wanted to hear their pronunciation whether British or American pronunciation. To me, it was helpful” (TPO11, 432-437).

“And because to me, when you record and you hear yourself, it’s good for your fluency” (TPOI1, 442-443).

From the above quotations, Tasneem was clearly thinking more about herself as an example and how technology helped her to learn. For instance, having been through a similar experience where recording herself proved to be helpful to her, she assumed that her students would also learn better in the same way. The preconception she held about using technology influenced her way of teaching. However, instead of using a typical tape recorder as she did when she was a student at SQU, she decided to use mobile phones because they are “accessible” and “readily available”.

Tasneem believed that technology could help her modernize her classroom and bring her teaching up-to-date. She tried to make her students’ classroom completely different from the type of classroom that she was taught in, where technology played no major role at all.

“It’s not going to be an old-fashioned classroom. It’s not going to be the same classroom that I was taught in. It has to be something completely different” (TII, 418-420).

Rather than teaching her students in an environment similar to the one she was taught in herself, Tasneem opted to teach them in ways that proved to be successful to her as an independent learner. Hence, she avoided making her classroom old-fashioned like her own when she was at school. In part, this was also an expectation that she believed her students had. She thought that her students expected her to teach them using different styles than those that she was taught with.

“Do not teach me in the same way that you were taught or do not expect me to respond to your classes in the same way than somebody who studied 20 years ago. That’s fair enough” (TFI, 127-129).

Not only did she realize this expectation, she actually thought that it was fair for them to think this way.

4.5.6 Tasneem’s cognition about technology and the contextual factors

The salient themes that emerged from Tasneem’s analysis of data in terms of the factors that motivated or demotivated her to use technology were positive self-image, peer support, and training.

4.5.6.1 Positive self-image

An important aspect in Tasneem's rationale for technology use was to appear as a modern teacher who uses technology. She continuously mentioned the idea of giving a positive impression about herself as a teacher. Actually, in the following quote, Tasneem attributed her use of computers to her attempts of introducing herself as a "developed" and "grown-up teacher".

"For me as a teacher to just to rely on the board only would be a big mistake. It would basically just show that I have not developed and I have not really grown over the years. And so these days, I do use the computer" (TII, 423-425).

Thus, Tasneem endeavoured to create an email account when she noticed that the majority of people had one. "Everybody is having email addresses. Okay, how do I get an email address? And so I got that one" (TII, 299-300). She quickly sought to create an email account, simply because she did not want to be different from others. Even when she did not really have any justification to have one. Although she did not know how to use it or who to use it with, she still wanted to have one. "I remember that was the first email that I had and not that I was using it that much at that time because honestly, I did not really know like who to use it with and how to use it" (TII, 293-295).

Tasneem's inclination to use technology was also based on an inner concern that others might view her negatively if she did not use technology in her teaching. Her colleagues, and probably her students as well, would question her decision of not using technology. "Everybody would kind of question that decision" (TII, 340). Therefore, she tried to avoid this embarrassment by incorporating technology into her teaching. In short, Tasneem's decision to use technology is largely influenced by her own desire to introduce herself as a modern and developed teacher, who responds positively to her professional environment and to her students' expectations.

4.5.6.2 Peer support

Another factor that Tasneem mentioned during the final interview was the effect of her peers. For example, Tasneem mentioned her colleagues' support as a way of helping her integrate more technology in her classes through their useful recommendations (TII). Tasneem described positively the experience of collaboration between herself and her colleagues at work and the way they exchanged information and feedback about their experiences of using technology in their classes. These sorts of discussions were useful from Tasneem's point of view.

“I mean sometimes my colleagues and friends, they would even share that voluntarily like they would just send me the information...like... I’ve used this with my students. What do you think?” (TFI, 70-72).

When I asked her if such collaborations with her peers have had any influence on her, she replied: “It makes a positive impact and it encourages me more to do more with the students” (TFI, 76-77). Apparently, she looked at her peers as a source of encouragement, and even of support at times when she needed it, especially when their experiences were positive. Interested to know if she was ever demotivated by her peers, I asked her if there were any instances where she got discouraged by her colleagues. Tasneem very clearly stated that she did not.

“I do not get demotivated, no, because I do not let people negatively affect me” (TFI, 90).

“I’m very particular about choosing which experiences to focus on” (TFI, 95).

From the above quotations, it becomes clear that Tasneem’s self-esteem is very strong. She does view her peers as a source of encouragement and support, but does not allow them to demotivate her in any way.

4.5.6.3 Training

Training was another theme in Tasneem’s data. For instance, while narrating her first few years of working as a language instructor at the CPS and her relationship with technology during that period, Tasneem recalled how attending workshops on technology integration were useful to her. “I started to attend some workshops about using technology” (TII, 303-304). Therefore, it was not unexpected for Tasneem to reveal in the interview in different places that she had been positively influenced by training and that she had positive feelings about this training. She also asserted that the training courses that she attended contributed to teaching her “the way [she] should incorporate technology into [her] classes” (TFI, 244) as she stated.

However, Tasneem was particularly more interested in workshops where “Teachers will share with you what they did in their classes and how it worked” (TFI, 217-218). Her interest was more on hands-on workshops where real

examples were shared by teachers who experimented technology-related tools in their classes. Her justification of this was that she wanted to hear from teachers who worked in a similar context to her own, for instance, the same course or same institution. “And so you go like you feel more encouraged like wow, this is great. It worked for this particular class in the same course or in the same institution” (TFI, 219-220).

4.5.7 Summary

In light of the theoretical framework that informed this study and based on the themes that emerged from the analysis of Tasneem’s data, her early experience with technology was extraordinary. During her school days, Tasneem did not have any contact with any technological devices, neither at school nor at home. The only exception was the tape recorder that was used by a teacher of English Language for listening tasks. Her first introduction to technology was during her undergraduate study, which she described as *nerve-wracking*. The limited use of technology in the course modules encouraged Tasneem to attempt to learn how to use technology independently. She soon discovered ways to use technology to improve her English language with the help of different computer software programs. During her first few years of working as a teacher at the CPS, Tasneem made the effort to find her way as a teacher. Her first years were marked with less use of technology as she was busy adjusting herself to the environment. Gradually, she increased her incorporation of technology, particularly smart phones. The two significant influences that emerged from Tasneem’s data were her inclination to emphasize outside classroom learning using technology and teaching her students in the same ways that proved successful to her as a learner. The main factors that Tasneem found influential when using technology were three; giving a positive self-image about herself to her surroundings, peer support and collaboration, and finally hands-on training.

5 Chapter five: Cross-case findings

The previous chapter looked at every case individually with an emphasis on revealing the relationship between each of the five teachers' cognitions and the use of technology. The findings show that teachers differed in terms of their early use of technology during their school days, during their teacher education programs and in their classrooms as teachers. These differences produced different stories of teachers' relationship with technology. Furthermore, while two of the teachers, Arwa and Muna, perceived technology as influential to their beliefs and instructional practices, two other teachers, Rashid and Tasneem, were less influenced by it and one teacher, Basma experienced no influence of technology. However, the following chapter will identify the commonalities and differences in terms of the relationship between teachers' cognition, technology use and their instructional practices. In order to do this, I discuss the main themes that will help compare all the cases together and provide a deeper understanding of the cases. The main themes are early experiences with technology as learners, teachers' cognitions and beliefs about technology use, teachers' perceptions of how technology influenced them, and the contextual factors affecting their use of technology. The chapter ends with a short conclusion that summarizes the cross-case findings.

5.1 Early experiences with technology as learners

Participants varied in terms of their previous backgrounds with technology as school and university students. Three of the participants who took part in this research, Basma, Rashid and Tasneem, had no or extremely limited contact with technology during their school days. According to their autobiographical accounts, the schools which the three teachers attended for their early education either did not have technology available, or teachers did not use it in their teaching. Even the participants who used technology once or twice, or saw their friends do so, were incapable of recalling or talking about their relationship with technology during that time since it was very limited as was its influence on them. For example, Rashid, who observed his friend and sister using technology, was not able to determine if technology had any role in his learning then (R11). Tasneem and Basma had nothing to say at all about technology during that period. Basma made clear that she did not have any contact with

technology whatsoever. As a result, these three teachers had one thing in common; they did not have any early experiences with technology as school learners. However, Tasneem's undergraduate study was characterised with some informal experiences with technology that may have influenced her current teaching.

The data gathered indicate that there was an influence of early technology-related experiences on teachers' cognition and instructional practices. For example, it was found that participants' previous informal learning experiences with technology influenced their decisions and choices about what technology to integrate and how. In contrast with the three teachers above, Arwa and Muna did have experience with technology during their schooling days. They both used technology at a very early age; one of them at school and the other at home. They both gradually increased their exposure to technology as they grew up and particularly when they joined the IT course that was offered as a school subject in their schools. What is common about both participants is the fact that they both attempted to communicate with other students from outside their environment using technology. For example, Muna used a famous Omani forum called Sabla to connect with others and to discuss various issues that were of interest to her. She thought that this experience was useful and *"rewarding to get to discuss local issues with Omani members. It broadened the way [she] viewed the world and life"* (MAA). Muna had this experience at a very early stage when she was still in Grades 10 to 12 (15 to 17 years old). Her personal observation of how the society confined her freedom of speech, as she indicated, took place when she was still a school student. This led her to realise the potential that technology could offer her to overcome the societal barrier and to reach out to others from around the world. This experience eventually made her value the prospects technology could afford her as a student and individual as she expressed eloquently when asked about her relationship with technology as a student. She explained that she *"maybe became that kind of student who is more aware of how technology can help"* (MII).

Inspired by a totally different motive, Arwa too used technology to communicate with others. However, she did that because she was looking for *"different things, new things, and new stuff"*. She was searching for "more experience".

"But when I used the forum and contacted students from other regions, I could learn a lot from them like different things, new

things, new stuff they had learned from their teachers so we shared with each other” (All).

Interestingly, the influence of these two experiences with technology were reflected in their instructional practices as teachers. For example, during Muna’s first classroom observation, she used technology for collaborative tasks where students shared experiences with each other. When asked about the aim of using technology in her lesson, she replied: *“So it’s more of practice together and sharing experiences and having collective kind of work together”* (MPO11). Muna also used discussion forums with her students which indicates that her early experience with using technology in communicating with others was translated again into her instructional practices believing that this would facilitate her students’ learning the way it did to her. Muna defended the use of discussion forums with students enthusiastically. In addition to how discussion forums are set up, she attributed their use to her own early experience:

“And teachers say students do not like discussion forums, they do not contribute. Why? I used it with my students and it went very well so the problem is how we set it up, how we introduce it to students” (MII).

A few lines later, she said:

“I even used discussion forums at university and email groups” (MII).

Similarly, influences of early experiences with technology on current instructional practices were also present in Arwa’s account. For example, during the first classroom observation, she used Lionit.com to encourage students to share their thoughts and ideas with others.

“So people can really feel they share ideas on the web. Instead of writing them on paper, you can write them somewhere on the Internet and they can share” (APOI2)

Arwa cited several justifications for using a software where students have the chance to share their ideas among which was the justification that she *“like[s] how technology helps us to share ideas”* (APOI2). Her personal experience was evidently present in making the decision about this particular activity.

A possible influence of early experiences with technology was also found in Tasneem's data. During her undergraduate study, Tasneem used technology independently to improve her language through recording herself speaking in English. She did that to develop her pronunciation and she would hear the recording to evaluate herself.

“When I was a student in the university, in my first year, because I was working on my pronunciation and I felt probably that would be a great thing to do. I just record myself and I would actually take a text and read the text; a part of a story or a short paragraph from one of my books. I would read it and I record myself reading it. And then I hear myself” (TPOI1).

As this experience proved successful and useful to her, she decided to use it with her students. During the first classroom observation, Tasneem incorporated mobile phones to get her students to record themselves speaking about a member of their family.

Tasneem: Like if they have certain problems with particular sounds, because you know, like our students might have problems with the ph sound or I do not know. In some cases, the g sound.

Mahmood: Was this present in your mind when you planned to use technology?

Tasneem: Yes, from the beginning because to me, I mean that's something actually I did as a student when I was. I mean I was not recording on a mobile phone. I was recording in a recorder. That's one of the things that I did as a learner” (TPOI1).

What is interesting about all of the above findings is that they all featured particular ways in which learning *through* technology use contributed to influencing teachers' actions and decisions about teaching and learning. Most of the participants who perceived the effect of early technology experiences on their cognition and instructional practices associated the effect to their independent personal experiences as learners, more than linking it to the way they were taught by their teachers either at school or at university. This might

be an indicator of the considerable impact of personal and self-driven technological experiences on teachers' identities. It also represents how early experiences as a learner informed participants' teaching practices, decisions and choices. In other words, the informal learning experiences with technology contributed to constructing teachers' identities and their decisions about technology integration.

5.2 Teachers' cognition and beliefs about technology use

Looking at the participants' data, all the teachers agreed that technology is an important and indispensable tool to be used inside and outside their classrooms. Apart from one teacher who previously had negative beliefs about technology and who later changed his position completely from an opponent to proponent, the other teachers showed passion when they talked about technology use in their classes. In fact, Tasneem could not imagine her classes without the use of technology. "Today I can never imagine my classes without the use of technology" (TAA). Another teacher, Arwa, thought that using technology was essential in her teaching and believed that it even influenced her teaching in general, as she stated in her autobiographical account.

"Using technology in my EFL classes is one of the firm beliefs that constitutes a big portion of my teaching philosophy and which has influenced my teaching practices" (AAA).

What is noteworthy about Arwa's beliefs about technology is that her opinion about technology was further reinforced by her constant use of technology and the relevant professional development courses that she attended, as stated clearly in her autobiography:

"This belief has strengthened over the years because of my exposure to various electronic devices, online courses, professional development sessions, readings and personal experiences that have emphasized the importance and effectiveness of using various digital resources with the new generation" (AAA).

Muna, also asserted that technology has always been a passion to her because it "broadened the way [she] viewed the world and life" (MAA). This view of broadening visions was also shared by other teachers. Three teachers, namely

Muna, Arwa and Tasneem, thought that technology was an essential part of language teaching and that it was a must, not a choice.

“My belief, I feel that as an English language teacher, it’s not just a choice. It’s a must to know about technology” (All).

One teacher, Muna, was so passionate about the use of technology that she volunteered to encourage and support other teachers to employ technology in their classes and even train them to do so. Muna made this her mission to train teachers to design technological activities for their students.

“That’s why I made it my mission as a teacher to spread the word of effective e-learning and provide training to teachers on designing effective online learning activities” (MAA).

However, two teachers also realized that technology as a tool has its downside. They were aware that technology cannot offer solutions for all problems and that at times, technology can fail them. This realization may have made teachers more careful when and how to use technology in their classes. One teacher, Rashid, affirms that technology cannot be seen as a solution for all teaching situations. He thinks that sometimes using technology causes confusion to students. Teachers should prepare their students to use technology purposefully.

“We cannot say that always technology is the solution for all challenges. There are cases where if you use technology, maybe you’ll confuse your students if they are not prepared” (RII).

Tasneem, for instance, believes that technology is positive and it can serve teachers greatly. She relates any failure caused by technology to lack of preparation from the side of the teacher, more than to the technology itself. She thinks that teachers should make additional effort to be well prepared whenever they plan to use technology, and that, obviously, should take place before the class.

“It’s a positive thing even though the times that it failed us, it does not work in the classroom, it’s not exactly ... you cannot just blame it on the technology. You have to blame it on yourself because you just have to go there all prepared” (TII).

Therefore, it becomes apparent that the two teachers believe technology could fail them if they, or their students, are not well prepared.

On the other hand, one teacher had a different view about using smart devices in the classroom; Rashid. Unlike other teachers, Rashid thought that smart devices were not helpful. He was under the impression that they would cause his students more harm than good and hence he was not motivated to use them in his classes. For example, he also thought that the presence of smart devices would affect the teaching and learning processes negatively. Added to that, Rashid indicated that the policy of the Centre for Preparatory Studies was not clear enough to him whether or not using smart devices such as mobile phones was permitted. All of the above made him unconvinced of integrating smart devices into his teaching. Nonetheless, Rashid’s beliefs changed after he realized the potential benefit of using smart devices as a tool.

“When I realized that these devices are constituting a huge part of those learners and it affects many aspects of their life, I came to more flexible and changed my view towards these devices. I have changed side from the opponent to the advocate because looked at it as a means of facilitating learning and teaching instead of as a destruction tool. Nowadays, I encourage my students to install at least three types of dictionaries in their smart phones and to use them during the class” (RAA).

Despite being slightly late, Rashid realized that the use of smart devices was integral to his teaching because his students were familiar with technology and were more motivated to use technology in class. His students probably expected to use technology in the classroom the way that they used it outside. Students do not necessarily see a reason to be deterred from using technology inside the class since it has become an important component of their everyday life. With this realization in mind, Rashid was encouraged to change his views and start using the smart devices in his classes, as he stated. Muna, who from

the very beginning seemed to have a positive view about technology use, also shares the importance of using smart devices. She strongly believe that students should not be disconnected from their own “dear” devices and she describe them as “*digital natives*”. Muna believes that the educational use of smart devices in class “*would even increase interest in learning the language outside the class*” (MII).

Basma also stated that she likes to use technology in her teaching and believes that this makes her appear as more of a modern teacher. She thinks that using technology enhances teaching and supports differentiated learning. Furthermore, Basma stated that using technology requires teachers to plan their lessons differently by considering the teaching style, her own skills as a teacher, students’ perceptions and students’ levels of participation (BII).

An interesting finding was also that four teachers seemed to have been affected by the discourse surrounding technology integration. For example, Tasneem thought that she was expected to use technology because everybody was using it in their teaching. Basma, also thought that she had to use technology because she did not want to appear as an old school teacher who did not believe in technology. Rashid also stated that “*They all talk about how technology can help students learn better*” (RFI, 395). Another example was provided by Muna who thought that using technology was a must for English Language teachers. These examples may demonstrate that the four teachers were aware of the sort of discourse surrounding technology use and how they were influenced by how other colleagues, managers or other superiors viewed the use of technology in teaching.

In short, all of the teachers who took part in this research had very positive beliefs about technology use in their classes in spite of their diverse early experiences with technology. They all shared a strong inclination to use technology and were able to justify their supportive beliefs about technology use. Nevertheless, teachers’ stated beliefs did not always reflect their real actions and sometimes there were mismatches between their stated and enacted beliefs about teaching and about technology use. A closer look at how teachers perceived technology as impacting their practices is demonstrated below with particular attention to teachers’ actions during classroom observations.

5.3 Influence of technology on cognitions and instructional practices

Based on the commonalities and differences between the participating teachers in terms of their beliefs about technology teachers seemed to be different in terms of perceiving the influence of technology on their cognitions and instructional practices. For example, two participants who had extensive early experiences with technology, used technology widely in their classes and their classroom practices reflected influences of technology such as using constructivist learning, independent learning and different teacher roles and classroom management styles. On the other hand, two teachers used technology less frequently and therefore less technology influences were documented during the observations such as using student-led activities and some examples of independent learning. However, one teacher who had no early experience with technology, used technology in an extremely limited way and her teaching was characterized with a traditional teacher-centred approach where technology did not seem to have any influence on her classroom practices. Table 9 depicts the influence of technology on all participating teachers based on the analysis of the data from the classroom observations and post-observation interviews.

Participant	Observation number	Role of the teacher	Role of the learners	Materials used	Technology used	Indicators of technology influence on teacher
Arwa	Classroom observation one	<p>Facilitated the activities</p> <p>Guided students to use the game</p> <p>Managing the class differently than in traditional classes</p> <p>Check students' progress</p> <p>Text from internet, questions prepared by teacher</p>	<p>Students worked together in groups</p> <p>Students did the game quiz with their partners</p> <p>Used their mobile phones to play the game</p>	<p>An activity prepared from the internet, not part of the textbook.</p> <p>Authentic weather forecast example.</p> <p>Online games.</p>	<p>Computer</p> <p>Teacher presentation</p> <p>Photo editing</p> <p>Used email.</p> <p>Kahoot.com website.</p> <p>Internet</p> <p>Mobile phones</p> <p>Video</p>	<p>Had and used a plan B when technology failed her.</p> <p>Collaborative learning</p> <p>Using authentic materials</p> <p>Teacher as facilitator</p> <p>Teacher as guide</p> <p>Different classroom management style</p>

	Classroom observation two	<p>Created the activity with a QR code</p> <p>Created a webpage</p> <p>Teacher provided instructions to students</p> <p>Teacher supporting students/saving their work for later uses</p> <p>Save time by using technology</p> <p>Observe the class</p>	<p>Use wordle.net to create list of words</p> <p>Use mobiles to scan a QR code</p> <p>Share ideas together using the lionit.com webpage</p> <p>Help each other collaboratively</p>	<p>Lionit.com webpage</p> <p>Pre-prepared activity</p>	<p>Wrodle.net website</p> <p>QR scanner app</p> <p>Lionit.com</p> <p>Mobile phones</p>	<p>Collaborative learning</p> <p>Sharing of knowledge</p> <p>Learning by doing</p>
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Muna	Classroom observation one	<p>Editing students' work using MS Word</p> <p>Use Word instead of the Whiteboard</p> <p>Teacher helped students</p> <p>Teacher asked students to correct her</p>	<p>Voting</p> <p>Check spelling of a word</p> <p>Students worked in groups to produce paragraphs</p> <p>Students corrected the teacher when she misspelled (racism)</p> <p>Learning independently using Khoot.com</p>	<p>Essay written by students</p> <p>Writing activity</p>	<p>Used Microsoft Word to mark down the appointments</p> <p>Mobile phones</p> <p>Mobile Application for scanning (Cam scanner).</p> <p>Email</p> <p>Kahoot.com</p>	<p>Collaborative learning</p> <p>Teacher is not possessor of knowledge</p> <p>Students can have their say</p> <p>Independent learning</p> <p>More responsible learners</p>
	Classroom observation	Facilitating	Worked in pairs to write using	Activity on passive and	Titanpad.com	Facilitation of

	two	students work Collaborator Observe everybody's work synchronously	Titanpad.com Writing collaboratively Discuss and evaluate their work online Sharing knowledge and experience	active voice Using connectors in writing Discover plagiarism activity	website Turnitin Computer laboratory	learning Collaborative writing Shred knowledge approach
Rashid	Classroom observation one	Encourage students to learn independently	Students listen and complete some questions Check spelling of some words from dictionary Record themselves using mobile phones	Listening and speaking Revise vocabulary	Computer Mobile phones Digital dictionaries	Teacher uses technology to protect students' privacy Independent learning

	Classroom observation two	Teacher monitored the class Moderated the lesson Presenter of information in activity two	Students recorded themselves Students used the Application and managed the activity	Speaking Audio-recording Video-recording Showing a short film	Mobile Application that functions as a microphone To play recordings for the whole class Video-record students	Student-led activity
Tasneem	Classroom observation one	In charge of the classroom Gave constant directions to students Information transmitter	Interact with each other Complete the questions by listening to recording Listeners Send sentences using WhatsApp	Listening and speaking activity Writing sentences, sending them via WhatsApp Recording themselves	Play recording Add another dimension to enhance learning Mobile phones WhatsApp computer	Technology does not give her direction Clear about what you want to do Using recording to improve language (as the teacher did when she was a learner) Limited learner-

						centred strategies used
	Classroom observation two	Distributed worksheets Explained the activity Played the video Information transmitter	Watch video and answer questions on a handout	Worksheet Two recordings for listening tasks	Video (just to stimulate students)	Giving the teacher options to choose from Limited learner-centred strategies used
Basma	Classroom observation one	Teacher gave instructions to students Teacher played the recording	Students listen and answer questions Students recorded 5 sentences and sent them via WhatsApp to teacher Students were	Listening activity	Computer WhatsApp Application Recording of a listening activity Mobile phones Showing questions on the projector	No evident influence of technology Class was led in a teacher-centred style

			unsure about what & how to do it			
	Classroom observation two	<p>Play recording</p> <p>Tried to play a recording from website but failed to.</p> <p>Teacher did most of the work</p> <p>Teacher led the class</p>	<p>Listen and answer comprehension questions on a handout.</p> <p>Read task from mobile phones</p> <p>Students did not collaborate or do much in this class</p>	Listening activity	<p>Computer</p> <p>Recording of a listening activity</p> <p>Mobile phones</p> <p>Showing questions on the projector</p>	<p>No evident influence of technology</p> <p>Class was led in a teacher-centred style</p>

Table 9 Analysis of the classroom observations and indicators of technology influences on teacher instructional practices

5.3.1 Two participants who perceived transformational influence of technology on practice

Two of the teachers who participated in this research, Arwa and Muna, showed that their pedagogical beliefs about teaching and instructional practices were influenced by the use of technology. Their data illustrate that their use of technology has led to the construction of new beliefs about teaching and learning. For example, Arwa stated that she could feel a positive impact on herself as a teacher and on her students too. “I can see a good impact on me, on my students, on my colleagues so it’s really a good thing and I’m happy that I’m on this path” (AFI). She also said that technology use “has influenced [her] teaching practices” (AAA). This impact was clear in her teaching when she used independent learning and different classroom management as a result of the continuous use of technology. Arwa and Muna spent time experimenting, implementing and refining their ways of teaching with the help of technology which led to refining their teaching beliefs and practices. “So after this turning point, I feel that I needed to dig deeper and look for more resources, I need to know more about technology” (All). One of the findings demonstrates that the two teachers found that the use of technology has helped them to improve their pedagogic knowledge about teaching and that their role as teachers has become more of a guide than an instructor. During the second observation, Arwa used a reading comprehension game using students’ mobile phones. When asked about her role as a teacher, she replied:

“I need to manage the class differently than traditional classes. I should observe their work and at the same time I need to remind them every now and then about looking back to the text” (APOI1).

Furthermore, the findings of the data of the two teachers also emphasize teachers’ views about the role of technology in providing more authentic materials and collaborative learning to students. This is clear in both teachers’ observations where indications of authentic materials and collaborative learning activities were found. For example, Muna used Titanpad to support collaborative writing amongst students. The software promotes collaborative writing by getting students to write an essay collaboratively and synchronously as a group. Muna explained this clearly when she said, “I would have the groups in class. Each group would have

one laptop and they would go to Titanpad. Titanpad is more of collaborative writing thing” (MII). During the second observation, Muna used Titanpad for group work writing and she was observed acting as a facilitator supporting students to write collaboratively. The findings also demonstrate how technology can influence teachers to use a constructivist approach in teaching. For example, Arwa reported that technology made her employ a more “learning-by-doing” method of teaching where learning by doing is promoted. She clearly stated that: *“students would be learning by doing. The more things students use and are exposed to, the more learning will take place”* (AFI). Both teachers allowed students the opportunity to work in groups and to apply a shared knowledge approach whereby teachers and students share knowledge and work together with the help of technology.

Another influence which was cited by Arwa was the ability of technology to improve teachers’ content knowledge as a result of using the internet and being exposed to a wide variety of information, content and materials from different parts of the world. This has surely contributed in making teachers more open to ideas they may have not come across without technology. Their teaching has been facilitated not only inside the classroom, but even before while preparing for their lessons. One of the teachers emphasized the significance of using the internet.

“In the past I feel that I was stuck with the textbook. I had to follow the textbook because I had no other options. But with technology, sometimes I skip some activities when I feel that they are boring and they do not provide students with the required language they need. So I go online and find endless options of resources which open my mind and make me more knowledgeable. I can use one of them, bring them to the classroom, students can see, can watch, can interact, and they get it.” (All).

“I feel that we as language teachers, in particular language teachers need technology very much because if you go online and check, you will find again a wide range of website tools, resources, people who are experts at language teaching through technology. They would help teachers a lot to be more creative, to be more effective in their classes” (All).

Arwa also mentioned that the use of technology has also improved relationships with students and has brought her closer to the learners both inside and outside the classroom. An example of that is Arwa's response to a question whether technology has affected her relationship with her students or not, "So I can see the difference in their eyes, in their feelings, their reactions" (AII). Muna, too asserted that she noted a difference with her students when she uses technology.

"And I think maybe students value this because they see a different way of teaching and hopefully a more interesting way of dealing with content" (MPOI2).

Arwa and Muna also cited the vital role of technology in making them more creative in their teaching. For example Arwa spoke about her feelings in that technology had helped her become more creative. "I feel that technology is the most...it can very well help me to be creative because of the wide range of possibilities available online" (AII). When asked how technology enabled her to be more creative, Arwa explained that "technology would help you go further with this activity" and that "you cannot be creative with them [textbooks]" (AII).

Furthermore, the data gathered during the observations suggest that the two teachers used differentiated learning with students. For example, Muna used technology to send different versions of an activity depending on students' levels as she clearly reported during the post observation interview.

"If I feel some students are weak or not up to the level, I edit and send them different copies to suit their levels. Also, this helps to improve all students according to their levels" (MPOI1).

In addition, both teachers reported that technology has promoted a more learner-centred approach in teaching. This is clear in Muna's excerpt below when she was asked if technology required her to think differently about her lessons. Muna explained:

"I think technology encourages teachers to be more learner centred with activities. For example, rather than the actual traditional checking of answers, I would have a program called Kahoot which is like a quiz, they just turn on their devices, enter a code or something and they're there. So

whenever they answer a question, they enter the answer here and I just see it on the board so every learner is having an input rather than one learner giving the answer for the whole group. So it's very learner-centred and I think people behind education and technology are aware of this. It's amazing how they are making learning learner centred rather than teacher centred" (MII).

Wanting to confirm if her students shared her enthusiasm of using technology, Muna allowed them the opportunity to give their feedback about it. She asked her students to vote whether or not technology should be used in class.

"I think I have got good feedback from students, they enjoy it. They push it. And as I told you, last time I made them vote. They voted for the technology, for the full technology thing and I have seen how they felt enthusiastic in that lesson" (MPOI1).

The two teachers also reported that they feel they did not have to worry much about delivering the curriculum effectively as technology would help them do so. In addition, Muna stated that she can search for any information even in the middle of the class, if she happened to need that information. "We do not have that worry about how to effectively deliver something, it's there" (MII).

What the two teachers had in common was an early exposure to technology when they were at schools. They both had the opportunity to use technology at home and in their schools for learning purposes. They also used technology to communicate with other students and teachers from inside and outside Oman through the use of technology. During their teacher education programmes at SQU, they were both exposed to technology and reported that they became more critical thinkers or independent learners as a result of using technology. Furthermore, the two teachers also spent a lot of time experimenting with and using technology when they were doing their master degrees and stated that they had the chance to use technology through a "learning by doing" approach. Both teachers also did their master degrees in areas related to technology integration in teaching and learning.

To sum up, findings from the data demonstrate that Arwa and Muna who considered themselves as skilled in using technology and viewed themselves as frequent users of technology perceived an influence caused by technology on their cognition about teaching and on the way they delivered their teaching. These teachers have claimed that they have observed a change in their teaching methods due to their continuous use of technology both inside and outside their classes. Examples of these changes were the construction of new beliefs, using independent learning, refining some of the ways of teaching, improving their pedagogic knowledge about teaching, becoming more of a guide than an instructor, using constructivist approaches in teaching, improving their teacher content knowledge, facilitating planning before the lessons, closer relationship with students, creativity in teaching and the use of more learner-centred approaches.

5.3.2 Two participants who perceived less effects

Two of the teachers who took part in this research, Rashid and Tasneem, sounded similar in terms of their positive beliefs about technology use compared to their actual use during the classroom observations. That is, they both expressed claims about the role of technology in shifting their instructional practices from teacher-centred to learner-centred ways of teaching. For instance, Tasneem reported that “technology has changed our perception toward teaching and learning” (TII) in that it made her “a better planner” (TII). She also stated that technology can contribute in changing her role as a teacher and the role of her students in the learning process.

“It also helps me to be a guide in the class, no need to do everything myself” (TII).

“Technology has also created that dimension, you know, throwing basically the responsibility, major parts of responsibility on the students” (TII).

Both teachers also expressed strong perceptions about the importance of technology in making teachers up-to-date, well-equipped and in motivating students to learn.

“I mean now, you cannot just go into the classroom without having several ideas” (TII).

“To equip their teaching with something that is up to date and also to live with the right generation and to get your students stimulated as well” (R11).

“Technology is something interesting, it’s something stimulating, it’s something making things easier but also on the other side it can make things difficult if it is not wisely used or properly planned for” (R11).

Nevertheless, evidence from the classroom observations revealed a contradiction as there were limited examples where learner-centred occurrences took place. Their usage of technology during classroom observations was minimal with a few examples of pedagogical influences of technology on their practices. Albeit briefly, the two participants used technology on a number of occasions and their uses were generally characterized by a tendency to lack constructivist techniques.

For instance, during the second observation, Tasneem used technology in two main activities, to show a video and to play an audio recording. When asked to justify her choices of technological uses, she replied:

“I mean the first one, the video, I just wanted, as I said, that’s why I picked the short one because I just wanted to stimulate. It was more like a warm up. I just wanted them to get excited about the idea” (TPO12).

“The audios, I used one of them was mainly to introduce new information about Hong Kong, and the other one was about checking answers” (TPO12).

Tasneem did not demonstrate any change in her way of conducting the activities to support her previously stated beliefs about being a guide or facilitator. During the observation, she undertook all the steps herself with students only responding to her instructions. Neither of these occurrences reflect a strong influence of technology on the teacher’s practice. In fact, technology was used in its basic form, for instance, for the presentation of material, to attract students or stimulate them. While this is important, it does not show a high constructivist or independent way of learning, and students did not have much to do.

As far as her role as a teacher was concerned, Tasneem did not believe that technology contributed towards changing her role in the classroom. She still held on to the typical teacher role of being in charge of the classroom. She thought that technology did not direct her and that it was a tool to enhance what she usually did, not transform it or change it.

“I’m still in charge of classroom because technology does not really give me direction. I use it to enhance what I want to do” (TPOI1, 95-97).

It was evident here that technology did not play a role in urging Tasneem to reconsider her role as a teacher from that of traditional teacher role to a more facilitator teacher role, as she previously stated.

Furthermore, the two teachers made some of their choices about their use of technology in classes based on their own preferences as teachers and what really worked for them, rather than based on their students’ preferences. For example, Tasneem encouraged students to record themselves to improve their English Language citing her own experience when she was a learner. She explained that this strategy worked successfully with her and managed to improve her language when she was a student. Her personal experience informed her decision to use technology more than her students’ levels or interests.

“And of course, the recording, to me I think it’s a good thing for people to record themselves because when they hear themselves again, it shows them first how confident they are in their pronunciation” (TPOI1).

“I mean that’s something actually I did as a student” (TPOI1).

Moreover, Rashid decided to incorporate digital dictionaries in his class based on the fact that they saved him time and reduced pressure on him. “Using [digital dictionary] in the classroom is very helpful and saves me time and reduce pressure on me” (RPOI1). His preference also informed his decision of which application to use. Rashid, who was an opponent of the use of mobile phones in his classroom by his students and then shifted to be a proponent, referred that shift to his own personal identity as a teacher. He did not want his students to view him as an old fashioned teacher.

“They do not say, “My teacher is old fashioned so it's very difficult to contact him” (RII).

“So he is away from us. He is different from us. He is not from our generation” (RII).

However, there were some instances when both teachers showed signs of specific influences of technology on their practices. For example, Tasneem encouraged her students to learn outside the classroom using technology. She reported that she shared some learning materials with her students via a WhatsApp group that she created for her students and some of those materials acted as preparatory for the next classes. This indicates that she co-planned with her students to better involve them in the class planning. Tasneem said: *“I can send them materials before the class” (TII)*. In addition, Tasneem used mobile phones during her lessons to urge her students to send their sentences, for example, to her via WhatsApp. She did this to save time.

Rashid's classes also witnessed some evidence of the influence of technology. For example, he used technology to help students to evaluate themselves through recording themselves and evaluating their performance during the first observation. In terms of his role as a teacher, Rashid gave the stage to his students during an activity in the second classroom observation. The activity was mainly student-led and Rashid acted as a moderator. It was evident during the class that Rashid was not in charge of the activity and that most of the work was done by students who happily led the activity and were involved in it.

“Of course my role was... I gave the students the stage to go out and as, let's say, moderating the session. Also to direct students on what to do, to select students, new students, to encourage them, to approve what is right, what is wrong? I ask the students to tell their mistakes but the teacher's role was to control the class and also see if there's something wrong” (RPOI2).

5.3.3 One participant who perceived no influence

One of the participating teachers behaved in such a way that suggests she was not influenced by the presence of technology in her classes. The analysis of Basma's data reflected inconsistencies between her teaching practices and her stated beliefs about how technology could influence her. One of Basma's beliefs about technology is that it "*can help [her] make learning more suitable for my students' and match their levels*" (BII, 195-196). Nevertheless, during the classroom observations, she used technology to support her teacher-centred instructional approaches where students were assigned tasks to accomplish and where technology had no real role. The low-level use of technology, or basic use of it in some cases, was noted during the classroom observations that were conducted. For example, Basma used technology only to play a recording in a listening activity and where students were not given any opportunities for independent or collaborative learning. Her use of technology was limited to presenting materials. For example, during the second observation interview, I asked Basma about the role of technology that she had planned for it to have. She replied: "*For playing the listening, showing questions on projector*" (BPOI2). Data gathered from the second classroom observations also conform to what Basma stated. She used technology to conduct a listening activity. This demonstrates that her role as a teacher was mainly that of a knowledge transmitter where technology played the role of a presentation or demonstration tool, more than a collaborative or productive tool. Such finding may contradict with Basma's stated beliefs as seen above and in her individual case analysis. This could be attributed to her own attitude of technology as she already stated that she does not trust technology totally; "*I like technology but won't trust it totally!*" (BII). On another occasion, Basma reaffirmed her point of view when she said that she "*cannot trust technology 100% for anything could happen*" (BPOI2). This could also be attributed to the fact that Basma tended to use the sort of technologies that she felt good about, or confident to use. Her positive beliefs about technology were associated with particular types of technology, and not technology in general. For example, Basma reported that she "*support[s] technology where effective!*" (BFI). In addition, Basma stated that she knew better what was good for her students. "*As a teacher, you know better what is good for your students*" (BII).

When Basma felt comfortable with her traditional way of teaching, she did not see a real need to use technology innovatively, particularly when this was nurtured by her belief that technology cannot serve her all the time. This also might link to her own early experiences with technology as she did not really have any contact with technology during her school days. Likewise, her relationship with technology during her teacher education was extremely limited, which might explain why she was reluctant to use technology in her class. Her previous teaching was probably more through direct instruction, and which she could have been influenced by.

In fact, when I asked Basma if technology had any role on her learning during her undergraduate study at SQU, she reported that it did not. She clarified the only effect of technology on her was in learning to type.

Mahmood: So in other words, do you feel that technology had any role in your own learning experience as a learner?

Basma: In university?

Mahmood: At the university, when you were at the university, yes.

Basma: Not so much actually, no. Only in terms of typing and that was it.

To sum up, the findings about Basma show that despite her positive stated beliefs about technology, she continued to teach in more traditional ways with very limited use of technology. This suggests that any influence of technology on teachers' cognitions and instructional practices is not possible without frequent use with clear purpose and with the active involvement of learners.

5.4 Contextual factors affecting participants' integration of technology

The analysis of the data in the final interviews of all participants revealed a diverse number of factors that participants cited as impacting their level of

technology integration into their teaching. These factors were previously discussed in the individual-case finding chapters (see Section 4.1.7 for an example), but are further discussed here as main categories. Table 10 below demonstrates the different factors that every participant perceived as influential when integrating technology. The various factors were then categorized into five main categories namely professional development, technical support, institutional environment, socio-cultural factors and personal factors. The order of the categories does not represent significance or time of occurrence.

Factors	Participants	Category
Special-interest groups	Muna	Professional development
Training	Arwa – Rashid – Tasneem – Muna	
Technology infrastructure/availability & accessibility	Arwa – Muna	Technical support
Learners' attitude/student pressure	Arwa – Basma – Muna – Tasneem	Institutional environment
Institutional policy	Muna	
Colleagues/Peer pressure	Arwa – Basma – Rashid – Tasneem – Muna	
Culture	Rashid	Socio-cultural factors
Positive self-image	Tasneem	Personal factors
Personal interest	Arwa	
Table 10 Contextual factors affecting participants' integration of technology		

5.4.1 Professional development

Generally, most of the participants reported that professional development training plays a considerable role in enhancing teachers' abilities to incorporate technology when teaching their lessons. It helps to improve their

skills in how they use technology, and also motivates them to continue using it. For example, teachers feel more empowered when they are provided with hands-on practical workshops that train them to use technology purposefully in their classes. Teachers also reported that they valued acting as active learners of technology integration through the various practical technological seminars and workshops.

The quality of teacher training in relation to technology use should not be limited to a general awareness of how to use technology. Rather, the training should also cover areas such as how to plan, implement and assess technology use in teaching. In terms of planning technology integration, Muna recalled how valuable a training session was when the trainer helped them to brainstorm ideas to implement the technological software; Linoit (Photo sharing application).

“The trainer gave us the chance not only to experience that but to brainstorm ideas of how we can actually plan to implement this in class” (MFI).

She liked the idea of engaging in planning for the use of technology before actually using it in the class. The result, according to Muna, was imminent as a teacher returned the feedback, on the next day of the course, about how the tool worked for her.

“And it was interesting the following day a teacher came up and shared something she did with her class, a tool we learned that very day. The very same day she learned that tool, she implemented it immediately” (MFI).

Arwa reported that she was motivated to use the software called Edmodo because the type of training she had received about it was hands-on training where she was an active learner applying knowledge, not just learning about it. *“I had a training course in Oxford in the summer and we talked about Edmodo and we used Edmodo ourselves in the training course so I took it from a learner point of view”* (All). The practical engagement in using the software convinced Arwa to incorporate it in her teaching immediately and professionally. Tasneem explained that it was important for her to learn *“the way [she] should incorporate technology into [her] classes”* (TFI). She also emphasized that she was more interested in hands-on workshops which

focus on “practice”. Tasneem vividly expressed her feelings after attending a hands-on workshop about how to incorporate technology.

“I came out of the workshop with positive feelings and in a way, it just made me feel more comfortable and more interested in using technology because I see new ways and I go why did not I think of this?” (TFI).

“They have positively affected the way I looked at technology and the way I should incorporate technology into my classes” (TFI).

Rashid also stressed the idea of attending workshops for the purpose of learning “how to integrate technology into teaching and learning” (RFI). Likewise, when I asked Muna if training had contributed in her decision to integrate technology in her teaching, she replied:

“Of course. Like the last training I attended was on mobile training, as I told you. It was a four-day training and each day it was four hours long, 10 to 2 and we had this trainer from Barcelona. She works there and she is really good. Why is she good? Because she does not just feed theory, she would talk briefly and she would give us practical tools to use in the classroom and then give us a chance to experience it and use it. So I can say that was one of the richest experiences ever in my career” (MFI).

From this excerpt, it is very evident that Muna does not appreciate training that is based on theory as opposed to workshops that incorporate application and practical hands-on activities, where teachers have the chance to experiment with what they have learned about. Muna commented that what she experienced above was the richest experience ever in her career as far as training was concerned because it was more practical than theoretical. Hence, Muna reported that she “*immediately implemented*” what she learned about. In addition, a practical course which Muna reported to have attended and in which most of the work was hands-on caused Muna to change her mind about some of the technological applications she previously used in her classes. She benefited a lot from that training because it was based on pedagogical and practical theories.

The sharing of experiences among teachers was another major area of interest for Arwa, Rashid and Tasneem. They all valued the importance of sharing successful and unsuccessful uses of technology with other language teachers. Arwa admired the idea of sharing feedback about the evaluation of tools application among other teachers whom she considered as a community of practice. Rashid and Arwa both share the perspective about the importance of sharing experiences with others. He reported that *“there are some things that you need to share with others and evaluate, reflect on it by yourself”* (RFI). His main aim of attending professional development training on technology integration was to learn new things about technology shared by other teachers. Similarly, Tasneem affirmed that she was more interested and motivated when the training included examples of teachers sharing their experiences with each other.

Nonetheless, special interest groups were seen as a significant source of training to Muna who found them very useful. This type of networking professional development afforded Muna the opportunity to interact with other teachers who shared the same interests. The use of special interest groups also served as a source of continuous professional development with expert personnel. Arwa, also, realized the significance of online training.

“I have discovered that online courses are really helpful. You meet thousands of teachers from different parts of the world and those people come with different experiences. They share the same interests as you so you feel like you learn from them. And it’s really very interesting and when I go to class, I have tried to implement many of these ideas” (AFI).

One of the teachers stated that she joined online courses in addition to the training offered by the Centre for Preparatory Studies. This was a self-motivated initiative.

Arwa: Whenever they run courses or workshops, but I’m taking online courses, mostly online courses.

Mahmood: Are they part of the Language Centre?

Arwa: No, they’re not.

Mahmood: So it’s a different initiative, yeah?

Arwa: Yeah. They are offered by different institutes (AFI).

Therefore, teacher professional development programmes in technology integration should emphasize application and pedagogy where the focus is more on instructional practices and not on use only. Also, practical training can be more influential in motivating teachers to use technology. When training is well-planned, practical and up-to-date, teachers are more likely to integrate technology in ways that may lead to transformational changes to their cognitions and instructional practices. It is also obvious that the provision of training in technology integration leads to more positive impressions vis-à-vis technology use.

5.4.2 Technical support

Two of the teachers, Arwa and Muna, believed that technical support was essential. For example, Arwa reported that she felt frustrated when she had limited accessibility to resources that she needed as a teacher. For example, she thought that having an interactive whiteboard would help her make classes more interactive and make full advantage of the new interactive books. During post-observation interviews, Arwa complained that she had to change her plans because of the slow internet connection.

Muna, too, recurrently made mention of technology availability as an important issue that demotivated her to integrate more technology in her classes. This issue was evident in most of her interviews. In fact, when asked about the factors that she thought affected her use of technology, Muna replied, *“the number one factor is the quality of internet service provided at SU”* (MFI). For example, she was unable to book the computer laboratory because of the long procedures she had to go through in order to book it. She also failed to access the internet during the observations (and in other unobserved lessons as she reported to me) which may have affected her plans as well. It was noteworthy that both teachers, Arwa and Muna, integrated technology extensively in their classes as seen during the observations and as they reported during interviews. This might indicate that they were actually looking forward to using more technology in their classes but were frustrated when faced with some technical issues.

Furthermore, as for the internet connection (slowness or unavailability), I noticed that this was an issue with almost all the participants who mentioned

it in one way or another, even though they did not talk about it as a factor directly. Apart from the internet connection, there seemed to be an agreement that the classrooms that were used for teaching the Centre for Preparatory Studies courses were well equipped with technology; computers, LCD projectors, and speakers. The computer laboratories provided interactive whiteboards in addition to the other equipment.

5.4.3 Institutional environment

Three main factors emerged from the analysis of the final interviews of participants, which related to the institutional environment. Those factors were colleagues' pressure, students' pressure, and institutional policy. The following is a demonstration of these factors according to participants' perceptions, as per their data.

5.4.3.1 Colleagues' pressure

A major and effective factor that all participants, Arwa, Muna, Rashid, Tasneem and Basma, reported as influencing them to integrate technology more frequently was colleagues or peer pressure. Rashid, who enthusiastically narrated a story of how his office mate persuaded him to change his way of teaching from using the whiteboard into incorporating Microsoft Word to save time, believed that some of his colleagues can actually motivate him to use technology. Arwa also thought that her colleagues, particularly those who are knowledgeable about technology use, can be encouraging for her to use more technology. *"They encourage me and I try to use more and different tools"* (AFI). However, she explained that such an atmosphere is not meant to be competitive but supportive and collaborative.

"But when you have this atmosphere, it's really helpful and healthy. It's not competition, as I said before. It is taking and giving at the same time and it's very interesting" (AFI).

The influence of the supportive atmosphere where colleagues play a key role in motivating teachers to use technology has also been mentioned by Tasneem. She, too, positively viewed her peers' influence on her through collaborating and supporting each other. On the other hand, the influence of

colleagues was the other way round with Muna who realized the significance of her colleagues' influence and the support they could provide to their peers. However, she played this role herself through providing her colleagues with help and advice about how to use technology in teaching.

“Most of my colleagues, close colleagues I would say, do not really use technology. It's the other way around. It's actually me giving them advice or giving them ideas” (MFI).

“And other teachers who know me, even those non Omanis and even much older than me. Whenever they see me and they know my interest and they know what I do with technology, I can see the appreciation and the respect for this. And I have now a co-teacher who told me to sit in front of the students, that Miss Muna is an expert in technology and whatever problem you have in technology, just ask her” (MII).

Muna's story indicates that she was viewed by other teachers as an expert in technology use and that she enjoyed playing the role of supporting her colleagues. She could see the appreciation and respect in their eyes that they considered her as a model teacher and was praised for that in front of other students. This made Muna more committed to using technology in her teaching and to supporting others as well.

5.4.3.2 Students' pressure

Three of the participants were motivated to use more technology in their teaching as a result of their learners' attitudes. For example, Muna, Arwa and Tasneem all agreed that students' reaction to technology integration encouraged them to continue using it. Arwa clearly articulated her thoughts about students' attitudes when she said: “Their reaction I think is a very important factor in helping me with whether to continue with this or not” (AFI). Therefore, it was usual practice for Arwa to ask for feedback from her students about the different technological tools that she used in her classes and whether or not they liked them.

Nevertheless, one participant, Basma, went through a difficult experience with her students when they criticized her for not using technology in her classes “they even criticize us if technology is not used” (BFI). One of her

students accused her of being “an old style teacher who does not use technology” (BII). Basma found this upsetting and tried to justify that it was a writing activity and due to the nature of the activity, she did not use technology. However, as seen above, Basma’s use of technology in her classes is still very limited.

5.4.3.3 Institutional Policy

All participants agreed that in the institution they worked within, it was an expected practice to use technology but not compulsory. Below are some example quotations of participants’ perceptions of the Centre for Preparatory Studies policy with concerning technology use. Similar quotations were found across all cases.

“We’re always encouraged to use technology” (AFI).

“Unfortunately we do not have a very clear policy here that forces us to use technology. Here it’s optional” (MII).

“And then of course there is the part about the institute itself or the overall organisation because SQU in general, they are interested in of course the use of technology ... The Language Centre itself in its policy, there is the expectation that yes, you would use technology” (TFI).

Participants, as is clear from the data above, attempted to translate this expectation into their instructional practices and Muna, for instance, regretted the fact that it was not compulsory to integrate technology. Muna thought that using technology should be enforced by the institutional policy to push teachers to use it in their classes. She was looking for some feedback from the part of the institution to evaluate her technology use and provide advice. When asked about the sort of feedback that Muna was looking for about her use of technology, she replied:

Mahmood: What sort of feedback you are looking for?

Muna: Even from the organization, from peers here...”
(MPOI1).

Arwa, also, expressed her need of some evaluation from the Centre for Preparatory Studies to be able to continue her use of technology and to

confirm if she was on the right path or not. A critical element, from Muna and Arwa's point of views, to the successful integration of technology falls upon the provision of timely and constructive evaluation of their usage and of the real impact of technology on them as teachers and on their students.

"I can see a good impact on me, on my students, on my colleagues so it's really a good thing and I'm happy that I'm on this path. But also I feel I need some feedback from my superiors at the LC" (AFI).

Therefore, in addition to the colleagues' pressure and students' pressure, two important elements should exist in the institution environment if technology is to be professionally integrated by teachers; a clear policy that motivates and encourages teachers to use technology and an evaluation where constructive feedback about their use of technology is provided to them.

5.4.4 Socio-cultural factors

One of the participants cited culture as a main factor when planning to use technology particularly when both male and female students are concerned. Rashid emphasized the importance of avoiding the use of technology in such a way that helps both male and female students to mix, even when this happens online via social media applications such as WhatsApp.

"You are a teacher. You need to think about cultural backgrounds of the students. You cannot just come and jump and teach those students.

Like some teachers are sharing their WhatsApp account with their students. As I told you, I have not done a study but I feel especially when we have different genders in the classroom that would create a problem. If that teacher does not separate the two groups like for males, for females, it will be a problem" (RFI).

Rashid explained that in some cases, he faced challenges using technology when his classes encompassed both male and female students. The reason being that female students did not accept some of the uses of technology if it meant to mix with other male students. Therefore, Rashid was aware that even when he asked his male students to record themselves, it was not possible to do the same with other female students.

Rashid: “You cannot feel comfortable with all ways, with all students because you have sometimes the two genders. You do not feel comfortable using this technology with all. For example, I may record my male students giving a speech.

Mahmood: But not female?

Rashid: “Under social or cultural aspects, maybe I would not be able to use this for my female students. See? The context will be a factor here” (RFI).

That is why, Rashid opted to use the Blackberry Messaging application (BBM) instead of WhatsApp, simply because, unlike WhatsApp, BBM does not support number recognition of the sender. He did this to protect the privacy of his female students to comply with the cultural and social norms. However, the observations conducted to observe Rashid’s classes were all executed in male students’ classes. There were no female students in the observed classes perhaps because no females were registered on the levels Rashid taught.

All the other participants, Arwa, Muna, Tasneem and Basma, had students from both genders, male and female. Nonetheless, they did not mention any social or cultural aspect in their interviews.

5.4.5 Personal factors

Personal factors, such as having a positive self-image and a personal interest on technology, were found to be influential with two participants, Arwa and Tasneem. For example, Arwa was always motivated to use technology because it was a firm belief of hers.

“Using technology in my EFL classes is one of the firm beliefs that constitutes a big portion of my teaching philosophy and which has influenced my teaching practices” (AAA).

Her personal interest in technology guided her since she was a student at school. It has also become the number one factor which motivates her to use technology in her class as she stated in the final interview. *“First my own belief about the potential of using technology in the classroom”* (AFI).

Tasneem, on the other hand, considered appearing as a modern teacher to be one important factor to use technology in her teaching.

“For me as a teacher to just to rely on the board only would be a big mistake. It would basically just show that I have not developed and I have not really grown over the years. And so these days, I do use the computer” (TII).

She wanted to prove to others that she has developed as a teacher through using technology in her teaching. She also emphasized the role of teachers’ beliefs in technology integration when she said: *“there are factors the teacher and his own belief or her own belief about the importance of technology for today’s generation”* (TFI).

5.5 Summary

The cross-case findings chapter has aimed at presenting the themes that emerged across all the five cases; Arwa, Muna, Rashid, Tasneem and Basma. The most common commonalities and differences among the cases were discussed. A major theme emerging from the cross-case analysis was the influence of early experiences with technology on participants’ cognitions and instructional practices. This was obvious in Arwa, Tasneem and Muna’s cases where indications of influences of previous informal learning experiences concerning technology use were documented in their data; both interviews and classroom observations. They all exhibited occurrences when they used technology in such a way that matched what they experienced as independent learners either when they were at school or university. They clearly justified those examples with their previous personal experiences and talked about those experiences positively when they cited them. As for Basma and Rashid, the data did not seem to reveal any evidence of their previous learning experiences. Another major theme that emerged from the cross-case findings was the influence of technology use on current teachers’ cognitions and practices. Based on their perceptions and on the observations, participants were grouped into three categories. The first category represents two participants who demonstrated transformational influences of technology use on their instructional practices as reported by them and seen during the classroom observations. These two teachers used technology to promote independent learning, collaborative learning and

authentic learning. They also perceived a change in their classroom management styles and their roles as teachers. The second category embodies two other participants who experienced less influence of technology use in their cognition and instructional practices. The third includes one participant who, according to her data, did not experience any form of technology influence on her teacher cognition. The current chapter also discussed the factors that all cases perceived as impacting their decision to integrate technology into their teaching and which were themed into main categories namely professional development, technical support, institutional environment, socio-cultural factors and personal factors.

6 Chapter six: Discussion

6.1 Introduction

In the following chapter I discuss the findings presented in the individual cases (see Chapter four: Individual case findings) and cross-case chapters (see Chapter five: Cross-case findings) in light of the research questions and the framework suggested by Borg (2006) which guided this study. The main aim of this chapter is to extend our understanding of the relationship between teacher cognition and technology integration, the influence of frequent technology integration on teachers' cognitions and instructional practices and the factors that mediate this relationship. The main issues that have emerged from the findings presented in the previous chapters are discussed here in relation to the pertinent literature. The chapter is organized in terms of the research questions that guided this study. Under each research question, I have provided key findings and I related them to the literature reviewed in chapter two (see Chapter two: Literature Review).

The following chapter will summarize the answers to the following research questions:

- 1- What is the relationship between five Omani teachers' cognitions and technology use?
- 2- How do early experiences with technology as learners influence five Omani teachers' perceptions in terms of their cognitions and instructional practices?
- 3- How does frequent technology integration influence five Omani teachers' perceptions in terms of their cognitions and instructional practices about teaching?
- 4- What factors mediate the relationship between technology integration and teachers' cognition and instructional practices?

6.2 Research question one: What is the relationship between five Omani teachers' cognitions and technology use?

The findings suggest that teachers' beliefs about technology integration influenced their decisions to use technology. For example, based on the data collected from the autobiographical accounts, initial interviews, classroom observations, post-observation interviews and the final interviews, the five teachers who participated in this study appeared to have positive beliefs about technology integration. For example, all of the five teachers realized the potential of using technology in improving the teaching and learning of English Language. Tasneem thought it was difficult to imagine teaching without the use of technology which gives an indication that they were strongly supportive of technology integration (TII). The data also reveal that one teacher was so motivated about using technology that they volunteered to help other colleagues. This was clear in Muna's case who made it her mission to provide technological training to teachers who needed it as she stated in her autobiographical account (see Section 5.2). In addition, Arwa, Muna and Tasneem believed that technology could facilitate learning and teaching, help to create authentic materials, promote independent learning, make learning more individualized along with other claims they made (see Section 5.3.1). The teachers' convictions about technology use were sometimes translated into action during classroom observations as we have seen with Arwa and Muna who both expressed strongly positive beliefs about technology use and were frequent users of it. For instance, Arwa and Muna both assumed that technology would help them create a collaborative learning atmosphere, use authentic materials and promote independent learning. Their instructional practices in the classroom matched their stated assumptions. That is, their reported beliefs about technology aligned with their actual actions in the classroom which demonstrate the influence of beliefs on their practices. This finding suggests that teachers' beliefs influenced their practices when using technology in their teaching. These results are in line with many studies that have investigated the influence of teachers' beliefs on teaching practices (Kagan, 1992b; Pajares, 1992; Ng et al., 2010; Song and Looi, 2012; Meirink et al., 2009). As we have seen in the literature chapter (see Section 2.13), it has been argued that teachers' beliefs shape and influence their practices (Song and Looi, 2012), for example, teachers who hold teacher-centred beliefs

tend to use traditional teaching while those who have student-centred beliefs use more activities that cater for independent learning (Meirink et al., 2009). Also, according to Pajares (1992), teachers' beliefs affect their behaviours. This is also in line with Shelton's study findings (Shelton, 2014a) indicating that teachers use of technology in the classroom was highly influenced by their own beliefs. Teachers sometimes use technology in a way that aligns with their beliefs (Shelton, 2014a), which demonstrates the influence of beliefs on their decisions to use technology. This finding is also in line with Ferguson's (2004) conclusion that teachers' teaching beliefs play a major role in determining how technology will be integrated into their teaching.

However, while Muna and Arwa viewed the use of all types of technology as a passion, there was one case, Rashid, who previously held negative beliefs about using smart devices, such as mobile phones, inside the classroom (see Section 4.4.5.1). However, he later changed this belief and became an advocate for using smart devices after utilizing them in his classes (RAA). His attempts to employ smart devices made him realize their potential advantage, as he stated. These findings also suggest that while teachers' beliefs shape and influence their instructional practices about technology use, their integration of technology has an effective influence on their cognitions as well. Another example occurred with Arwa who clearly said that her "belief has strengthened over the years because of [her] exposure to various electronic devices" (AAA). Arwa's exposure to technology contributed to reinforcing and enhancing her beliefs, apparently towards more use of technology. This indicates that the relationship between cognitions and practices is bilateral. Such findings are supported by the results of a previous study by Kim et al. who investigated the relationship between teachers' pedagogical beliefs and instructional practices in relation to technology integration (Kim et al., 2013a). The study suggests that there was a strong relationship between teachers' pedagogical beliefs and technology integration practices. However, this two-sided relationship can have a positive or a negative effect (Hammond and Gamlo, 2015). For example, Basma who appeared to be content with her ways of teaching, and was comfortable with the traditional way of delivering her lessons, did not see a real need to change her ways. Therefore, her use of technology was less and, hence, there was no influence caused by technology as observed in her classes (further detail to follow in the next question). This

demonstrates that her strong pedagogical beliefs characterized by a traditional teacher-centred approach had a negative influence on her technology integration attitude. This is consistent with findings from literature as some studies demonstrated that teachers are less likely to implement technology and change their traditional practices which, from their point of view, worked adequately, as they see no clear need to change (Tondeur et al., 2016; Ward and Parr, 2010; Donnelly et al., 2011).

6.2.1 Fundamental beliefs about the benefits of technology

The findings of the current study show that when the teachers have expressed their beliefs about technology use, they cited various reasons and justifications. Their beliefs about technology use, despite being mostly positive, varied in terms of its potential value to each of them. For example, Arwa talked about her beliefs that technology use helped her improve her teaching style (AAA). She thought that using technology enhanced her teaching practices. Muna, on the other hand, thought technology afforded her opportunities to gain wider knowledge of the subject-matter (MAA) as a teacher. Rashid and Basma explained that they used technology to meet students' expectations and needs of learning (RAA, BII). Several researchers have contended that an important predictor of technology use by teachers is their belief about the value of technology to meet their instructional and learning outcomes (Ottenbreit-Leftwich et al., 2010; Russell et al., 2003b; Wozney et al., 2006). Kim et al. (2013a) argue that in order to better understand teachers' beliefs about technology use, their *fundamental* beliefs should be studied. In other words, teachers' fundamental beliefs about what is important in student learning and thus teaching in relation to technology use are important since teachers have different conceptions. Kim et al. (2013b) identified two types of teacher fundamental beliefs about technology integration; teacher beliefs about the nature of knowledge and teacher beliefs about effective ways of teaching. Both beliefs were evident in some of the cases in this study (as discussed in Section 6.4). However, the findings may add another fundamental belief that is key to technology integration, beliefs about how best students learn through technology (see Section 6.4.3 below). As we have seen in previous chapters, Rashid's decision to use smart devices in his classroom was partly due to his own implementation which made him realize its potential to facilitate learning for

his students. When teachers believe that technology will improve learning outcomes, they are more likely to use it in their classes (Ertmer, 1999).

6.2.2 Mismatch between reported and enacted beliefs about technology use

As we have seen in the cross-case findings chapter, two of the teachers, Arwa and Muna, who took part in the study demonstrated a strong consistency between their stated beliefs about technology use and their instructional actions inside the classroom while other two teachers showed less consistency between beliefs and practices. Nevertheless, there was one teacher, Basma, whose beliefs did not match her instructional practices, as the data in the interviews and the observations suggest. Although Basma stated that she believed technology could support differentiated learning (see Section 4.2.5.1), and that it requires teachers to think differently, she rarely used it in her classes. Even when that happened, she used it to support her teacher-centred practice where technology did not appear to play a major role in the teaching and learning process. Basma's role, as discussed in the previous chapter (see Section 5.3.3), was mainly that of a knowledge transmitter. Basma's actions inside the classroom in relation to technology seemed to contradict her articulated pedagogical beliefs about technology use. This finding is consistent with the literature relating to the relationship between beliefs and practices. For example, many recent studies stated that although teachers hold positive attitudes about technology integration, they do not necessarily use it frequently or purposefully in their teaching practices (de Aldama and Pozo, 2016; Peled et al., 2015; Blau et al., 2016).

Various reasons could lead to such inconsistencies between stated and enacted beliefs in relation to technology as the findings of this study suggest. For instance, in Basma's case, she tended to distrust technology and was inclined to use only technologies that she was confident about, such as using the computer and speakers to play for listening activities. She was not completely confident about how other technological tools could serve her or how to purposefully implement them. This finding reiterates the findings of Ertmer (1999) which have been discussed in the literature (see Section 2.17). Ertmer (1999) considers a distrust of technology as a second order barrier to technology integration. This lack of confidence in the value of, or way of implementing, technology can be seen as a reason for the

discrepancy between Basma's beliefs and practices. It has been debated in the literature that even when teachers viewed technology positively, they might not realize how to implement it in practice (Fullan, 2013).

Furthermore, as discussed above in the findings chapter (see Section 5.3.3), Basma was probably satisfied with her own teaching methods and might not have felt any need to change her ways. Actually, Basma stated that she used technology only when she felt the need to, otherwise she might have taught her lessons without it. The use of technology usually requires exerting more time and effort and may lead to changing the classroom code of practice that teachers have established along the years (Jääskelä et al., 2017). Jääskelä et al. (2017) stated that "contended traditionalists do not typically recognize the need to change the prevailing education culture and feel extrinsically pressured to use ICT in their teaching" (Jääskelä et al., 2017, p. 199-200). Some studies which looked at this phenomenon attempted to offer an explanation. For example, some researchers argued that teachers tend to stick to their traditional ways of teaching because they consider themselves to be in the comfort zone (Hara et al., 2000; Maor, 2004). Hara et al. ascertain that in order for teachers to be able to integrate technology purposefully, they need to push the boundaries of their comfort zone. Guskey, too, stated that learning to be efficient at something new requires time and effort and such change can bring an "amount of anxiety and can be very threatening" (Guskey, 2002, p. 386).

In addition, discourse surrounding technology use and the promises it is usually associated with, has been an interesting finding in this study. Teachers felt that they were expected to use technology in their teaching and to show an awareness of the most discoursed potential of technology, promoting constructivist learner-centred approach of teaching and learning, in order for others to view them as technology-aware. This assumption was found in some of the interviews when teachers talked about their beliefs and practices (see Section 5.2). For instance, Tasneem spoke a great deal about technology's potential to shift responsibility of learning from teachers to students. Moreover, Tasneem talked about how, as a teacher, she was expected to use technology because everybody else was. Nonetheless, when it came to real practice, teachers greatly differed as we have seen in the cross-case findings chapter (see Table 9 and Section 5.3.2) which indicated that teachers might have been affected by the discourse surrounding technology use in their context. Although this discourse can

have “a powerful influence in determining teachers’ reactions to and use of new technologies”, the influence could be positive or negative (McDonagh and McGarr, 2015, p. 57). On the one hand, the discourse can lead to positive results. For example, Arwa said that she was highly encouraged to use more technology when she mixed with her colleagues and when they spoke about how they used technology in their own classes. Another example is manifested by Muna who was under the impression that the whole world is heading towards the use of mobile learning. “Now the world is going towards mobile learning so why would I just walk in the opposite direction?” (MII, 303-305). Therefore, she made her choice to go with the wind, not against it. On the other hand, when Rashid talked about the disadvantages of smart devices, he linked it to what everyone said about their drawbacks in addition to his unawareness of their potentials. For some time, this affected his decision to use the smart devices in his class, until he was finally convinced otherwise. McDonagh and McGarr (2015) stated that teachers resist technology use, and hence its influence, if the prevailing discourse about it is extremely negative.

6.2.3 Pedagogical beliefs and technology

Teachers’ pedagogical beliefs and technology beliefs should be compatible with each other, each influencing the other. When teachers think of technology as just a tool that adds excitement to teaching or as another means of lesson delivery without reflecting on the pedagogical aspect of it, teachers are less likely to be influenced by technology or even use it. In this case, pedagogy and technology work separately and do not support each other. This results in teachers becoming reluctant about technology integration because they are unable to see the value of technology, even if their attitudes towards it are positive. Rashid, for instance, thought that smart devices were a waste of time and effort and tended to prohibit them in his classes until after he started using them himself, and changed his mind. When Rashid realized the pedagogical value of smart devices as a technology, for instance, facilitating learning and teaching (see Section 4.4.5.1), he allowed his students to use them in class. Maor suggests that the gap between pedagogical beliefs and technology use can be abridged through continuous opportunities through face-to-face dialogue between teachers, reflection and deliberation (Maor, 2004). This is consistent with the findings of Maor and Zariski (2003) who argue that it is

essential for teachers to create a relationship between their pedagogy and technology integration if technology is to lead to quality teaching and learning.

6.2.4 Social shaping of technology

Technology can socially shape teachers' practices in the classrooms through the frequent use. In other words, technology and the social setting within which teachers use it influence each other. This helps to view technology as more than just a technological tool, but rather as a cultural, organisational and social issue (Al Lily, 2013). An example of this was the use of WhatsApp as a tool for teaching and learning purposes despite the fact that it was not created for this purpose. For example, Rashid used WhatsApp for co-planning with his students. Rashid's use of WhatsApp changed the way he and his students viewed WhatsApp as a tool from that of a chatting application into a platform for co-planning. Tasneem also used WhatsApp for receiving students' attempts for a writing task. The drive of this social shaping could be a "need" rather than an external factor. Donald and Wajcman state that "often what is more immediately relevant are 'local' considerations" when social shaping takes place (Donald and Wajcman, 1986, p. 32). In such a case, the social shaping of technologies we use "change our perceptions of them and our use of them does allow change or development to occur" (Motteram, 2013, p. 180). This finding is also in line with what Dutton (2013) concluded that people and other related social factors such as their beliefs and attitudes contribute largely in shaping the adoption of technology and its uses and implementation.

6.2.5 Summary

Finally, drawing on the teacher cognition framework suggested by Borg (2006), and which informed the current study (see Figure 1), the finding that indicates the bilateral nature of the relationship between cognition and technology use is consistent with literature. Borg asserted that teachers' cognition shape, and is shaped by, what happens in the classroom (in this case technology use). Tondeur et al. (2016) concluded that the relationship between teacher cognitions and technology use is bidirectional. They claimed that experiences with technology can alter teachers' beliefs towards a learner-centred approach, while teachers' beliefs can also influence the way they implement technology in their classes. Teo and Zhou found that,

along with other factors, teachers' beliefs had a significant influence on their decisions to use technology. Teachers who hold constructivist beliefs about teaching and learning are more likely to use technology in their practices than those with traditional beliefs (Teo and Zhou, 2017). This is also supported by the recent study of Scott which revealed that beliefs and technology use influence each other and that there is an interaction between beliefs and practices which makes the relationship far from being one-directional (Scott, 2016).

The following diagram (Figure 5) suggests a refined framework of studying teacher cognition in relation to technology use based on the findings of this study. The figure portrays the bidirectional relationship between teacher cognition about technology and their technology use inside the classroom, as seen by the participating teachers in the current study. The diagram emphasizes teacher cognition *about* technology compared with Borg's (2006) and Attia's (2011) frameworks which embody teacher cognition about language teaching in general.

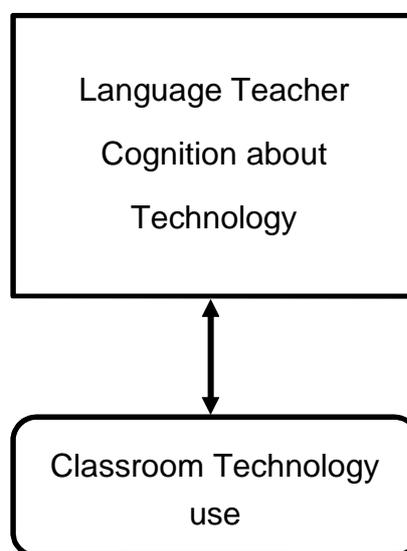


Figure 5 The relationship between teacher cognitions and technology use based on Borg's framework (Borg, 2006, p. 333)

6.3 Research question two: How do early experiences with technology as learners influence five Omani teachers' perceptions in terms of their cognitions and instructional practices?

The one most evident feature emerging from the analysis of the data is that teachers who participated in this study varied in terms of their early experiences with technology, as they stated in their autobiographical accounts and during the initial interviews (see Section 5.1). While two of the participants, Arwa and Muna, had adequately good experience with technology during their school days, three participants did not have access to any computer until they started university. Moreover, whereas Arwa used technology to communicate with people from outside their context using social forums, Muna had the chance to use technology as school learners outside their home country of Oman. However, the data indicated that only two teachers had contact with technology during their school days as learners, Arwa and Muna, while the other three teachers had their first contact with technology during their undergraduate courses. Tasneem, Rashid and Basma had no, or extremely limited, exposure to technology until they commenced their undergraduate studies. The findings presented in the previous two chapters suggest that there were occasions when teachers' decisions, and practices, to use technology demonstrated an influence of their early experiences with technology during school days or undergraduate study as learners (see Section 5.1). The findings indicate that teachers' memories of the way they learned while using technology constituted an important reference of knowledge of how to integrate technology. However, not all early experiences were recalled. The findings show that three teachers used technology in ways that echoed their previous experiences that represented how best they learned. For example, Tasneem reused recording activities with her students, Arwa employed communication tasks, and Muna utilized collaborative learning, all of which echoed their *best* early experiences in learning *thorough* technology. This finding is supported by literature. For example, early experiences as learners were found to be among the factors influencing teachers' beliefs and practices in addition to teachers' experiences as instructors and researchers (Oleson and Hora, 2014). The influence of early experiences on teacher cognition and instructional practices has been stated in many studies and research (Cox, 2014a; Ertmer and Ottenbreit-Leftwich, 2010; Thompson et al., 2002).

Moreover, participants in a study by Irwin (2016) implemented teaching strategies based on early informal learning methods that proved to be effective to them. The study concludes that three teachers who participated in the study, Muna, Arwa and Tasneem, utilized early learning experiences to develop approaches that were relevant and authentic to their students. Therefore, three main issues emerged from the analysis of the current findings with regards to the influence of early experiences with technology on teachers' cognitions and instructional practices; teachers teach the way that they learned, social experiences with technology and early experiences in teacher education and professional coursework. These three issues are discussed below.

6.3.1 Teachers teach the way they learned

The findings from the current study indicate that early informal learning experiences influence teachers' technology cognition and practices. Three teachers were found to use technology in their teaching that aligns with ways in which they previously learned *through* technology use, as they stated. This contrasts with what the literature states that teachers are largely influenced by their experiences with formal learning in teacher education programmes (Bramald et al., 1995; Cabaroglu and Roberts, 2000). For instance, Barbezat and Bush (2013) argued that teachers' beliefs were transformed during teacher education programs. In this study, teachers who perceived the influence of early learning associated it with their own informal learning experiences. Less influence was given to teacher education programmes when the participating teachers talked about their decisions to use technology. The relatively weak influence of education programs was also revealed by a study conducted by Flores and Day (2006) who argued that personal histories have a stronger effect than literature suggests. Moreover, the past learning experiences were found to impact future teaching practices according to Blackley and Walker (2017). This finding is in agreement with Swanson (2016) who stated that the impact of technology integration on teacher cognition and practices is strongly linked with their own personal approaches and pedagogical beliefs about teaching and learning.

Tasneem, also, used technology independently to improve her English Language during her undergraduate study. She used to record herself and then listen to her recordings to develop her pronunciation and evaluate

herself. Because this experience was successful for her (TPO11), she was inclined to use the same technique with her students citing the same reason; improving pronunciation. She associated her choice of a recording activity during the first classroom observation with her early successful experience “*I mean that’s something actually I did as a student*” (TPO11). It is clear that this informal learning experience had an effect on Tasneem’s decision on the type of technology to use and the aim underpinning it. This is similar to the findings of Shelton’s study (2014a, p. 899), who found that changes to practices with technology were influenced by teachers’ formal and informal learning experiences. The results of this study also align with the findings of the study conducted by McGlynn-Stewart (2016) which looked at the role of teachers’ previous experiences during preservice programs and how their early experiences intersected with their current teaching experiences. Teachers in the study were motivated to help students in the same ways that proved successful to them during their teacher education programs. Thompson et al. (2002) also argued that teachers teach the way that they learned.

It can be concluded that three of the teachers who participated in this study tended to teach, using technology, in ways that were more relevant to how they learned than to how they were taught. This is consistent with Cox’s finding. Cox (2014b) conducted a study to determine empirically if teachers teach the way they were taught or not. Forty four instructors were observed, surveyed and interviewed at seven colleges and universities. One of the most important findings of the study was that teachers do not teach the way they were taught. Instead, teachers teach the way they preferred to be taught. In other words, teachers tend to teach in ways that proved successful in their own learning, not necessarily following the ways their teachers used when they taught them. Thompson et al. (2002) too argue that teachers teach according to the way they learn.

6.3.2 Social experiences with technology

The findings also show that teachers’ early personal social experiences with technology affect their beliefs about technology. Some of the social experiences that were characterized by the use of technology had an imprint on teachers’ actions in the classroom. For example, the findings reveal that both Arwa and Muna were influenced by their early social experiences with technology during their school days. For example, both teachers used

technology to communicate with other students when they were still at school. They used social forums to contact others either for socialization purposes or for gaining more experience and knowledge (see Section 4.1.2.3 and Section 4.3.2.2). Interestingly, Arwa and Muna, this time as teachers, both used tasks when teaching English Language which involved the sharing of experiences and communicating with others and, when asked to justify, Muna said that she had already used discussion forums previously as a learner (see Section 5.3.1). Muna also provided the justification that she used discussion forums and email groups when she was at university. This finding matches the findings of Shelton (2014a). Shelton's study revealed that some participants had had positive technological experiences as learners which inspired their teaching. In fact, some of the participants in Shelton's study related their use of technology in their teaching to the social environment that they lived in when they previously used technology as learners. The social environment was also cited as a key factor in influencing teachers' cognitions about technology in a study to investigate the influence of previous experiences with technology on teacher cognition (Attia, 2011). Attia (2011) found that even in the absence of technology during teacher education programmes, the early participation in social networks outside the school context influenced teachers' cognitions about how to use technology. The effect of early social learning experiences on teachers' technological practices was also found to be strong in a study that was carried out to explore teacher educators' practices in relation to technology (Adam, 2017). Adam, who proposes a framework where the teachers' culture is emphasized as a key influential factor on their technological and pedagogical practices, puts strong emphasis on the early learning experiences as part of the teachers' own social culture. Klauswitz (2005) also argues that teachers are influenced by their early life experiences such as jobs, coaching, and community and that these experiences, in addition to others, serve as a lens through which decisions about teaching are filtered and analysed.

6.3.3 Technological experiences in teacher education programs and professional coursework

Another finding that arose from the analysis of the data was the influence of teachers' experiences with technology during their higher education professional courses. This influence was sometimes reflected in the

classroom instructional practices directly, while in other occasions the change occurred after a process of experimentation and reflection. For example, we have seen Arwa talk about her journey during the masters' course when she had the opportunity to reflect on various types of technology applications that she was exposed to. She reported that she learned so much while experimenting with the different technologies. Arwa talked about a turning point where she shifted to using technology more frequently than she did before the course. Three key factors contributed to the influence of the program on her cognitions; her own personal interest, related training, and experimenting with technology. Arwa also recalled her online contributions and collaborations with other students through the use of MOOCs "I have also participated in many MOOCs, online conferences and webinars which have exposed me to various educational tools that I can use with my students" (AAA, 44-47). Another example occurred with Muna, who recalled that the most influential aspect of her master degree course was to learn how to integrate technology in teaching through "learning by doing" hands-on approach. The success of this experience made her change her views about how to integrate technology in her teaching. She started to implement what she learned immediately upon returning to teaching, as she stated "The program introduced me to Web 0.2 tools which I then used with my students at SQU" (MAA, 35). Arwa's tendency to change her instructional practices immediately after she came from the course suggests that she was eager to apply what she had learned. In her autobiographical account she articulated that she used several applications and tools after completing her masters. This was eye-opening to her in that it made her change some of her ideas about teaching with technology. These examples all demonstrate that teachers were influenced by their professional coursework during their higher education courses. These findings are not surprising because literature suggests that teachers are impacted by their teacher education programs and other professional coursework that they are involved in. For example, Lux and Lux (2015) discovered that preservice teachers developed a new understanding about how to use technology effectively, which was based on their previous involvement in a Technology Club. Rana (2016), also, indicated recently that teachers' attitudes towards using technology in their teaching were largely influenced by their prior computer experience (Rana, 2016).

With a closer look at Arwa and Muna's experiences with technology during their masters' courses, it becomes evident that there are key factors that contributed to making their experience with technology more influential. As discussed above, these factors can facilitate the influence of professional coursework on teachers' cognitions about the use of technology. These factors are: hands-on activities where learning by doing is emphasized, close links to teachers' classroom environments, collaboration and contribution and reflection on own practices (Discussed further in Section 6.5.1). These findings support previous pertinent literature related to teachers' beliefs about technology use. Similar factors were found to enhance teachers' overall benefit from the masters and professional courses such as incorporating hands-on activities (Ottenbreit-Leftwich et al., 2012), link to classrooms (Polly et al., 2010), collaboration with others (Williams et al., 2009), and reflection (Polly et al., 2010). Generally speaking, this supports Kimmons et al.'s (2015) conclusion that the careful selection, and delivery, of technologies for teacher courses can promote transformative classroom use of technology (Kimmons et al., 2015).

However, the interesting finding that emerged from the analysis of the data is that master courses seem to have a stronger impact on teachers' cognition and instructional practices in relation to technology than undergraduate teacher education programs, particularly when they involve hands-on training, link to classroom environment, collaboration with others and self-reflection. One possible explanation of this finding is the limited exposure to technology during the undergraduate teacher preparation programs. For example, Tasneem and Basma stated that technology was not employed extensively during their undergraduate studies, perhaps because technology availability was still limited when they were at university. Rashid, too, indicated that there were limited computer labs and that they had to wait in queues to get access to a computer.

In addition, although the other three cases hold masters degrees, they do not seem to have been influenced by their experiences with technology during the master courses compared with Muna and Arwa. One possible explanation for this is that Arwa and Muna both studied master's courses that involved a great deal of technology use. However, technology was not only used as a delivery medium but also for learning how to use technology purposefully in their teaching. Authentic and hands-on activities were utilized throughout their courses, with opportunities to experiment and reflect which

may have maximized their overall gain from the courses as discussed above. However, Tasneem and Rashid completed their masters' courses in TESOL, Teaching English to Speakers of Other Languages, while Basma did it on ESP, English for Specific Purposes. Perhaps this is an indication that the TESOL and ESP courses they joined lacked sufficient integration of technology. The focus of these courses might have been on the theoretical and practical methods of teaching English Language with less focus on technology use or technology implementation in teaching. On the contrary, Arwa's masters' course was about Learning Science and Technology and Muna's course was about Curriculum studies and blended learning. Obviously, both courses, as Arwa and Muna explained, involved a great deal of technology use. Technical skills, with attention on technology integration approaches, and teaching strategies are equally important, especially nowadays where technology plays a major role in teaching and learning in order to ensure successful technology integration by teachers. This is consistent with literature which suggests that all courses which target teachers should put adequate focus on educational technology courses (Strudler and Grove, 2002; Conde et al., 2014; Venkatesh et al., 2014). In addition, Ertmer and Ottenbreit-Leftwich (2010), stated that teachers' understanding of what constitutes good teaching is also based on their early experiences as learners and that teacher education programs could involve the incorporation of technology use to facilitate teacher technology change.

6.3.4 Prior knowledge and teacher identity

The impact of prior knowledge in shaping, and reshaping, teachers' beliefs and practices has been extensively researched in literature. Teachers come to teaching with a range of prior knowledge, beliefs and conceptions that considerably influence their actions (Bransford et al., 2000) including their ability to acquire new knowledge. Pennington and Richards (2016) asserted that, in addition to other factors such as the subject, methods, students and approaches to teaching, teachers' personal and autobiographical identities represented in their prior knowledge about teaching influenced their identities. Weinstein (1989, p. 53) also stated that teachers' identities are "based on memories of previous teachers, former teaching experiences, and childhood events". These memories, prior experiences and events, whether perceived as successful or unsuccessful by teachers, have left their imprints on teachers' perceptions. Teachers' personal history-based theories and

knowledge are thought to be developed informally without the direct influence of a formal teaching context (Holt-Reynolds, 1992). Reynolds argues that this “volume of personal experiences”, theories and beliefs which teachers bring with them represent what really works and what does not, which constitute “good” practice for them (1992, p. 326). Reynolds further emphasizes the importance of teachers’ prior beliefs and the significance of investigating how they use them in real practice:

“If, as teacher educators, we want to influence those we teach toward positive decisions about the value of our ideas, we would do well not only to explore the beliefs our students have developed about “good” teaching but also to investigate how they use those beliefs to defend the decisions they make” (Holt-Reynolds, 1992, p. 344).

Collay (1998) argues that teachers’ personal histories not only shape their beliefs and instructional practices, but also that personal histories and teachers’ beliefs interact with each other. That is why Bransford and Schwartz (1999) state that teachers’ pre-existing knowledge provides a lens through which teachers evaluate and interpret new experiences, for example, using technology. Darling-Hammond et al. (2005) claim that teachers use their prior knowledge as a starting point and that the interaction between their prior knowledge and the new opportunities is essential for them. Therefore, teaching is not only about modelling the best practices of other skilled teachers (Loughran, 2013). This implies that teaching comprises unpacking prior experiences, events, knowledge, memories and practices in a complex process of reasoning and reflection. In fact, Rossacci (2016) recently conducted a study of the influence of ICT on teachers’ self-efficacy, technology proficiency, frequency, perceptions, classroom practices and student’s classroom interactions using quantitative and qualitative methods. She concluded that one major limitation for the study was the influence of teachers’ past experiences on their implementation of technology in their current practices. For example, teachers’ self-efficacy when integrating technology was affected by their previous experiences. However, such influences are sometimes positive or negative. Nevertheless, what is understood by Rossacci as a limitation, is viewed as a key constituent of teachers’ identities in other literature. For example, Technological, Pedagogical and Content knowledge (TPACK) theory highlights the interplay between pedagogy, content and technology including

teachers' previous experiences which lead to effective teaching with technology (Koehler and Mishra, 2009). The theory acknowledges teachers' prior knowledge along with theories of epistemology to build on existing knowledge.

6.3.5 Summary

To sum up, the findings of this research demonstrate that early experiences with technology influence teachers' beliefs and practices inside their classrooms. This study adds new understandings of further influences that early experiences have on teachers' technological practices. First, informal learning experiences are major factors contributing to shaping and reshaping teachers' cognition and practice. Teachers were found to teach in the way they best learned when they were learners themselves, more than in the way they were taught as literature widely suggests. In addition, teachers' memories of using technology for social purposes seems to impact their attitudes and actions about technology use in their classes. Ertmer and Ottenbreit-Leftwich (2010) argue that teacher education programmes need to include learner centred technology experiences to help teachers acquire positive skills which will positively impact their instructional practices. This recommendation is supported by the findings of this study. The impact of personal and self-driven technological experiences on teachers' identities was evident in this study. If teachers are offered opportunities for self-learning using technology, there may be greater chances that they use those experiences in their teaching. Second, early informal experiences appear to constitute a frame of reference for teachers' use of technology and even learning how to use it. Third, the finding that professional coursework affects teachers' decisions and cognitions about technology use in their classrooms reiterates Borg's claim that coursework during education programs can influence how teachers think about and teach their subjects (Borg, 2006). Referring to the framework that guided this study, the following diagram (Figure 6) demonstrates the relationship between early experiences with technology; formal and informal learning, professional coursework, teacher cognitions about technology and classroom technology use. Unlike the original framework suggested by Borg (see Section 2.8), the diagram highlights that early experiences with technology and professional coursework have the potential to influence teaching practices directly which in turn may lead to changes in teachers' cognitions about technology. In

addition, the following diagram confirms the change of titles suggested by Attia (2011) (See Figure 2) from “schooling” into “early experiences with technology” as learners based on the findings of this study that not only school experiences influence teachers but also the informal experiences largely do so. However, the following diagram (Figure 6) adds new understanding to Attia’s refined framework in that it recognizes the direct influence between early experiences with technology and classroom practice whereas Attia’s framework does not clearly demonstrate this influence. This supports Guskey’s “Model of Teacher Change” (See Figure 3) who argues that the successful implementation of a practice may precede the reshaping of teachers’ beliefs and assumptions (Guskey, 2002). Guskey argues that only practices that prove to successfully work are repeated, which in turn influence teachers’ cognitions.

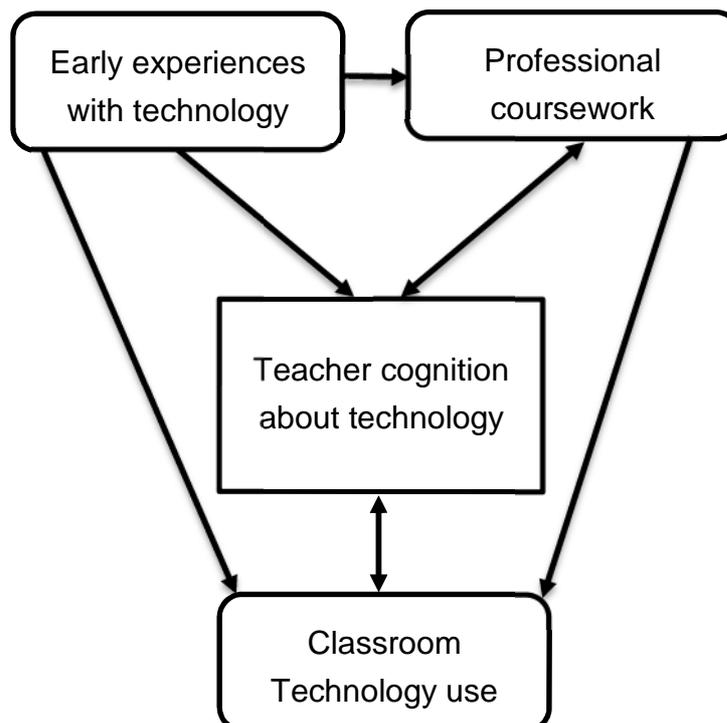


Figure 6 The influence of early experiences of technology use on teachers' cognitions and instructional practices (Borg, 2006, p. 333).

6.4 Research question three: How does frequent technology integration influence five Omani teachers' perceptions in terms of their cognitions and instructional practices about teaching?

According to the self-report questionnaire, all five teachers who participated in this study claimed to frequently integrate technology in their teaching and this was one criteria for selecting them for the qualitative phase of the study. The influence of their frequent technology integration was explored using the different methods of data collection; autobiographical accounts, initial interviews, classroom observations and post observation interviews. However, in reality not all of the teachers utilized technology as frequently as they reported, and therefore their perceived impact of technology on their cognitions and practices varied. The results of this research revealed that some teachers, Arwa, Muna, Tasneem and Rashid, experienced an influence to some degree, in the way they perceived teaching and the way they delivered their lessons. The use of technology has resulted in changing their methods of teaching into a more student-focused way, different teacher role, different classroom management techniques, improved content and pedagogic knowledge, different planning and an improved relationship with students. This is the reason that I classified them into three different categories; two participants who perceived transformational influence of technology on practice (Arwa and Muna), two participants who perceived less effects (Tasneem and Rashid) and one participant (Basma) who perceived no effects (see Section 5.3). Although the influence of technology sometimes occurs in beliefs and is then reflected in practices, it could be vice versa (Borg, 2006). For example, Scott (2016) discovered that out of six teachers who took part in his study to examine change in university teachers' eLearning beliefs and instructional practices, four teachers experienced a change in their beliefs before changing their practices, while two of them changed their practices first and, as a result, their beliefs were influenced. Both examples reflect an influence caused by technology integration. For the sake of discussing these results, I shall summarize them into two major issues; impact of technology on cognition and teaching practices, and why technology failed to lead to changes in instructional practices.

6.4.1 Influence of technology on teachers' cognitions

A recent study by Yamada et al. (2016) found no effect of technology use on teachers' pedagogical practices in the sample as a whole. In fact, Yamada et al.'s study revealed that laptop use generated a negative influence on teachers' performance, such as reducing the probability of teachers using student-centred methods in teaching. The findings in this study contradict Yamada et al.'s conclusions as well as the results of Çoklar and Yurdakul (2017), whose study revealed that teachers who participated in their study employed a teacher-centred approach when integrating technology instead of a student-centred approach. The results suggest that Arwa and Muna were largely influenced by their frequent integration of technology into their classrooms, while limited influences were documented with Tasneem and Rashid (see Section 5.3.1). Arwa and Muna reported that they used technology frequently according to the self-report questionnaire which might explain the positive impact technology has had on their cognitions and instructional practices. Both teachers talked about how technology impacted their cognitions. For example, Arwa explained how technology makes teachers think differently about teaching and gave an example of herself before she was interested in technology integration and after she became a frequent user of it (see Section 4.1). Muna also believed that technology could influence teachers' cognitions about teaching into more learner-centred ways. In addition, there was another teacher, Tasneem, who affirmed this influence on technology on her perceptions by saying that "*technology has changed our perception toward teaching and learning*" (TII). Therefore, the overall impression that the above three teachers hold is that technology has influenced their cognition and the way they perceive teaching in one way or another. This finding supports Shelton's (2014b) conclusion that there was a strong relationship between teachers' reported frequency of technology use and their perceived impact of technology on their teaching. In Shelton's study, 84 per cent of participants who used PowerPoint frequently thought that it had a positive impact on their teaching. A number of recently published studies have also concluded that the integration of technology impacted teachers' beliefs, as well as ways, about teaching and caused a shift towards more student-centred approaches (Montrieux et al., 2015; Alharbi, 2014; Hsu, 2016; Englund et al., 2017; Tondeur et al., 2016; Peled et al., 2015).

6.4.2 Influence of technology on instructional practices

As we have seen in the individual case findings and in the cross-case chapter, two teachers used technology in a way that demonstrated a learner-centred approach, where students were given opportunities to reflect on their learning. For example, Muna evidently confirmed the influence of technology on her teaching and delivery of her lessons when she said that her students “see a different way of teaching and hopefully a more interesting way of dealing with content” (MPOI2). On another occasion, she said that “technology encourages teachers to be more learner centred with activities” (MII) which was reflected in her class when she used Kahoot that allowed learners to take control over their learning. The role of technology to provide students with more control of their learning has been suggested in literature (Hattie, 2008). Literature suggests that for teachers to achieve a successful transformation of teaching style when technology is integrated from a teacher-centred to student-centred approach, students should be in control (Hattie, 2008). Hattie suggests that for computers to have a desirable effect, students, not teachers, should be in “control” of learning. When students take control of their learning, they are more likely to be responsible for their learning. Teachers who used technology proficiently were also found to have “a strong commitment to learner-centred approaches in which students took responsibility for self-regulation of their learning and behaviour” (Ryba and Brown, 2000, p. 11). Moreover, literature also suggests that technology contributes in supporting students to construct knowledge through engaging in activities that are student-focused. This is reaffirmed by the study of Hsu (2016) which showed that approximately 75 per cent of the K-6 teachers changed their teaching beliefs from a teacher-centred to student-centred about technology integration. Furthermore, teachers also gave students more responsibility in that they allowed them the opportunity to vote on matters related to their learning. Other examples were also documented during the observations where teachers asked students for their feedback (MPOI1). Rashid was also observed using technology for the self-evaluation of students. Students’ reflection about their learning and evaluating their learning are seen as key features of a learner-centred approach and a constructivist model of instruction (Bonk and Cunningham, 1998). In a study to examine the influences of integrating one-to-one computing initiatives on teachers’ pedagogical perceptions and instructional practices, three out of fourteen teachers expressed explicitly how technology had helped them to apply student-centred approaches where students could reflect on their

learning (Peled et al., 2015). Furthermore, Arwa explained that technology enabled her to use learning by doing, which was observed during her classroom observations. This finding supports the findings of a 10-year longitudinal study which was conducted to examine teachers' conceptions and approaches to technology integration (Englund et al., 2017). The results of the study illustrated that while some teachers experienced no change at all in terms of their conceptions about technology integration, others shifted from teacher-focused approaches to teaching using more student-focused teaching by using web-based learning and allowing students more opportunities for learning by doing (Englund et al., 2017).

Another finding of this study is the effect of technology in shifting and changing teachers' roles and classroom management techniques during their classes when they used technology. For example, during the second observation, Muna acted as a facilitator and she observed her students collaboratively write synchronously using Titanpad. Also, in the second observation of Rashid, he acted as moderator and the activity was student-led. Students were observed leading the activity and being in charge of the whole activity. Similar enactments were observed in other classes such as Arwa's. Teachers did not follow the usual drill and practice techniques when they used technology, particularly when they used softwares such as Titanpad, Kahoot, and other student-led activities. In addition, Arwa reported that technology also made her change her ways to manage the class compared to a traditional class where no technology was used. This was sometimes because students become easily distracted by technology, and other times because the sort of activity used requires teachers to manage the class differently. In so doing, Arwa suggested that teachers should bear in mind the time, level of students, students' interests and the objective. The overarching result, as findings indicate, is that teachers used different techniques to control the classes. This aligns with the study by Kim et al. (2013a) which demonstrated that three out of 12 teachers were influenced by technology integration to transform their methods of teaching. The three teachers were found to adopt new teaching methods such as acting as facilitators, allowing students more choices about their own learning and using technology to solve problems. For these teachers, technology was a tool to experiment and reshape their teaching approaches. Another influence where a change of roles into facilitators and mentors of students' learning

was reported in a study by Peled et al. (2015). The finding which suggests a shift in the teachers' role and classroom management techniques to have taken place with some of the teachers in this study is consistent with the extensively reported influence of technology integration in literature (Riasati et al., 2012; Levin and Schrum, 2012; McKnight et al., 2016; Peled et al., 2015; Gilakjani et al., 2013; Archambault et al., 2010). For example, in their study, McKnight et al. found that the most profound change caused by technology integration was the potential of technology to shift teachers' roles inside the class (McKnight et al., 2016). The potential of technology in shifting teachers' roles from that of a transmitter of expert knowledge into a facilitator or coach for learning is key in 21st Century education, as Crick (2012) argues.

One final and common finding obtained from the interviews and observation data was teachers' reporting a change in their way of planning and preparation. All five teachers reported that technology made them well-prepared with a second plan, or *Plan B* as they usually called it. Whether the justification was the wealth of materials that the internet provided, and hence made teachers come up with a second plan, or the sudden technical problems that they could face, technology seems to have encouraged teachers to always have an alternative plan in mind. Tasneem stated that technology made her "a better planner" (TII). She even reported that she "can send them materials before the class" (TII) using WhatsApp as a way of co-planning. This is consistent with some of the literature which also reported a similar effect on teachers' practices in relation to lesson planning (Kim et al., 2013b). For example, Archambault et al. (2010) found that the teachers' role changed to require more time to plan when technology was integrated in teaching. Teachers in the study also reported that they used technology to redesign the curriculum.

6.4.3 Influence of technology on learning practices

Another finding that emerged from the data and was observed during the classroom observation was the influence of technology to promote different types and styles of learning. Some of the teachers were found to employ technology in ways that made learning more individualized. Some teachers also used technology to take learning beyond the classroom walls. For

example, Tasneem encouraged her students to learn outside the classroom using the WhatsApp application. Arwa and Muna used independent learning, differentiated learning, and collaborative learning in their classes. Arwa, for instance, used technology to promote independent learning in her classes during the lesson observations. She used technology to create an activity which contained personalized learning according to the students' own abilities and interests. Findings from the observations also documented the use of differentiated learning tasks conducted by Muna who sent different versions to her students depending on their levels. Muna explained that, with the help of technology, she catered for the individual differences among her students especially when she felt they were weak. A further example occurred when Muna used Titanpad for the purpose of creating a collaborative learning atmosphere with her students. These practices which were influenced by the use of technology improved teachers' relationships with their students. Improved relationships with students as a result of using technology was a recurrent theme in the data. Arwa and Muna both stated that their relationship with students improved when they used technology in their teaching. These influences of technology as perceived, and performed, by teachers made them realize the potential of technology to make them more creative in their teaching. Arwa articulated this very elegantly when she said that technology "can very well help me to be creative" (AII).

The role of technology to stimulate teachers to employ various ways of teaching which accommodate a wide range of learning practices have been widely discussed in the literature. While some studies denied any effect on teachers' models of teaching and learning (Yamada et al., 2016), others indicated that technology contributed in reshaping teachers' models of teaching (Tondeur et al., 2016). Tondeur et al. conducted a systematic review of 14 studies to synthesize the findings related to the relationship between teachers' pedagogical beliefs and their classroom use of technology. One of the results of this review demonstrated that technology use can lead to changes in beliefs and practices. For example, in 9 out of 14 studies, the findings revealed that the teachers adopted more constructivist beliefs about teaching as a result of their use of technology. A report by Crook et al. (2010) concluded that technology influenced learning practices in the classroom in four main dimensions; differentiation, inspiration, coherence and engagement. The ability of technology to motivate teachers

to promote personalized learning and student reflection were two major findings in various recent studies investigating the impact of technology on teachers (Hwang and Wu, 2014; Rossacci, 2016; Mandinach and Cline, 2013). Gilakjani et al discuss how technology can promote a constructivist teaching approach. Gilakjani et al argue that for technology to succeed in achieving this promise, it should be used “as part of an approach that involves the students in the activity” (Gilakjani et al., 2013, p. 59).

6.4.4 Influence of technology on teachers’ knowledge

Arwa, Muna, Rashid and Tasneem were also influenced by technology in that their content knowledge about their subject (English language) was improved. Arwa also stated that technology contributed towards improving her content knowledge about English Language as a subject. Through her use of the internet, she was exposed to more information, contents and materials that made her more open to new ideas about the teaching and learning of the English Language. Rashid and Tasneem, too, reported that technology can make teachers more up-to-date and well-equipped for classes. Another apparent influence of technology is teachers’ realization of a shared knowledge attitude between themselves and their students. Since most students nowadays have their own devices, for instance, mobile phones, and can access information at any time, even during the lessons, teachers have become more open to the fact that knowledge can be shared. Muna, for instance, was observed asking her students to check the spelling of a word she misspelled. This might have made her feel equal when it came to the ability to reach out to knowledge through technology. Furthermore, in the first observation, Arwa was observed while using authentic materials in her classes which she got from the internet. In fact, Arwa resorted to the internet in search of more authentic materials because she distressed the textbook. She also explained that technology makes learning more real to students. What teachers reported, and enacted, in their classes as a result of using technology was also cited in literature. For example, Alev (2003) revealed that lecturers valued the wealth of information and resources made available by technology in their institutions. However, these findings contradict the results of a study by Wong (2013), who found that teachers who used technology, e-learning in particular, did not experience core changes in terms of their teaching practices. For example, they did not acquire knowledge-sharing strategies or enhanced teaching experiences.

Nevertheless Wong attributed this to a lack of understanding of the pedagogical advantages of technology and to a lack of training and support.

6.4.5 Teachers perceiving no influence of technology in their cognition and instructional practices

The findings demonstrate that Basma was not influenced by technology in her classes. In fact, she rarely used technology during the lessons observed and this is why I put her in a separate category which contained teachers who perceived, and experienced, no effect of technology on their instructional practices. Although Basma had a remarkably good access to technology, she rarely used it in her classes. Furthermore, evidence of the influences of technology were not observed inside Basma's classrooms during observation visits. Basma, for instance, stated that she always wanted to be in control of her class. Her use of technology depicted this personal belief in that she only used technology for listening and where students had no real chance of independent or collaborative learning. Her use of technology was basic and limited in nature. No fundamental change can occur when technology is used in a limited way (Alev, 2003), unless teachers integrate it in ways that help learners to learn collaboratively by fostering their involvement, collaboration, problem-solving and control over learning. As previous literature suggests, technology has the potential to support teachers to employ the constructivist approach. Palak and Walls (2009) cited two main reasons behind teachers' rare use of technology for a student-centred approach: teachers lack the necessary models to facilitate a student-centred approach and the influence of teachers' contextual factors such as class size and student abilities. The findings of this study add another reason which is teachers' distrust of technology to achieve their aims. In addition, teachers are less likely to be influenced by technology if they feel comfortable with their traditional teaching styles. The findings here reiterate the results of a recent study that was carried out to discover the reasons that technology failed to influence teachers' classroom practices (Tallvid, 2016). Five different, yet interrelated, reasons were cited by participants in the study namely a lack of technical competence, unworthy effort, inadequate material, less control over classes and lack of time.

In this study, teachers' resistance to change can be attributed to several factors. For example, teachers' low exposure to technology during their early school days, teacher education programs and the limited opportunities they

got while studying at university. Second, teachers distrust technology and feel that it might negatively affect their beliefs and values about teaching as we have seen with Basma. Some of these reasons were discussed in Section 6.2.2 above. The findings related to Basma who perceived no effect on her instructional practices agree with the findings of another study by Palak and Walls (2009). Palak and Walls examined the relationship between teachers' beliefs and instructional technological practices and whether technology integration resulted in a change in practice into a student-centred paradigm. The results indicate that teachers rarely used student-centred approaches and that technology did not mediate changes in teaching styles. Palak and Walls accredited this to the influence of "teachers' educational beliefs and what they believed to be good teaching" (Palak and Walls, 2009, p. 435). The findings here also agree with the results of another study which revealed that teachers did not experience any shift in their instructional practices as a result of technology (de Aldama and Pozo, 2016; Abdussalam, 2016). In fact, the results indicated that there was a wide gap between beliefs that teachers held and the ways in which they used technology in their teaching, with clear indications that they did not transform their traditional ways of teaching.

Basma reported that she was a frequent user of technology in the questionnaire. Yet, the lesson observations indicated otherwise (see Section 4.2.5.1). A possible explanation for this is that sometimes teachers might over report their stated practices compared to their actual practices. Kopcha and Sullivan (2007) argue that in spite of the common use of self-report surveys, self-report surveys of teacher's use of practices and attitudes associated with technology integration may yield inaccurate data as teachers tend to report greater-than-actual teacher use of technology. This was clear in Basma's case. In addition, the investigation of teachers' beliefs about technology in general may yield different data than when investigating a specific technology (Shelton, 2014a). This could possibly be another reason as the study attempted to explore the influences of technology in general and not a specific type of technology. Perhaps if Basma's perceptions and instructional practices were investigated with regards to one specific technology, for instance, smart whiteboards, the data revealed would have been different. This is supported by Shelton (2014a) who found that teachers valued some technologies more than others and considered some more important and relevant to their everyday practice than others. Teachers in

Shelton's study viewed two groups of technologies; "core technologies" which they used widely, and "marginal technologies" which they employed less frequently. When teachers are approached about a specific technology which, according to their own perceptions, may fall into "core" or "marginal", their attitudes and views may be different than when investigating their perceptions about technology in general, Shelton (2014a, p. 225).

6.4.6 Summary

Overall, the findings in this study suggest that technology can influence teachers' beliefs about technology and their teaching and learning practices. Several influences were observed, and reported by some of the teachers who took part in this study, and which conform to a constructivist approach, a learner-centred approach, collaborative learning, cooperation, reflection, using authentic materials, different teacher roles, and having alternative plans. The findings of a five year longitudinal study to explore the changing practices of teachers when integrating technology indicated four categories where teachers' practices changed as a result of using technology (Orlando, 2014). These were: knowledge, learning organization, pedagogy, and core approaches to teaching (Orlando, 2014). However, the findings obtained from this study add major areas that were influenced by technology integration, such as teacher cognitions about technology, instructional practices, and learning practices. However, this influence is largely associated with the frequent integration of technology. These findings are in line with a recent study which found that teachers indicated no fundamental change in their teaching practices when technology was used in a very limited way (Blackley and Walker, 2017). According to the Blackley and Walker's study, this was partly caused by participants' low integration of technology as they used technology only as a substitution tool. The study highlighted the importance of preparing and training teachers (pre-service and in-service) to use technology to modify and re-define their teaching practices (Blackley and Walker, 2017).

Drawing on the teacher cognition framework (Borg, 2006) that guided this study, it can be concluded that technology as a tool can influence teachers' cognitions about teaching and affect their instructional practices. Teaching experiences with technology integration have caused some teachers to restructure their beliefs about teaching and learning, whereas others resisted the change because it was too challenging for their previously held beliefs

(Reese et al., 2016). The following diagram adds “frequent technology use” as a separate element which is not directly found in Borg’s framework. The reason it is added as a separate element is that according to the findings of the current study, technology plays a major role in influencing what teachers think, believe and do inside the classroom and that it is also influenced by teachers’ cognition and practice. Furthermore, unlike Attia’s (2011) refined framework, the diagram below emphasizes the frequent use of technology rather than just “ICT” as Attia (2011) proposed. In other words, ICT itself may not be able to lead to meaningful and purposeful influences on teaching and learning if it is not used frequently and purposefully. Therefore, I chose to label it as “frequent technology use” as compared with “ICT” as suggested by Attia’s (2011) refined framework (See Figure 2).

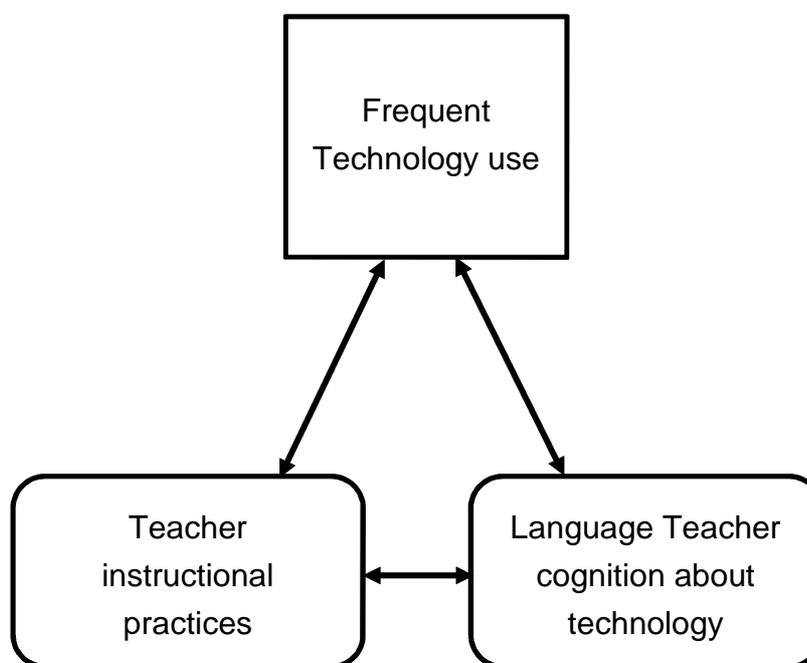


Figure 7 Impact of Technology use on teachers' cognitions and instructional practices

Furthermore, the study also found that one teacher who did not frequently use technology in her classes, although her self-reported data showed that she did, and hence no effect of technology was observed in her classes. This also supports the choice of “frequent technology use” as an entity instead of “ICT” as Attia (2011) proposed because without such continuous use, the influence of technology may not be perceived by teachers or observed in their practice. This resistance to change can be attributed to

several reasons (see Section 6.2.2 and Section 6.4.5), teachers' low exposure to technology during their early school days and teacher education programs, teachers distrust technology, satisfaction with own teaching methods and, most importantly, low use of technology in the class.

6.5 Research question four: What factors mediate the relationship between technology integration and teachers' cognition and instructional practices?

The findings from this study reveal various contextual factors that play an important role, according to participating teachers, in motivating them to integrate technology more frequently. These factors were presented earlier in the individual case chapters and in the cross case findings chapter (see Section 5.4). In addition to teachers' beliefs about technology which influence their decisions to use technology in their classes (see Section 5.2), there exist other factors that mediate teachers' relationships with technology integration. Such factors have been classified into first order (extrinsic, institutional) and second order (fundamental, personal) factors that affect teachers' integration of technology (Ertmer, 1999). These contextual factors can largely influence teachers' perceptions and beliefs about technology and may cause inconsistencies between teachers' beliefs and practices as discussed above. (Richardson, 1996). Five major categories were thematised using teachers' data; professional development, technical support, institutional environment and socio-cultural factors and personal factors (see Table 10). A discussion of these categories with reference to the pertinent literature now follows.

6.5.1 Professional development

All of the teachers reported professional training as an important factor that motivates them to integrate technology in their instruction. They stated that training to use technology is helpful in improving their skills and abilities to integrate technology. Several themes emerged from the analysis of teachers' interviews about the factors influencing their technology integration, for example, quality training, hands-on practical training, teacher engagement in training sessions, sharing of experiences and special-interest groups (see Section 5.4.1). For example, Muna talked positively about her

experience in a workshop where she learned not only about the software, but how she could plan to implement it in her class (see Section 4.3.4.1). This indicates that training should not be limited to how technology is used but also how to imbed it into pedagogy. Arwa also explained that training workshops should be hands-on where teachers are engaged into applying knowledge, not just learn about it. Tasneem, too, shared this view as she likes training opportunities where she learns how to use technology in her teaching with hands-on activities. Muna, also, does not appreciate workshops where the theoretical aspect dominates the workshop, rather she feels that practical sessions are more useful. Arwa, Rashid and Tasneem also admired the idea of sharing experiences with their colleagues. Rashid considered this as a “need” to share feedback with others and listen to their experiences. Additionally, having a special interest group of teachers, who share the interest of integrating technology in their teaching, was yet another significant source of professional development as perceived by participants. Finally, Arwa mentioned online courses as a means of self-development. She explained that the online courses that she attended were not part of the courses offered by her institution, and that she independently searched for, and joined, them.

Professional development in relation to technology integration has been extensively cited as a significant factor that motivates teachers to integrate technology (Mumtaz, 2000; Drent and Meelissen, 2008; Buabeng-Andoh, 2012b; Koh et al., 2017; Al-Hajri and Echchabi, 2017). Furthermore, a lack of professional development training has been cited as an influential demotivating factor to technology integration (Kirkwood, 2000; Preston et al., 2000). However, not every professional development opportunity is seen as successful by teachers. For example, the teachers in this study wish to see opportunities or engagement with other colleagues. An essential element of successful professional development in technology integration is the active engagement of teachers in hands-on activities that help to build the communities of colleagues (Lawless and Pellegrino, 2007). Lawless and Pellegrino further add that teachers should be engaged in meaningful activities that relate to their individual contexts. *“Their learning should be facilitated by giving these teachers ample opportunities to interact with peers, to report about their learning and to access resources for learning”* (Hoekstra et al., 2009, p. 672).

Different opportunities should be provided to teachers to ensure that they benefit most from them. Caffarella and Zinn (1999) suggest that professional development programs should encompass three major activities: “(1) *self-directed learning experiences*, (2) *formal professional development programs*, and (3) *organizational development strategies*” (Caffarella and Zinn, 1999, p. 242). Although Lawless and Pellegrino (2007) state that technology can ultimately lead to the adoption of “new and arguably better approaches to instruction and/or change the content or context of learning”, they confirm that “decisions about when to use technology, what technology to use, and for what purposes cannot be made in isolation of theories and research on learning, instruction, and assessment” (Lawless and Pellegrino, 2007, p. 581). Therefore, they argue that any professional development training that is aimed at supporting teachers’ integration of technology should combine professional development on the integration of technology in teaching, learning about technology and how to use a particular software. Combining professional development and the use of technology could be useful for training teachers.

The Technological Pedagogical and Content Knowledge (TPACK) theory may be seen as contributing to the discussion about professional development in relation to technology (Koehler and Mishra, 2009). TPACK associated the effective role of technology integration in teaching with better knowledge in technology, pedagogy and content which requires teachers to continue developing themselves professionally to be skilled in using technology (Koehler and Mishra, 2009). As an English Language teacher, knowledge of the content itself, knowledge of the pedagogy underpinning teaching, learning of the English language, and knowledge of the technology that support his pedagogy and content are all essential and may lead to more meaningful integration of technology. Koh et al. (2017) conducted a review on professional development as a method and TPACK-focused ICT in-service professional development programs and suggest five critical aspects to be involved in technology-related professional development: co-design experiences, pedagogical orientation, opportunities for implementation, opportunities for reflection and evaluation of teacher and student outcomes.

6.5.2 Technical support (availability)

Findings also revealed another contextual factor that affects teachers' decisions to use technology, availability of technology. Two of the participating teachers, Arwa and Muna, were frustrated when they were unable to access the internet or when there was limited accessibility to the resources. Technological equipment and access to internet and electronic resources have been cited by many studies as a key factor of technology integration (Hsu and Kuan, 2013). Tondeur et al. (2008b, p. 502) argue that the level of technology availability determines teachers' integration level. For example, providing computers only enables teachers to use technology for "basic computer skills" in their teaching, and providing computers with internet access will probably help teachers use them to "research and process information", and providing computers in the classroom with internet access may result in using it as "a learning tool".

However, Arwa and Muna have shown that extensive use of technology in their classes and their teaching indicated a large influence of technology as discussed earlier. Their complaints about technology availability may be seen as an attempt to use more technology in their classes. Also, Muna's comment about her inability to book the computer laboratory may indicate an important issue. Sometimes the provision of computers in the classroom makes it easy for teachers to plan for, and implement, more technology than when the computer laboratories are isolated. This is consistent with literature which states that computer laboratories are less effective when separated from classrooms (Tondeur et al., 2008c). The type of technology and internet access has a significant impact on teachers' levels of technology integration (Hsu and Kuan, 2013). In fact, Hsu and Kuan (2013) found that three types of access were essential: access to internet, availability of projectors and stability of computers and access during teaching. During observations, there were issues regarding both access to the internet and the stability of access during teaching. Some teachers were frustrated when they could not access the internet according to their original plans, such as Tasneem, Muna and Basma.

6.5.3 Institutional environment

One finding that emerged from the analysis of the data of this study is the influence of colleagues in motivating teachers to integrate technology. For example, Rashid was encouraged to use Microsoft Word by his colleague

who inspired him to do so, and who also explained to him how to do it. Arwa and Muna, also believed that their colleagues constituted a significant support to them encouraging them to use more technological tools in their teaching. Tasneem also mentioned that the supportive atmosphere could motivate her to integrate more technology. In short, most of the participants expressed their strong agreement that having a supportive atmosphere in their institution helps them to use more technology. In addition, the teachers also cited students' attitudes to technology integration as an important factor towards using technology. When students require, or are interested in, using technology, their teachers are more likely to respond to their wishes. These findings are in line with the literature about the factors that motivate teachers to use technology. For example, the positive institutional environment represented in the support and encouragement to integrate technology has been cited as a key aspect. This supports Salinas et al.'s hypothesis that "the more support received from colleagues, the higher technology adoption levels will be" (Salinas et al., 2017, p. 6).

6.5.4 Socio-cultural factors

The findings reveal that Rashid, the only male teacher in the study sample, cited culture as an essential factor when he planned for, or used, technology, particularly when his class involved both male and female students. Rashid did not want males and females to mix, even when using online applications. That is the reason that he used Blackberry Messaging BBM since this applications uses codes only, rather than phone numbers. Rashid emphasized that as a teacher, he should think about the cultural background of the students. This finding is in line with literature as stated by Nistor et al. (2014) who defined culture as "cultural patterns are shared within a social environment such as nation, ethnicity or profession" (Nistor et al., 2014, p. 38). Nistor et al. recommend that cultural background is taken into account when designing and using technology which highlights culture as a factor mediating teachers' decisions to use technology.

"Due to increasing internationalisation of higher and continuing education, learners involved in a joint learning process may have different cultural backgrounds, hence different expectations with respect to design and outcome of technology-enhanced learning. In consequence, they may

need different instructional support” (Nistor et al., 2014, p. 51).

However, the findings also show that the other four participants (all female teachers) did not consider this as a significant factor. This might indicate that Rashid was more considerate of what he perceived as a cultural norm and tried to avoid being accused of causing male and female students to mix with each other. Rashid even blamed teachers who come from the “West”, and do not comply with the cultural norms. “Some teachers coming from the West do not understand the context. They ask and try to mingle students by force. They impose what they think. This is against the university rules” (RFI, 257-259). Female teachers, on the other hand, paid less attention to this probably because the culture is rapidly changing and that technology has contributed to this change. Culture plays an essential role in teachers’ decisions to integrate technology (Barton, 2010). In the Arab world, culture was also among the factors that inhibited teachers from using technology, especially when there was a great deal of uncertainty and risk (Khushman et al., 2009).

6.5.5 Personal factors

The findings suggest that Tasneem and Arwa considered their personal interest of technology as a factor for using it in their classes (see Section 4.1.7.1 and Section 0). For example, Arwa stated that she was motivated to use technology because this was a personal interest of hers and that using technology constitutes an important element of her teaching philosophy (see Section 4.1.7.1). When asked about what motivated her to integrate technology in her teaching Arwa replied that her own belief about using technology was a major determinant to using technology. These findings support the findings of some studies reported in literature. For example, a very recent study was conducted by Montgomery (2017) to investigate the factors that teachers perceived as the most influential to their technology integration. The results indicated that personal interest, as well as the availability of technology, were viewed as the primary motivating factors for the participating teachers. The results of another study by Frazier and Sadera (2014) that investigate 300 teachers’ perceptions about the factors that influenced their technology integration and the results revealed that personal interest was found to be the most influential factor. In addition, the factors influencing teachers’ technology integration have been widely

explored and investigated in literature (Ertmer, 1999; Lam, 2000; Chen, 2008; Al Senaidi, 2009; Al-Senaidi et al., 2009; Frazier and Sadera, 2014; Montgomery, 2017).

6.5.6 Summary

To sum up, the findings of this study show that five important factors affected teachers' integration of technology; professional development, technical support, institutional environment, personal factors and socio-cultural factors. These contextual factors may have contributed to the inconsistencies between some teachers' reported beliefs and their enacted practices inside the classroom. Therefore, teachers are more likely to integrate technology more frequently and in ways that lead to positive changes in their teaching when demotivating contextual factors are eliminated. For technology to influence teachers' beliefs and practices positively, more focus should be allotted to technology integration training and pedagogy in teacher education programmes. For example, providing teachers with the necessary pedagogical skills in relation to technology integration is crucial to ensure more competent, meaningful and transformational use of technology in teaching. This finding supports the results of another study to explore the factors enabling teachers to use technology in subject teaching (Cubukcuoglu, 2013). Cubukcuoglu recommends that teachers are provided with opportunities to learn pedagogical ways to integrate technology in addition to basic ICT skills. Furthermore, the availability of technology can motivate teachers to use technology. Referring to the teacher cognition framework that has guided this study, it is evident that contextual factors have a significant effect on teachers' decisions to integrate technology.

6.6 Summary of the chapter

Although the teachers work in the same environment and are provided with the same facilities and resources in relation to technology, they seemed to be heterogeneous in terms of their cognition about technology use, and their pedagogical thinking about technology. In addition, the findings demonstrate that early experiences with technology influence teachers' decisions and practices inside the classroom, and that some teachers used technology in

ways that reflected their previous informal learning experiences. Some teachers also tended to teach, using technology, in ways that matched the ways they learned, rather than the way they were taught. More than that, they seemed largely diverse in terms of their perceptions of the influence of technology on their practices. While some teachers perceived technology as influencing their cognition and instructional practices, others experienced no effect at all. The findings show that some teachers used technology to promote several types of learning such as collaborative learning, learner-centred approach, constructivist activities and individualized learning. Moreover, they stated that technology changed the way they taught their lessons into a more learner-centred approach with different teacher roles and classroom management strategies. However, there are various reasons that could explain why some teachers did not find that technology has impacted their beliefs and practices, such as having no early experiences with technology, an inability to see the value of technology, a distrust of technology and very little use of technology in teaching. Finally, the findings show that professional development, technical support, institutional environment and socio-cultural factors are the most essential factors from the perspectives of the participating teachers.

The following diagram (Figure 8) presents the relationship between the different constructs involved in teacher cognition about technology, and the influence of frequent technology integration on teachers' cognition and instructional practices. It demonstrates the following findings:

- Early experiences with technology, particularly informal learning activities which the teachers were involved in, have influenced teachers' beliefs about technology use. In addition, those events and experiences acted as a reference frame for Arwa, Muna, Tasneem and Rashid when they decided to use technology. Teachers were observed during their classes employing technology in ways that matched what they narrated in their autobiographical accounts. The

new finding here is that teachers' personal histories with technology also influenced their instructional practices. This is clearly represented in Figure 8 by the title "early experiences with technology" and their effect on teacher professional coursework, teacher cognition about technology and teacher classroom practice.

- Professional courses and higher education courses were also found to have an impact on teachers' assumptions and practices in relation to technology. Some teachers immediately made use of what they learned during their professional development and master courses. Sometimes the effect of these courses took place in teachers' instructional practices before it took place in their beliefs, and hence, changed their beliefs about certain assumptions about technology use. The direct influence of teacher professional coursework on both teacher cognitions about technology and teacher classroom practice is depicted in Figure 8 through the use of arrows.

- The relationship between teachers' cognitions and instructional practices in relation to technology is bilateral. It is two-sided because while sometimes beliefs influence teachers' instructional practices, their actions inside the classroom may also affect their assumptions and beliefs about technology integration. This can be seen in the following figure where teacher cognition about technology and their classroom practice are linked with a double arrow.

- Frequent use of technology has influenced teachers' beliefs and instructional practices and this was reflected in many occurrences during the classroom observations and during teachers' interviews. Frequent technology use was added as a separate element which influences how teacher think about technology as well as how they use it in their classrooms.

- The contextual factors (namely professional development, technical support, institutional environment, personal factors and socio-cultural factors) were found to mediate teachers' decisions to integrate technology and how.

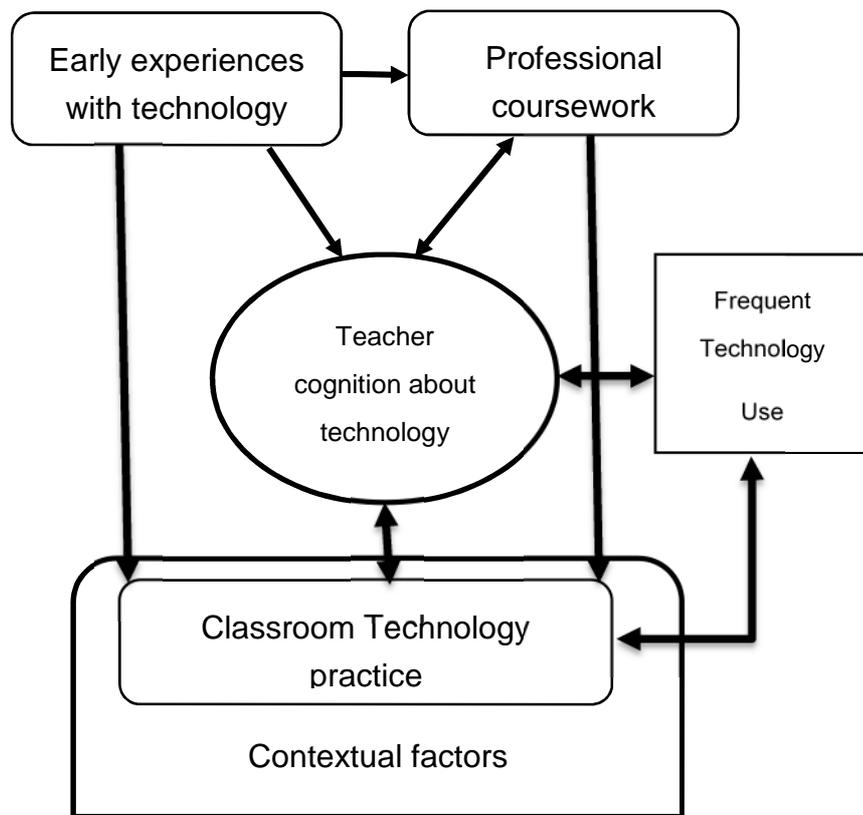


Figure 8 Influence of technology use on five Omani teachers' cognition and instructional practices. Original framework (Borg, 2006, p. 333)

7 Chapter seven: Conclusions

This following chapter will summarize the main contributions of the study into the relationship between five Omani teachers' technology use and their teacher cognition and instructional practices. First, the main contributions of this study are discussed in two parts: contributions to the knowledge and the methodological contributions. Second, the implications of this study to researchers, teachers, and higher education institutions are presented. Third, some suggestions for future research are presented in light of the findings of this study. Finally, I will discuss the limitations of the study. I conclude this chapter with some personal general reflections about this study.

7.1 Key contributions to knowledge

One of the key findings of this study is that the relationship between teacher cognition and technology use is bidirectional. Whereas teachers' beliefs about technology integration influence their decisions to use technology, their experiences with technology use also impact their beliefs and instructional practices. Some of the findings suggest that technology use facilitated teaching towards more use of learner-centred and constructivist approaches to learning and teaching. However, while some teachers experienced positive influences of technology, there were some who did not perceive technology as influencing their cognitions and practices.

Another contribution suggested by the findings of this study is the confirmation of the findings found in literature that even when teachers hold positive beliefs about technology use, there might exist a mismatch between some of their stated beliefs and their actual practices in the classroom. Some personal or contextual constraints may prevent them from putting those beliefs into practice. For example, the mismatch found in this study was mainly associated with various reasons such as distrust of technology, satisfaction with own teaching methods and discourse surrounding technology use. Actually, an interesting contribution which was found in this study is the effect of discourse surrounding technology use. The discourse surrounding technology made teachers believe that they were expected to show their awareness of its potential to promote a learner-centred approach.

“The popular discourse surrounding technology integration may tend to characterise teaching in terms of how particular tools are used without taking into account teachers’ perceptions and beliefs (Deaney et al., 2006, p. 3).

One of the strongest contributions of this study to knowledge is that the findings reiterate the impact of teachers’ early experiences and prior learning on their beliefs and instructional practices. The study, in addition, provides valuable insights to, and rich accounts of, teachers’ development of beliefs and the shaping and reshaping of their cognitions about teaching with technology. The findings presented in the previous chapters also suggest that teachers’ decisions, and practices, to use technology demonstrated an influence of their early experiences with technology during their school days or undergraduate study as learners. For example, the findings show that teachers used technology in ways that echoed their previous experiences that represented how best they learned. Some of the teachers in this study taught in the same way that they had learned, in comparison to what is mostly found in literature, that teachers teach in the way they were taught. Moreover, teachers’ early personal social experiences with technology seem to affect their beliefs about technology use. These findings resonate with the conclusions of which state that teachers’ technology use was influenced by their pedagogical style and personal theories (John and La Velle, 2004).

Another contribution is suggested by the findings of this study is the social shaping of technology. Even though some of the technologies that were used during the observations were originally designed for a particular function, teachers used those technologies in different ways as a result of some social factors. For example, WhatsApp was used for co-planning and as a platform for sending writing sentences to the Tasneem from her students. We can see how this technology, as an example, is being socially shaped by language teachers at the CPS. In addition to this, several other social elements contribute to the development of language learning inside the classroom as a result of technology integration. Examples of these elements are the time they live in, the place, education stage, pedagogical approaches used and the attitudes of the community (Motteram, 2013) which all help to understand how technology shapes, and is shaped by, teachers’ practices.

A final contribution relates to the factors which affect teachers’ integration of technology. Five major factors were revealed namely professional development courses, technical support, institutional environment, personal

factors and socio-cultural factors. Although these factors were previously documented in international literature (Ertmer, 1999; Lam, 2000; Chen, 2008; Al Senaidi, 2009; Al-Senaidi et al., 2009; Frazier and Sadera, 2014; Montgomery, 2017), they can be considered as new findings, to my own understanding and knowledge, emerging from a qualitative study as far as the Omani context is concerned. Most of the studies that were conducted used a quantitative approach particularly in SQU (see Section 2.19).

7.2 Methodological contributions

A large number of studies conducted in the area of teacher cognition have attempted to explore teachers' perceptions and beliefs in relation to technology using mainly surveys to assess teachers' levels of technology integration. The main focus of most of the studies in Oman, for example (see Section 2.19), was on the level of integration of technology or the extent to which teachers adopted technology based on some theoretical frameworks such as the Technology Acceptance Model (TAM). These researches yielded decontextualized findings about teachers, and failed to provide in-depth understandings of the relationship between teachers' cognitions, technology and the context. This study used a more qualitative design than has been the case in most of the other studies of this kind in Oman. The use of teacher cognition framework in this study was useful in many ways. First, given that the study explored teachers' beliefs, assumptions and attitudes towards technology use, the teacher cognition served as an important structure to guide the study. Teacher cognition acknowledges that teachers' beliefs are implicit in nature and can best be explored indirectly (Borg, 2006). Second, the framework was also useful in setting a road map for the identification and analysis of teachers' beliefs through the different key elements it proposed as important components of teachers' cognition, such as early experiences, professional coursework, classroom instructional practices and the contextual factors. The study instruments were also informed by this sequence which helped the participants as well as the researcher to make sense of the stages of the research. Third, the teacher cognition framework accentuates the important role of classroom practices in relation to their overall teacher cognition. Therefore, in this study, my understandings of the teachers' accounts were built on the interviews and the autobiographical accounts, classroom observations and not limited to self-reported instruments.

Another contribution that is suggested by the overall findings of this study (see Figure 8) which illustrated the influence of technology use on five Omani teachers' cognition and instructional practices. The findings of the current study extends Borg's (2006) and Attia's (2011) frameworks. For example, unlike the original framework suggested by Borg (2006) and the refined framework proposed by Attia (2011), the diagram presented highlights the direct influence of teachers' past experiences on their instructional practices. In addition, I changed the term "schooling" into "early experiences with technology" to represent all past experiences with technology whether formal or informal. For example, some personal experiences which took place outside school had an influence on some of the participants in this study such as Arwa. This change of terms confirms the conclusion reached by Attia in that early experiences as a learner is more appropriate to represent teachers previous experiences than "schooling" which is found in Borg's (2006) original framework (Figure 1). Finally, professional coursework also can directly affect teachers' classroom practices as suggested by the findings in this study and which matched Guskey's model of change.

Moreover, the use of narrative approach in language teacher cognition research is novel, particularly in the Omani context where no prior studies have been published which investigate teacher cognition from a narrative approach. Autobiographical narratives helped in the identification of teachers' sense of self and knowledge and presented an understanding of their persona, historical and cultural backgrounds which play a key role in their identities as teachers. In addition, the autobiographical accounts also contributed in bringing to light the ways in which the participants in this study conceptualized, shaped and reshaped their beliefs, decisions, assumptions and knowledge with regards to technology use and teacher cognition. They proved to be helpful in providing a window through which I was able to look at teachers' past experiences and to analyse them. Autobiographies give teachers "voice" (Diamond, 1993). Not only was the use of the narrative approach useful as a method of data collection for this study, some participants also valued the act of writing their narratives. "I enjoyed writing my autobiography. And I'm really happy to be part of this research because it helped me actually reflect on my own teaching and my own use of technology" (AFI, 196-197).

Although the mismatch between beliefs and practices is mostly viewed negatively in literature, more research should be carried out to explore the

potential “positive aspect” of this mismatch. When teachers are faced with challenges or innovations that force them to act in ways which contradict their beliefs, they do so for various reasons. This incongruence may lead to some unexpected results and unanticipated changes and transformations either in their beliefs or practices. It is worth looking at this area as a way to support teachers through in-depth investigations.

7.3 Implications

Based on the findings suggested by this study, the following are some suggestions of implications for researchers, teachers and institutions.

7.3.1 Researchers

Rather than investigating teachers’ cognitions about technology use using technology adoption models which do not provide in-depth details of the context and the other factors that influence teachers’ beliefs, researchers are recommended to pay more attention to the methods that offer teachers more opportunities to have their voice. Teachers’ personal histories and narratives provide important in-depth and rich data which allow researchers to deeply analyse their beliefs. This study has shown that the use of several methods to collect data about teachers’ cognition in relation to technology has resulted in the presentation of rich accounts that are based on teachers’ own personal narratives, co-constructed accounts through interviews and evidenced accounts through classroom observations. Had a more quantitative design been used, limited teachers’ accounts might have resulted from it.

7.3.2 Teachers

Teachers are recommended to engage with technology integration sooner or later as a result of the wide spread of technology use in the educational field. Teachers are recommended to try to make a balance between technology integration, their beliefs and the curriculum they are teaching to avoid focusing on one aspect on the account of the others. For example, teachers are recommended to not overuse technology while neglecting the curriculum or the other way round. Teachers are also recommended to reflect on their own past experiences as learners and teachers and how these are linked to their own current beliefs and practices. This reflection can provide teachers with insight on how to meaningfully integrate technology in their teaching

and help them to self-evaluate their teaching practices. Their early experiences with technology, for instance, may form a point of reference to them consciously or subconsciously. They could do this through self-written narratives as this study has suggested that autobiographical accounts are a strong instrument.

7.3.3 Institutions

The findings of this study emphasize an important issue relating technology use. While most of the innovation and change projects involve the introduction of technology as a “tool”, teachers do not view technology as a mere “tool” of teaching. In teachers’ perceptions, technology constitutes more than a tool. They are influenced by it and their use is also impacted by the personal, social and contextual environment they live and work within. It encompasses the ways in which the relationship between technology use, people and culture interact (Dobres and Hoffman, 1999). Therefore, it must be viewed in conjunction with the social and professional context surrounding it because a set of complex perceptions, critical thinking, previous experiences and contextual factors contribute to teachers’ decisions to use technology and in what way it is used. Just as Postman (1998) states, “A new medium does not add something; it changes everything” (Postman, 1998, p. 4), technology has the ability to change, influence and inspire teachers as supported by the findings of this study. Hence, higher education institutions should bear this in mind when introducing technology as a medium of instruction. Teachers’ understandings and views about technology and its influence on their cognitions and instructional practices should be taken into account when planning for technology adoption.

Moreover, in-service professional development courses are an important source of information to teachers on how to purposefully incorporate technology in their teaching. These professional opportunities should be presented in ways that match teachers’ needs and provide a range of delivery methods to accommodate teachers’ interests such as face-to-face courses and online courses in which emphasis is given to the involvement in professional communities of practice. It is also recommended, based on this study, that these courses offer opportunities for self-reflection about technology integration. It is essential for teacher educators to get an understanding of what personal experiences teachers bring with them to any

educational program. Addressing those experiences explicitly will help teachers to make more sense of the educational programs and make the latter more relevant and applicable to teachers. In addition, teachers' reflections, perspectives, viewpoints and assumptions are key when planning for technology integration and can be more important than simply training teachers on how to use one particular technological tool. This is due to the fact that the tools used today by teachers may be outdated tomorrow so the focus should also be given to teachers' perspectives about technology. The importance of involving teachers' reflections, perspectives, assumptions and personal experiences also hold true in pre-service training programs. More time should be allotted for teachers' reflections in the pre-service education programs.

A final point for institutions, stakeholder and policy-makers is that the introduction of technology use in the educational field should be implemented wisely and with active involvement on the part of the teachers. Care should be given to how such technological innovations are publicised to teachers and the discourse surrounding them. In addition, the findings from this study also suggest that some teachers were not influenced by the masters' courses in TESOL and ESP because those course did not involve educational technology subjects. It is recommended that more focus is given to how technology is used professionally and purposefully in teaching. Teachers should receive enough training on how to teach the English Language with the use of technology

7.4 Future research

This study has looked at technology generally. I particularly chose to include all devices that are considered useful for teachers when teaching using technology including, but not limited to, computers, iPads, mobile phones, and digital software programs such as Microsoft Word. However, it is worth exploring the impact of a specific technology (for instance, mobile phones) on teachers' beliefs and instructional practices rather than investigating general technology impact on teachers. This may yield different and valuable findings about how teachers perceive a specific technology than when talking about technology in general.

Participant selection was based on two main criteria: Omani teachers at CPS SQU who possess a high level of technology competence and

integration. No emphasis was given to their past experiences with technology when they were selected. Participants greatly varied in this study in terms of their early experiences with technology. While some of them were highly exposed to technology during their school days, others did not have any contact with technology until they started university. It is recommended that another study is conducted to explore the perceptions of teachers who have been taught at school using rich technology-supported classes. Such a research will yield important information about how teachers' early experiences in technology-rich schools impact their current teaching.

7.5 Limitations

Although the study used various methods of data collection to ensure comprehensive, and triangulated, teacher accounts were composed, I must also acknowledge the fact that there could be some aspects of teachers' relationship with technology (beliefs, events, assumptions or feelings) that I did not capture neither through their personal accounts, nor through the interviews or classroom observations. This is partially due to the fact that the relatively small number of classroom observations was not enough to observe all aspects with regards to teachers' technology use and how these relate to their early experiences. Perhaps more observations would have resulted in richer findings.

Another key limitation of this study is the relatively small sample of participants. Only five Omani participants were involved in this study. I chose five because I wanted the data to be manageable and to conduct an in-depth analysis of their accounts. Although the study did not aim to make generalizations about teachers' relationship with technology, it would have been more interesting to explore other teachers' stories in order to reach richer findings.

One final limitation concerning this study was that it involved teachers only. No other parties such as stakeholders, students, or parents were included. For example, in assessing whether teachers' incorporation of learner-centred or constructivist approaches were used successfully or not, only the researcher's evaluation and teachers' claims and interpretations were taken into account. It would have probably provided more relevant and more

concrete evidence if students' views were explored. In fact, educators can examine the consequences of their efforts in terms of students' achievement and performance as an indicator of teachers' changed teaching practices (Vescio et al., 2008).

7.6 Conclusion

This chapter has presented the main contributions of this study and discussed the implications. It has also provided some suggestions for future research based on the study's findings. Finally some of the limitations were discussed. However, I choose to conclude this chapter with some personal reflections.

Going through the course of this research has been a huge learning experience to me. When I started this research, I had a question in mind based on my own personal experience with technology. The answer to that question took me a long time in terms of planning, researching, collecting data, analysing it and presenting the answer in a systematic way. This whole process actually developed the researcher identity in me in comparison to the academic identity I had developed as a teacher and academic supervisor. In this process of developing a researcher identity, different aspects intersected such as my own past experiences, my present experiences and my own aspirations and hopes for the future. Moreover, the development of the researcher identity, as I experienced it, was not isolated from the various social interactions and the broader professional development context I was involved in.

In addition, through reading, and attending to, teachers' autobiographical accounts, I was privileged to "relive" important parts of their lives and to be immersed in their personal memories as school children that they voluntarily shared with me. I cannot deny that while reading their narratives, my past life as a school child flashed in my mind, too. I learned that sacrifice is also essential for research to continue considering the kind of contribution that the participants in this research were willing to offer; their own personal narratives as well as their time.

Finally, I learned that everything above this sentence was written in letters, but was lived with passion.

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Appendices

Appendix A Ethical approval from the University of Leeds

Performance, Governance and Operations
Research & Innovation Service
Charles Thackrah Building
101 Clarendon Road
Leeds LS2 9LJ Tel: 0113 343 4873

Email: ResearchEthics@leeds.ac.uk



UNIVERSITY OF LEEDS

Mahmood Al Waaili

School of Education

University of Leeds

Leeds, LS2 9JT

ESSL, Environment and LUBS (AREA) Faculty Research Ethics Committee

University of Leeds

28 October 2014

Dear Mahmood

Title of study: Omani Teachers' perceptions of the impact of technology on their teacher cognition and instructional practices at Sultan Qaboos University

Ethics reference: AREA 14-034, amendment Feb 2015

I am pleased to inform you that your amendment to the research application listed above has been reviewed by the Chair of the ESSL, Environment and LUBS (AREA) Faculty Research Ethics Committee and I can confirm a favourable ethical opinion as of the date of this letter. The following documentation was considered:

<i>Document</i>	<i>Version</i>	<i>Date</i>
AREA 14-034 Mahmood Ethical Review Form_V3 (3).doc	2	14/10/14
AREA 14-034 fieldwork-assessment-form-medium-risk-2013.doc	1	14/10/14
AREA 14-034 amendment Feb 2015 Mahmood revised questionnaire.docx	1	18/02/15
AREA 14-034 Amendment_form- Mahmood 2.doc	2	05/02/15

The Chair made the following comments

- If you intend to make direct quotes, even anonymised, you should first take a look at the advice on the confidentiality vs anonymity webpage <http://ris.leeds.ac.uk/ConfidentialityAnonymisation>.

Please notify the committee if you intend to make any further amendments to the original research as submitted at date of this approval as all changes must receive ethical approval prior to implementation. The amendment form is available at <http://ris.leeds.ac.uk/EthicsAmendment>.

Please note: You are expected to keep a record of all your approved documentation, as well as documents such as sample consent forms, and other documents relating to the study. This should be kept in your study file, which should be readily available for audit purposes. You will be given a two week notice period if your project is to be audited. There is a checklist listing examples of documents to be kept which is available at <http://ris.leeds.ac.uk/EthicsAudits>.

We welcome feedback on your experience of the ethical review process and suggestions for improvement. Please email any comments to ResearchEthics@leeds.ac.uk.

Yours sincerely

Jennifer Blaikie

Senior Research Ethics Administrator, Research & Innovation Service

On behalf of Dr Andrew Evans, Chair, [AREA Faculty Research Ethics Committee](#)

Appendix B Participant informed consent form

**Title of Research Project: The relationship
between five Omani teachers' technology use,
and their teacher cognition and instructional
practices: a case study**



UNIVERSITY OF LEEDS

Name of Researcher: Mahmood Al Waaili

Please tick the box if you agree with the statement

- 1 I confirm that I have read and understand the information sheet explaining the above research project and I have had the opportunity to ask questions about the project.
- 2 I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline.
- 3 I understand that my responses will be kept strictly confidential. I give permission for the researcher to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research.
- 4 I agree for the data collected from me to be used in future research
- 5 I agree to take part in the above research project and will inform the researcher if my contact details change.

Name of participant Date Signature

Name of researcher Date Signature

Appendix C The questionnaire

The relationship between Omani teachers' technology use, and their teacher cognition and instructional practices: a case study



UNIVERSITY OF LEEDS

Dear teachers,

This short questionnaire aims to explore your level of technology competency and the extent to which you integrate technology in your teaching. Your participation in this questionnaire is entirely voluntary and you have the right to withdraw at any time. Should you have any queries about the questionnaire or wish to obtain a copy of the study results, please contact me via the contact information provided below.

To ensure privacy and confidentiality, your responses will not be identified with personally. All data will be dealt with confidentially and for the purpose of the study merely.

The questionnaire is made up of two sections:

Section one: Background information

Section two: Teacher technology integration level

The aim of the questionnaire is to choose Omani participants for the qualitative phase, so if you are interested, please provide contact details at the end of the questionnaire.

Thank you for your cooperation

Sincerely,

Mahmood AL-Waaili

University of Leeds

School of Education

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Definition of terms:

Technology: Information technology such as computers, devices that can be attached to computers (e.g. LCD projector, interactive/smart whiteboards), iPad, tablets, mobile phones, networks (e.g. internet, local networks), websites in the World Wide Web and computer software/applications. Other non-computerized technologies such as OHPs (Overhead projectors) are not included.

Technology integration: The act of using technology in the different phases of teaching i.e. preparing for lesson, teaching, assessment, communicating with students...etc.

Section one: Background information

No.	Item	Choices
1	Name	(optional)
2	Gender	A) Male B) Female
3	What is your age	A) Less than 25 years B) 25-35 years C) Above 35 years
4	Teaching experience	A) 1-5 years B) 6-10 years C) 11-15 years D) 16-20 years E) 20+
5	What is your current academic position?	A) Assistant professor B) Language lecturer C) Assistant language lecturer D) Senior language instructor E) Language instructor F) Demonstrator G) Others (Please specify)
6	What is your level of technology proficiency?	A) Beginner B) Average C) Advanced
7	What programmes do you teach	A) FPEL (Foundation Programme English Language) B) CELP (Credit English Language Program).
8	Please indicate how often do you integrate technology in your teaching?	A) Not at all B) Rarely C) Occasionally D) Frequently E) Almost always F) All the time

Section two: Teachers' integration levels

9- Please indicate how often do you integrate technology in your teaching?

No.	Item	Never	Rarely	Sometimes	Often	Very often
1	Word processing (creating documents, saving, formatting..etc.)					
2	Spreadsheets (i.e. Excel)					
3	Database management (i.e. Access)					
4	Presentations software (e.g. PowerPoint)					
5	Electronic mails (i.e. compose and receive)					
6	Learning Management Systems (e.g. Moodle, Blackboard)					
7	Graphics and imaging software					
8	The world wide web (Web Browsing, Internet resources)					
9	CDs/DVDs					
10	Web 2.0 tools (i.e. Blogs/Wikis)					
11	Search Engines (e.g. Google, yahoo...etc.)					

12	Interactive Whiteboard					
13	LCD projector					
14	Handheld devices (i.e. iPad, iPod, tablets..)					
15	Video streaming (e.g. YouTube)					

10. Would you be willing to participate further in this study? This would involve the writing of an autobiographical account about your relationship with technology as a teacher, semi-structured interviews, classroom observations and stimulated recalls.

Yes

No

11- If yes, could you please provide your email address?

Appendix D Autobiographical account

“Me and Technology”

Task:

Please write an autobiographical account about your relationship with technology highlighting the roles that technology has played in your life. Include your memorable experiences with technology as a learner and teacher and how your relationship with technology has/has not affected you as a teacher.

Hint:

An autobiography is an account of a person's life written by the person who lived it. A technology autobiography is a narrative that tells the story of one's life with technology reflecting on the memorable experiences with regards to technology education, use and habits.

Possible prompts:

You may use the following prompts as threads. You do not need to stick to them.

Previous experiences with technology as a learner. When was your first encounter with technology as a learner? What technologies do you still remember? Was it a positive or negative experience? Why?

Your past and current experiences with technology as a teacher? Technology as a medium of teaching English. How do you currently use technology? Why? Has it informed how you think about your teaching/plan your teaching? Is it benefitting students? What particular incidents do you recall about using technology as a teacher? Has it affected the relationship between you as a teacher and between students themselves? How? Any further ideas.

NB: No word limit.

To ensure privacy and confidentiality, your responses will never be identified with you personally. All data will be dealt with confidentially and for the purpose of the study merely.

Appendix E Sample of Arwa's response to the questionnaire

The relationship between Omani teachers' technology use and their teacher cognition and instructional practices: a case study

1- Background information

No.	Item	Response
1	Name (optional)	Arwa
2	Gender	Female
3	What is your age	25-35 years
4	Teaching experience	6-10 years
5	What is your current academic position?	Language instructor
6	What is your level of technology proficiency?	Advanced
7	Please indicate how often do you integrate technology in your teaching?	Frequently

Section two: Teachers' integration levels

8. Please indicate how often do you integrate technology in your teaching?

No.	Item	Never	Rarely	Sometimes	Often	Very often
1	Word processing (creating documents, saving, formatting..etc)					✓
2	Spreadsheets (i.e. Excel)				✓	

3	Database management (i.e. Access)		✓			
4	Presentations software (e.g. PowerPoint)					✓
5	Electronic mails (i.e. compose and					✓
6	Learning Management Systems (e.g. Moodle, Blackboard)					✓
7	Graphics and imaging software					✓
8	The world wide web (Web Browsing, Internet resources)					✓
9	CDs/DVDs				✓	
10	Web 2.0 tools (i.e. Blogs/Wikis)				✓	
11	Search Engines (e.g. Google, yahoo...etc.)					✓
12	Interactive Whiteboard	✓				
13	LCD projector					✓
14	Handheld devices (i.e. iPad, iPod, tablets..)			✓		
15	Video streaming (e.g. YouTube)				✓	

10. Would you be willing to participate further in this study? This would involve the writing of an autobiographical account about your relationship with technology as a teacher, semi-structured interviews, classroom observations and stimulated recalls.

Yes (Email removed).

Appendix G Sample of autobiographical account initial analysis

Muna Autobiographical Account

Code: (MAA)

Received: Via Email

Date: 03/09/2015

Words: 586

Me and Technology

<p>Technology has always been my passion. My first encounter with computers was when I was in grade 2 while I was studying in a private school. I do not remember much how I felt about my interaction with computers but I do remember drawing on Paint program and creating shapes and stuff. I left the private school after grade 4. Since then, I never used the computer until my family bought a desk computer when I was in grade 10. I remember being thrilled about the whole idea of getting to connect with the world around me through the internet. I started using Hotmail and Messenger, emailing and chatting with friends and people who share interests with me. I was also greatly involved in participating in the Omani Sabla discussion forum. It was rewarding to get to discuss local issues with Omani members. It broadened the way I viewed the world and life. I was an active member in the Omani Sabla forum until 2003/2004 when I joined SQU. At that time, my computer interests changed since, as a student, I had no time to spare for online</p>	<ul style="list-style-type: none"> - More details on how technology is her passion. - Could you tell me more about your encounter with tech in grade 4 - Remember Paint and drawing programs in particular! - In your opinion, in what way would your experience be any different if you had no contact with technology then? - In your opinion, in what way would your experience be any different if you had no contact with technology then? - What changed in grade 10? And in what way was your experience different? - You described the ability to reach out to other Omanis using Forums as rewarding? Could you tell me more about what you mean by that? - Did using technology during your school days bring about any change? - What technologies do you still remember that had an impact on you as a learner? - What happened when your interests changed? Developed new interests?
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<p>discussions and chats. At that time, I only used chats when I was away and needed to be in touch with family and close friends. I continued to use Hotmail to read general interest emails from mailing groups I subscribed to. I also used SQU email to exchange emails to get academic or extracurricular work done. During my studies, I remember taking a course on educational technology where I was asked to design learning activities using PowerPoint following specific guidelines. It was a very successful project where I designed listening activities to teach a number of letter sounds and they included audio files which I recorded myself.</p> <p>After becoming a teacher at the Language Centre, SQU, I found myself interested in educational technology both because I was skilled in it and I found it interesting and stimulating. At the beginning, I used Moodle a lot to design English language learning activities, such as reading and listening quizzes and discussion forums. I then left for my master's which I did in Learning Science and Technology. The program was designed around the key features of e-learning where students interact and attend a lot of classes online. The program introduced me to Web 0.2 tools which I then used with my students at SQU. I slowly decreased my use of Moodle and found Web 0.2 tools richer and more user-friendly.</p>	<ul style="list-style-type: none"> - Tell me more about this course. Enjoyed it? How? Useful or not? - How did you record yourself? Good experience? More details. - What particular incidents (positive/negative) do you recall about using technology as a teacher? - Tell more about master's program? - Why did you use Web 0.2 tools? Explain? Did they contribute in any way to your teaching?
---	---

<p>In classes, I used a number of e-tools which I also did some research on. I experimented using discussion forums with students in levels 3 and 4 and presented my results in conferences. I also designed and held online reading lessons on a virtual platform called Titanpad and monitored the lesson distantly from my office. What was eye-opening about these experiments was that students showed great interest in learning online and were able to handle these activities very well. This opposes the very widely spread belief amongst teachers which says that students have very poor computer skills which make them unqualified to participate in such e-activities. That's why I made it my mission as a teacher to spread the word of effective e-learning and provide training to teachers on designing effective online learning activities. I did this both on my own and with other fellow teachers. I was involved in presentations on mobile learning where different mobile apps were introduced to teachers and how they could be used in teaching. Quizlet, Camscanner and Picsart are three of these apps.</p>	<ul style="list-style-type: none"> - How was your experience with Titanpad different from other traditional classes? - Did using technology in teaching make a difference to you/your students? How? - Does using technology change your way of thinking about your lessons? Tell me more. - Explain what you mean with "I made my mission"? How and why? - What motivated you to do training on your own? - Want to add anything?
--	--

Appendix H Sample of initial interview

Initial Interview questions (Muna case) – Based on her “Me and Technology” Autobiographical account.

Early experiences with technology

- Could you tell me more about yourself and your background?
- Tell me about your learning experience as a student when you were at school?
- You mentioned that your first encounter with technology was back when you were in grade 4? Could you tell me more about that?
- In your opinion, in what way would your experience be any different if you had no contact with technology then?
- After grade 4 till grade 10, did you use technology in learning? Why?
- What changed in grade 10? And in what way was your experience different?
- You described the ability to reach out to other Omanis using Forums as rewarding? Could you tell me more about what you mean by that?
- What happened when your interests changed? Developed new interests?
- Did using technology during your school days bring about any change?
- In what way has technology affected you as a learner of English Language?
- What technologies do you still remember that had an impact on you as a learner?

Experiences as a teacher

- How long have you been working in the CPS?
- What courses do you teach? Do these courses differ from one semester to another?
- Do you usually find technology useful in learning and teaching English Language?
- As a teacher of English language, how do you describe technology as a medium of teaching?
- In what way do you think it contributes to your teaching?
- What particular incidents (positive/negative) do you recall about using technology as a teacher?
- Is it benefitting your students? How do you know?
- As a teacher, has technology affected your relationship with your students? How?
- How was your experience with recording yourself?
- Did using technology in teaching make a difference to you/your students? How?
- Does using technology change the way you view/deliver curriculum?
- Does using technology change your way of thinking about your lessons? Tell me more.

Appendix I Sample of individual case coding using Nvivo 11.

The screenshot displays the Nvivo 11 software interface. The top menu bar includes options like FILE, HOME, CREATE, DATA, ANALYZE, QUERY, EXPLORE, LAYOUT, and VIEW. The left sidebar shows a 'Nodes' list with categories like Case Nodes (Anwa, Baraa, Mona, Rashid, Taleem), Thematic Nodes (Cases, Case Nodes, Sentiment, Relationships, Node Minutics), and other tools like Sources, Classifications, Collections, Queries, Reports, and Maps.

The main workspace shows a list of nodes under the 'Anwa' case. Each node has a name, a source, and a reference count. The node 'Technology in teacher education' is highlighted in blue. Below the list, a detailed view of this node is shown, including a list of sources and references, and a text excerpt from the source.

Node Name	Source	References
Belief about Technology		2
Early experiences with technology		2
Technology at school		4
Feeling privileged		3
As part of the school curriculum		3
Disinterest in tech at school		6
Obstacles faced		3
desire to learn more		2
Technology at home		2
Eagerness to use tech		3
Feelings about technology		3
using tech for academic purposes		2
Influence of technology		3
communicating with the world		2
Technology in teacher education		3
from ignorance to exploitation		3
Change as a teacher		2
reflective use of technology		3
evaluating technology use		2
influence of learning point on students		2
different classroom management		2
Programs used - learned		2
Communicating with others		3
using technology to develop		3
becoming a critical thinker		2
Creativity and excellence		2
Instructional practices during observations		2
Technology for fun		2
Technology and higher education		1

The detailed view of the 'Technology in teacher education' node shows the following sources and references:

- Sources:** Anwa (3)
- References:** 3

The text excerpt from the source is:

1- What are the factors that will motivate you or that will integrate technology in your teaching and integrate it in your teaching?

Anwa: First my own experience in the classroom. While I was a student, I can see, we can be learning by using technology more learning. The other thing is Language Centric competition.

2- Do your colleagues help you to integrate technology?

Anwa: Yeah. We have teachers who are well known as good teachers. They focus on technology and actually boost their learning and more. And that I need to use that they show me that I use more and do more.

Mahmoud:
Does anyone cross your mind, those who are good colleagues, those who are good teachers?

Anwa: Yeah.

Mahmoud:

Appendix J Sample of cross-case coding using Nvivo

11.

Memorandum Analysis June 17 (Recovered)/mnp - Micro Plus

Name	Sources	References	Created By	Created On	Modified By	Modified On
Changer to cognitions and instructional practices	6	16	MZM	20/04/2016 09:53	CL	16/05/2017 16:24
Classroom practices	8	14	MZM	19/03/2016 17:51	CL	10/05/2017 17:59
Using tech in giving feedback to students	1	1	MZM	13/08/2016 13:57	CL	19/05/2017 11:19
Tools used in classrooms	12	21	MZM	19/03/2016 17:52	CL	10/05/2017 17:59
Experiences of using technology as a teacher	3	3	MZM	20/03/2016 08:31	CL	10/05/2017 17:59
Technical problems during lessons & how to overcome them	2	2	MZM	24/04/2016 10:57	MZM	22/09/2016 14:35
use of ICT during lessons	2	2	MZM	24/04/2016 11:00	MZM	11/06/2016 15:10
Technological instructional practices	0	0	MZM	09/06/2016 12:56	MZM	09/06/2016 12:56
Teacher talks about students' feelings	2	2	MZM	11/06/2016 13:46	CL	18/05/2017 10:09
Planning stage	1	1	MZM	23/09/2016 09:28	CL	21/10/2016 15:52
Changes to instructional practices as a result of technology	2	5	MZM	11/06/2016 13:28	CL	21/10/2016 15:33
Tech require different classroom management styles	3	5	MZM	09/06/2016 13:09	CL	21/10/2016 15:29
learner-centred activities using tech	1	2	CL	21/10/2016 15:27	CL	21/10/2016 15:27
Feedback & technology	1	1	MZM	20/04/2016 10:40	MZM	05/10/2016 12:02
Teacher uses personal mobile phone in teaching	2	2	MZM	11/06/2016 13:46	MZM	12/08/2016 13:58
Increase ability to produce instructional materials	1	2	MZM	09/06/2016 14:44	MZM	09/06/2016 14:46
Deep reflection on lessons taught	1	1	MZM	09/06/2016 14:42	MZM	09/06/2016 14:43
Incidents where technology should not be used	1	1	MZM	09/06/2016 13:00	MZM	09/06/2016 13:00
Beliefs about using technology	12	24	MZM	20/03/2016 17:57	CL	10/05/2017 17:59
Factors affecting teachers integration of technology	0	0	MZM	19/10/2016 13:31	MZM	19/10/2016 13:31
Social and cultural environment	3	7	MZM	21/04/2016 18:43	CL	10/05/2017 17:48
Organization	1	1	CL	21/10/2016 14:46	CL	21/10/2016 15:07
students	1	2	CL	21/10/2016 14:45	CL	21/10/2016 15:07
related to teacher	0	0	CL	21/10/2016 14:43	CL	21/10/2016 14:43
Course books	1	1	MZM	21/10/2016 10:45	MZM	21/10/2016 10:45
some activities better done on paper	1	1	MZM	19/10/2016 17:27	MZM	19/10/2016 17:28
training	1	1	MZM	19/10/2016 13:51	MZM	19/10/2016 13:51
Trainings	1	1	MZM	20/04/2016 09:56	MZM	22/09/2016 10:22
Motivators to use technology	0	0	MZM	20/04/2016 12:45	MZM	20/04/2016 12:45
Turning points - shift towards technology	6	13	MZM	19/03/2016 17:46	MZM	18/10/2016 10:48
Inspirational stories & moments	5	14	MZM	20/04/2016 09:32	MZM	14/10/2016 11:29
Challenges of using technology	1	1	MZM	20/04/2016 10:15	MZM	22/09/2016 14:35
Experiences as a learner	2	3	MZM	19/03/2016 17:34	MZM	19/04/2016 18:28
Reflections of tech use as a learner	3	5	MZM	20/04/2016 09:33	CL	19/05/2017 10:09

Appendix K Sample of classroom observation schedule notes

Classroom Observation (1)

1- BACKGROUND INFORMATION

Name of the teacher	Arwa (pseudonym)	Lesson	
Date	11/10/2015	Equipment	LCD projector Computer Mobile phones
No. Students	15	Class/computer lab	class
Time	10-11		

2- CLASSROOM ACTIVITES

General description of the teacher's actions/ instructional practices, the lesson observed and the classroom settings.

- The teacher took attendance online using the SQU portal
- The teacher revised the H.W.
- The teacher used an activity to introduce critical thinking. Teacher used a picture which she displayed through the projector – students were asked to comment.
- Teacher used an independent activity for skimming/scanning a weather forecast- displayed through projector- coloured and with labels
- The copies distributed of the activity were in black and white- displayed copy in colours (Is the activity part of the curriculum or did you prepare it yourself?)
- Teacher mostly depended on the displayed copy- limited students' use of the printed copy was observed
- Teacher asked the students to work out the activity- referring to the displayed copy of the activity
- Teacher did not allow students to use mobile phones to look up difficult words (Why?)
- A few students were asked to come out to the front of the class to explain some words/issues on the screen.
- Teacher mainly guided them here

- Teacher informed students that they were going to play a reading game
- Teacher switched off the projector and started working with the desktop computer
- Teacher showed the website address (www.Kahoot.com) and asked students
- Teacher provide a PIN on the board and asked students to log in using their usernames
- Students seemed to know what they were doing
- Students were very enthusiastic as they competed each other – teacher was enthusiastic too
- Several attempts by the teacher to calm students down – teacher did not seem to be frustrated or angry – she did that with a smile
- Two groups won – students celebrated for a moment
- Students gave short feedback about the activity (Nice, nice teacher – teacher can we do it again).
- Teacher asked students to switch off their mobiles and put them into their pockets.
- Teachers shouted (It's time for the book again!).
- Teacher asked students to watch a video (asked them some Qs beforehand)
- Teacher elicited answers from students
- End of lesson

Appendix L Participant information sheet

Participant Information Sheet for Observation & Interview

Title of the research:

(The relationship between Omani teachers' technology use and their teacher cognition and instructional practices)

You are kindly invited to participate in this research. However, the choice is totally yours to take part in this research. Please take time to read the following information carefully about the research. Please do not hesitate to ask if you need any clarifications.

What is the purpose of the research?

The aims of this research are:

- To explore the relationship between Omani teachers' technology use and their cognitions and instructional practices
- To investigate the impact of technology integration on Omani teachers' cognitions and instructional practices.
- To identify the possible factors which influence Omani teachers' integration of technology

Why I have been chosen?

You have been chosen because you are an Omani teacher teaching at the Centre for Preparatory Studies at Sultan Qaboos University. All Omani teachers in the Centre for Preparatory Studies at SQU are invited to take part in the study.

Do I have to take part?

Taking part in this research is entirely voluntary. If you decide to take part, you will be asked to sign a consent form and you can withdraw at any time you wish. You will also be given a copy of the information sheet to keep. You do not have to give any reason for your withdrawal and there will be no negative consequences for that.

What will happen if I take part?

If you decide to take part in this research, you will be asked to write an autobiographical account about your relationship with technology as a learner and as a teacher. I will also ask you for your permission to visit your classroom twice. We will arrange this together. You will be provided with all

information beforehand as to what will my role be during the classroom observations. It is worth clarifying, though, that I will not interfere in any way during my observation and that my role will be only observing. I will also seek your permission to conduct interviews after the observations where we will discuss what happens during the observations. We will arrange these meetings together according to your own timetable. You will also take part in a final interview.

Will I be recorded?

I will seek your permission to audio record the observations and interviews. Recordings will only be used for analysis and no other use will be made of them. Also no one except for me and my supervisors will have the chance to access the original recordings. If you feel that you do not want to be audio-recorded, I will take notes of what happens in the observations and also our conversation during the interviews.

Will taking part in this project be kept confidential?

All the information that we collect about you during the course of this research will be kept strictly confidential. You will not be able to be identified in any reports or publications.

Who is organizing and funding the research?

The research is organized and conducted by me, Mahmood AL Waaili, under the supervision of Dr. Martin Wedell and Dr. Aisha Walker in the School of Education at the University of Leeds, UK, and it is funded by the Ministry of Higher Education in Oman.

If you wish to speak to me or ask about any details regarding the research, please contact me via:

E-mail: ed10mzaw@leeds.ac.uk,

Mobile: (00968) 99243176 (Oman)

(0044) 7880728490 (UK)

Thank you so much for taking the time to read through the information sheet.

Appendix M Sample of Muna post observation interview

Label: Muna Post Observation Interview 2 (MPO2)

Date: 25/11/2015

Words: 1464

Duration: 10m 52s

Mahmood: Okay. Thank you so much, Miss, for allowing me the chance to attend your lesson. It's been great. I'd like you first to give me a brief about the aims of today's lesson.

Muna: Students have been writing a lot. They have been writing essays a lot so I thought it's a good chance for them to revise some grammar. So at the beginning they did an activity on the passive and active voice, an activity on paper then we all as a class did it on the board. And then we did revision of certain connectors that can be useful in writing essays and I asked each one of them, actually I asked them to work in pairs using TitanPad and come up with examples for each connector. I gave them feedback on each of their examples and finally we ended the class by getting students on Turnitin, which is a tool that discovers plagiarism. So they have actually finished writing the reports and they had to upload their typed report to check if there are any problems in plagiarism.

Mahmood: Do you feel you have achieved your aims?

Muna: I think I did, yes. I was actually concerned at the beginning because Turnitin and TitanPad were not working at the beginning, but then it went well.

Mahmood: What role did you plan technology to have in your lesson?

Muna: Actually it's more of a facilitation tool just to facilitate and maybe even enrich the activity. Like doing the paperwork, mostly it has been a routine so for a change we would have it on TitanPad instead of paperwork. And TitanPad also allows for having students read others' work at the same time.

Mahmood: So there was a moment when you were trying to log in to the TitanPad and it did not work. Could you tell me what your thoughts were at that moment?

Muna: When it did not work?

Mahmood: Yes.

Muna: Well, I have been feeling frustrated, especially by the Internet connection here at SQU, and it's getting even worse and worse. So I do not know. It is frustrating to me and quite embarrassing because in front of students I would plan for this and why are we in the lab then. The point of it is to use technology, to use computers. So at the moment I'm trying to get used to this problem so I know like well, it's not working right now. Hopefully it will be working in 5, 10 minutes.

So I have been trying to get accustomed to this situation at SQU. So yeah I got frustrated at the beginning but I said hopefully it will work. I know it will work sooner or later. And that's why I was jumping between trying to use TitanPad and Turnitin, trying to see which one will work first. And what helped is that students got on TitanPad quicker than me so I thought okay let me try now again and it worked. So yeah it's frustrating but I have to get accustomed to it.

Mahmood: Was there any change of your plans?

Muna: Well, I dint plan for a plan B because this was what I wanted and I thought it's a 4 to 6 class so the Internet connection should be better because it's not as busy as it is during the day when everybody is using it.

Mahmood: Was that why you felt more frustrated because there was no plan B?

Muna: Of course, yeah. And I do not know what...I booked the lab to use technology so what plan B would I have, paperwork? But maybe in future I need to do this.

Mahmood: Then you started working with TitanPad and you got your students grouped into pairs.

- Muna: Actually I had all of this. I had the prompts done before class so everybody...
- Mahmood: Did you do them yourself?
- Muna: Yes.
- Mahmood: That was while you were at the office beforehand.
- Muna: Yes, beforehand. Everything was there so they just get in and they start. Actually this listening platform we have been using this for a while like in different classes so everything is saved, even the previous lessons. You can actually play the whole lesson all over again and even the previous lessons. You can see everything in action.
- Mahmood: Okay, so students can still go home and have a look at what they have done.
- Muna: Exactly and those who were absent can actually go to the lab and see what was done.
- Mahmood: Okay. What made you choose TitanPad in a writing class? What was your thinking?
- Muna: TitanPad makes it easier for everybody to be working on the same window and see what others are writing. So it's really more of, as we mentioned before, it's like putting input, writing your own, reading other's input and even thinking of others input and maybe evaluating what others have written. And it's also helpful for me as a teacher to see everybody's work at the same time and keeping track of what they are doing and giving comments, real time comments for them.
- And everything is done on one screen so whatever they see, they see on the projector. Even though everybody is doing their own thing, but it keeps things together and everybody is following the same thing.
- Mahmood: Does that make it challenging to you as a teacher that you have to comment on students' work synchronously at that very moment?
- Muna: It's challenging in a way that you do not want to leave anybody behind. You want to make every student or every pair at least

to feel that their input is actually being commented on and it's valued and it's being taken care of. So that's why actually I did my best to cover most of them and I apologised for not covering the rest of it. And that's why I pair them up, just to make it not as chaotic as it would be if each person is actually working on their own.

And also pairing them up gives them that chance to discuss what example to come up with and discuss the grammar used in each so they evaluate and reflect on their writing before I start giving comments.

Mahmood: How does it feel for you as a teacher watching your students write live in front of you? Usually students go home and they write their assignments or whatever.

Muna: Of course it's different because it's rewarding to me because if I see them doing it, first of all I see their effort in front of me, visible in front of me. Second, when I see them using the right grammar, this is also very rewarding and I can easily comment on that for all of them and say, "This is excellent grammar." This is what I saw. And also what is interesting about it is that a pair would start one example and it's perfect and others would copy the same grammar and this is good practice after all. Even though it's not the same example but they learn the grammar from there and they realise this is the correct grammar to use and then they start using the same grammar. So I think it's not even rewarding just for me, even for the students. It's even more rewarding for the students.

Mahmood: Are students supposed to submit their assignments or essays through Turnitin?

Muna: They do not. Teachers do not have to mark them on Turnitin but students should actually. Teachers must actually follow what Turnitin says about plagiarism so before the teachers do this, the student are given the chance to upload their work on Turnitin and check if there are any serious problems they have to take care of before submitting the second drafts to the teacher. And once they submit the second draft, then the

teacher uploads it to Turnitin and marks the students for plagiarism and see if there are any problems.

Mahmood: Is there anything you'd like to add about today's lesson in terms of technology use?

Muna: I tried to integrate it as much as possible and it's a habit. It has been a habit for me. And I think, as you say, maybe students value this because they see a different way of teaching and hopefully a more interesting way of dealing with content. And I think students, especially the guys, are very good with technology and they would give solutions, technological solutions to handle something wherever there is a problem. So it has been rewarding and again these students interacting with it and they're very much into it. I even get suggestions from them so it is rewarding and I feel like I'm learning from them too.

Mahmood: Thank you so much.