TEACHER COGNITION AND THE USE OF TECHNOLOGY IN TEACHING ARABIC TO SPEAKERS OF OTHER LANGUAGES

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ABSTRACT

This study investigates teacher cognition and technology use within a context of teaching Arabic to speakers of other languages. Specifically, teacher cognition is examined in relation to early learning experiences, teacher education, classroom practice, and work environment. Following a case study approach, three in-service teachers have been selected to represent different perspectives on using Information and Communications Technology (ICT) in language instruction. Findings suggest that teachers' cognitions about teaching and learning, and about themselves as Arabic language professionals, shape technology use, determine reactions to perceived challenges, and illuminate differences between practitioners working within the same environment with regard to the integration of ICT into their practice. The research suggests that despite the absence of digital learning opportunities in early schooling and teacher education, these experiences still influence the choice of instructional strategies employed by teachers to support technology use. The study accentuates the role of context as a mediating force, supporting teacher cognition and ICT use, but also creating dissonance between them. Teacher cognition determines the weight that practitioners assign to different contextual factors. While lack of time is identified as the most significant barrier to adoption, peer collaboration is recognized as the most effective enabler for technology integration. Other key factors emerging in this study include institutional philosophy and policy, learning opportunities, and technical support. Conceptual, methodological, and professional contributions are addressed, and potential for further research is identified.

DECLARATION

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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DEDICATION

To my parents,

With endless love and gratitude

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Dr. Waheed Samy of the University of Michigan was a pioneer on the path of Arabic language teaching and technology, and I undertook this research inspired by his work and encouraged by his words. Sadly, he passed away as this thesis was reaching its conclusion. He will always be remembered by his friends, colleagues, and students, and his legacy will live on.

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ABBREVIATIONS

ALI	Arabic Language Institute
AUC	The American University in Cairo
CALL	Computer-assisted Language Learning
CLT	Center for Learning and Teaching
ELI	English Language Institute
ICT	Information and Communications Technology
L2	Second Language
TAFL	Teaching Arabic as a Foreign Language
TASOL	Teaching Arabic to Speakers of Other Languages
TEFL	Teaching English as a Foreign Language

CHAPTER 1: INTRODUCTION

1.1 Rationale

As digital resources gradually permeate Arabic language teaching settings, research has identified support for teachers (Al-Sharari, 2008), and teacher educators (Al-Kahtani, 2006) as essential for effective integration. As agents for change, teachers play a pivotal role in the process of technology adoption (Dexter, Anderson, & Becker, 1999). At the heart of what they do lie their cognitions, the tacit elements of their professional lives. It is, therefore, important to understand "the key role teachers - and their cognitions - play in the implementation of educational innovations" (Borg, 2006, p. 1).

This study explicates teacher cognition in relation to individual technology practices within a context of teaching Arabic to speakers of other languages (TASOL). Since integrating information and communication technologies (ICT) into Arabic language settings is a relatively new area of investigation, attention is given to exploring aspects of teachers' mental lives in light of the distinctive characteristics of such emerging "ecologies" (Zhao & Frank, 2003).

1.2 Context of Study

The topic for investigation was inspired by my ten years of teaching experience at the Arabic Language Institute (ALI) at the American University in Cairo (AUC), Egypt. Since its foundation in 1921, the Institute has attracted thousands of learners from various parts of the world, and is currently considered one of the leading centers for Arabic language study in the region. The ALI also hosts the MA in Teaching Arabic as a Foreign Language (TAFL) program, tasked with preparing qualified Arabic language teachers and promoting research in the field. ICT was first introduced to the Institute in the late eighties at the hands of Waheed Samy¹, who, in addition to teaching Arabic, took an active interest in educational technologies. He set up a small computer-assisted language learning (CALL) Unit whose objective was to develop digital material, and provide basic training to interested teachers. Over subsequent years, AUC took gradual steps toward incorporating learning technologies, and by the end of the nineties, every teacher in the ALI had a desktop computer. Later, upon receipt of a generous grant, Arabic language classrooms were refurbished to accommodate a wide array of educational technologies (Z. Taha, Director of the ALI, Interview, 11.02.2008).

At the time of field investigation (November 2007 - July 2008), the Institute could be considered a language learning environment of ubiquitous computing and networking. Every Arabic language classroom was equipped with PCs for the teacher and all learners, a smart board, a document camera, a satellite TV connection, in addition to digital audio and video facilities. Classrooms were also Wi-Fi supported and the Institute operated its own server. In addition to their desktops, teachers were each entitled to a portable computer, and a secure space on the server. The ALI also hosted a larger CALL Unit, supported by four full-time personnel: the head of the Unit, a lab specialist and programmer, a classroom technologist, and a lab assistant.

Despite this pervasive technology, only a limited number of teachers chose to make use of the new resources. This raised questions about factors for adoption of ICT, and the role of teacher cognition for effective integration within this particular teaching environment.

1.3 Research Questions and Design

The research questions that have guided the investigation consist of one main overarching one, and four sub-questions.

What is the relationship between teacher cognition and the use of technology in teaching Arabic to speakers of other languages?

¹ All names stated in this study are real ones. The rationale behind non-anonymization will follow in Chapter 4 *Ethics and Culture.*

- What is the relationship between teacher cognition and teachers' early experiences as learners?
- What is the relationship between teacher cognition and teacher education?
- What is the relationship between teacher cognition and classroom practice?
- What is the relationship between teacher cognition, classroom practice, and context?

A multiple case study design has been chosen for this study, whereby three in-service teachers have been selected to represent different perspectives on teacher cognition in relation to ICT use. The approach allows for an in-depth understanding of the cases in question, and a comprehensive analysis of the contextual complexities involved.

1.4 Definition of Terms

The following are definitions of key terms used in this research:

1.4.1 Teacher Cognition

Pajares (1992) argues that one of the problematic aspects of understanding teachers' beliefs is the inconsistency in the terminology used to refer to this concept. He explains that beliefs:

.. travel in disguise and often under alias - attitudes, values, judgments, axioms, opinions, ideology, perceptions, conceptions, conceptual systems, preconceptions, dispositions, implicit theories, explicit theories, personal theories, internal mental processes, action strategies, rules of practice, practical principles, perspectives, repertories of understanding, and social strategy, to name but a few that can be found in the literature. (p. 309)

The same challenge is identified by Borg (2006) in his review of literature on teacher cognition during the period 1976 - 2006. He notes that diverse terms have been used to refer to similar constructs, and similar terms are used to refer to diverse constructs.

He concludes that having a shared frame of reference can lead to some "unity and coherence", which are vital for continued progress in the field (p. 272).

Due to the difficulty of drawing clear lines between mental constructs such as beliefs, attitudes, and knowledge, the term *teacher cognition* will follow the work of Calderhead (1996), Borg (2003, 2006, 2009), Fang (1996), Kagan (1990), Johnson (2006, 2009), and Woods (1996).

I use the term teacher cognition as an inclusive term to embrace the complexity of teachers' mental lives [...] what teachers at any stage of their careers think, know, or believe in relation to any aspect of their work, and which, additionally but not necessarily, also entail the study of actual classroom practices and of the relationships between cognitions and these practices. (Borg, 2006, p. 50)

1.4.2 Technology

A wide range of definitions may be offered for the term *technology*. However, in this research, I limit my discussion to digital technologies, particularly those supported by the ALI, and commonly recognized by members of that community as *technology*. For example, within the Institute, certain applications and facilities are no longer considered *technology* either because they have become invisible or "normalized" (Bax, 2003, p. 23), such as the word processor, or because they are slowly superseded by other tools, such as in the case of the cassette player, the over head projector, and the traditional language lab.

1.4.3 TASOL vs. TAFL

In this research, I have chosen to use the term TASOL rather than TAFL because it avoids the whole foreign/second dichotomy, and also shifts the focus of attention from the language to the learners. The usage of the term TAFL will, therefore, be restricted to the specific context of the MA in TAFL, as this is the official name of the degree program.

1.5 Overview of Study

The study is organized into three parts and nine chapters (including this Introduction). The following presents an overview of the work as it will unfold.

Part I: Exploring Teacher Cognition and Technology

Comprising three chapters, this section situates the research within the broader landscape of teacher cognition and ICT, and presents a detailed analysis of the process of investigation.

Chapter 2 discusses factors for adoption of technology and identifies the essential role of teacher cognition in integration. It further presents the theoretical framework chosen for this study, and discusses the relationship between teacher cognition on the one hand, and early learning experiences, teacher education, classroom practice and context, on the other.

Chapter 3 expands on the methodology employed in this investigation. It presents a rationale for the choice of research design, followed by a discussion of the process of selecting the three cases, the different data collection strategies, and the analytical procedures used. The chapter then addresses measures of establishing trustworthiness and maintaining rigor.

Chapter 4 presents a personal account of the lived experiences of a researcher investigating her own work site. It sheds light on the importance of the affective elements of fieldwork methodology, specifically when examining familiar territory. The value of personal relationships is discussed in relation to four main aspects of insider research: researcher identity, access, advanced knowledge and disengagement. The chapter goes on to highlight the significance of interpersonal relationships in establishing academic rigor in qualitative research, and the need to develop a deeper understanding of the methodological opportunities and limitations of one's fieldwork environment.

Part II: Articulating Teacher Cognition and Technology

The emphasis here is on teacher cognition in relation to technology use as expressed by the three participants. *Chapter 5, Chapter 6*, and *Chapter 7* represent the case profiles where teachers' cognitions about ICT are discussed in light of the broader research areas of early learning experiences, teacher education, classroom practice, and teaching context.

Part III: Understanding Teacher Cognition and Technology

The insights gained from examining the teachers' thought processes as reflected by the three case profiles, are the subject of Part III. It is divided into two chapters.

Chapter 8 discusses the key findings that emanate from the three case profiles in light of the research questions that have guided the process of investigation.

Chapter 9 summarizes the outcomes, addresses implications, and elucidates areas for further research.

PART I: EXPLORING TEACHER COGNITION AND TECHNOLOGY

This section familiarizes the reader with the investigation, its nature and direction. Chapter 2 presents a rationale for the study and situates it within the wider landscape of language teacher cognition. A detailed analysis of the literature leads us to Borg's *Elements and processes in language teacher cognition* (Borg, 2006, p. 283), which summarizes the main understandings in the field, and constitutes the theoretical foundation for this project. Chapter 3 addresses the methodological decisions underpinning the investigation, and in particular, the research design used and the approaches to data collection employed. Chapter 4 guides the reader into a different area of fieldwork methodology. Serving as a window into insider research, it addresses the importance of field relations in naturalistic inquiry, and emphasizes the role of the cultural context in informing the course of the study, as well as the ethical decisions made.

As both Chapter 3 and Chapter 4 are methodological in nature, they complement one another, and may overlap in certain areas, as information central to both chapters is addressed from different perspectives. In fact, all three chapters are closely linked as Chapter 2 focuses on the theoretical, Chapter 3 emphasizes the procedural, and Chapter 4 addresses the cultural-ethical. Combined, they represent the vehicle which has carried this research forward.

CHAPTER 2: TEACHER COGNITION AND TECHNOLOGY USE

2.1 Introduction

This chapter presents an analysis of the literature that has informed the development of this study. It sheds light on the current debates in the field, positions the study on the broader research map, and presents a rationale for the theoretical framework used.

This review of the literature mirrors the various stages of my thought processes as I investigated this area of interest, mapping territory, recognizing gaps, exploring conceptual models, and situating the study.

As identified in Chapter 1, the motivation for exploring teachers' cognitions about ICT use in TASOL emerged from personal observations of and reflections on the state of minimal technology implementation in an Arabic language teaching context despite ubiquitous computing. I started looking into factors for adoption of ICT by teachers in general, and language teachers in particular. The literature consulted was broad in both scope and geographical spread, and given my specific area of interest, relevant research from Arab countries was specifically sought out.

My examination of the enablers and barriers for technology integration revealed teacher cognition to be one of the most influential factors for adoption, if not the most influential. I, therefore, decided to follow this thread and examine the nature of teacher cognition, in general, and cognitions about using technology in teaching in particular. I delved into the relationship between teacher cognition and a) previous schooling experience, b) teacher education, c) classroom practice, and d) work environment.

In the process, Simon Borg's (2006) *Elements and processes in language teacher cognition* emerged as a conceptual springboard for the project. I recognized the opportunities and challenges associated with the framework, and added a technology element to it.

In a nutshell, this was my journey toward situating the research within the wider landscape of literature on teacher cognition. The following will present the details of this voyage of exploration.

2.2 Factors for Adoption of Technology

Different classifications have been used to refer to factors for adoption of ICT, such as first order and second order (Ertmer, 1999), personal and contextual (Ruthven, Hennessy, & Brindley, 2004), teacher-level and school-level (Jones, 2004), teacherlevel, school-level, and system-level (Balanskat, 2006), material and non-material (Pelgrum, 2001), and internal and external (Al-Ammari, 2003; Ertmer, 1999; Lam, 2000). Despite the wealth of classifications available, some researchers stress the difficulty of dividing these factors into categories as they are highly interrelated and interdependent (Bingimlas, 2009; Zhao & Frank, 2003). For example, Zhao and Frank (2003) explain that such elements have often been studied independently of one another or of the environment in which they interact, and are seldom investigated within a coherent structure so that they are prioritized in terms of their comparative significance, and analyzed in relation to interactions between them. For these reasons, and due to overlap between the different categories, factors for adoption of technology will be approached without any specific categorization, although the various relationships between them will be highlighted.

2.2.1 Availability of Resources

It is unreasonable to expect teachers to integrate technology into their teaching if there is not much technology to be integrated. Mumtaz (2000) reports that availability of high standard technology resources is associated with successful implementation of technology, and that limited resources confine teachers' ICT use. In the same vein, Cox et al. (2003) explain that the majority of teachers use the technological facilities that are available to them instead of purchasing the ones that they really need. Consequently, their pedagogy becomes dependent on the technology rather than enhanced by it.

So, how does availability of resources affect technology integration globally? According to an international study by Pelgrum (2001), lack of resources emerged as

one of the most important barriers to ICT implementation. On a regional level, a European study confirmed that although availability of resources does not necessarily guarantee technology adoption, lack of resources is a major obstacle to technology uptake by teachers (Balanskat, 2006). In the US, a study by Baylor and Ritchie (2002) in 94 schools across the country found insufficient numbers of computers to be one of the barriers identified by the teachers. Similarly, the importance of access to resources is emphasized in a Canadian study of 764 elementary and secondary school teachers (Wozney, Venkatesh, & Abrami, 2006). Focusing in on the Arabic-speaking countries, research identified lack of resources as a major hindrance to ICT adoption. In their study on the Arab region, Loch, Straub and Kamel (2003) explained that whereas many private universities are wellsupported with computers and networks, the majority of public universities are not. Zooming in on particular Arab countries, we find that according to a Syrian study, for example, 57% of the teachers had computers at home, while only 33.4% of them had access to machines at school (Albirini, 2006b, p. 385). Within the Saudi Arabian context, the absence of online networks and computer hardware was reported as a barrier for technology integration in schools (Al-Alwani, 2003). Similarly, lack of access to the Internet and inadequate quality of connection were identified as hindrances to faculty technology use in Saudi institutions of higher education (Al-Asmari, 2005; Al-Fulih, 2002).

A related area of concern is that within educational contexts in the Arab world, teachers may encounter a serious lack of language specific resources. In other words, although teachers might have the technological equipment necessary to run their classes, lack of Arabic language resources could stand in the way of using that equipment effectively. According to *The Global Information Technology Report* 2002-2003, "the lack of local language content availability shuts out the Arab public from ICT" (Dutta & Coury, 2003, p. 128). Similarly, Bäbler (2006) explains that despite the availability of different educational technologies "teachers of less commonly taught languages often still struggle to find appropriate language teaching resources" (p. 275). Although Arabic is one of the six official languages of the United Nations, it is very under-represented in terms of Internet content and software production (Albirini, 2006a). The development of ICT-based material in Arabic is,

therefore, emerging as an area of concern to educators in the field. For example, in the context of teaching Arabic to speakers of other languages, Ditters (2006) describes "arabization" of technology-based resources as "necessary", and explains that considerable efforts are being made in this direction (p. 239). It is, therefore, not surprising that the relationship between Arabic and technology uptake has been identified as an important, yet under-explored, area of investigation (Loch, et al., 2003).

Related to language appropriateness is the issue of perceived cultural suitability. Technology tools might be available but not necessarily appropriate to the cultural context. This applies specifically to software and web content. Studies from teaching contexts in the Arab world reveal that although language teachers might use different forms of digital tools, they prefer to keep away from the Internet due to the social and moral values carried into classrooms through this medium (Al-Oteawi, 2002; Albirini, 2006a, 2006b; Loch, et al., 2003). Preferences are stated for "Arab-made" software that addresses the teachers' needs, and suggestions are proposed for teacher awareness programs (Albirini, 2006a, p. 57). In a different language teaching context, Al-Asmari (2005) suggests allocating time for teachers to surf the Internet and develop their own instructional material.

In addition to time, availability of resources is closely linked to other factors for ICT adoption, such as: technical support, computer competence, confidence, training, school culture, and teacher cognition.

2.2.2 Computer Competence

Evidently, there is a high correlation between availability of resources and teacher computer competence. In environments where teachers do not have access to computer-based tools, it is unlikely that they will have the opportunity or the incentive to develop their ICT skills. It is, therefore, unsurprising that in Pelgrum's (2001) international research, lack of computers and lack of ICT competence emerge as the main obstacles for adoption respectively. The inter-dependence between resources and competence is corroborated by a study on foreign language teachers in Malaysia (Md Yunus, 2007). The author suggests that language teachers' lack of ICT knowledge might be attributed to limited access to technology in their workspace.

Research from some Arab countries proposes the same causal association (Albirini, 2006b).

The relationship between teacher computer skills and ICT adoption is supported by the literature (Baylor & Ritchie, 2002; Gobbo & Girardi, 2001; Granger, Morbey, Lotherington, Owston, & Wideman, 2002). As concluded by Egbert, Paulus, and Nakamichi (2002), "in short, teachers cannot implement what they do not know about" (p. 110). This relationship can also be illustrated with evidence from the Arab world. For example, in a study involving 622 Omani teachers, insufficient computer skills emerged as a barrier to efficient integration of ICT (Al-Rabaani, 2008).

It should be noted however, that teacher ICT competence does not necessarily lead to improved technology implementation, for there are additional factors that come into play, such as teacher cognition, openness to change, and access to further training (Granger, et al., 2002).

In addition, the literature does not suggest a consistent relationship between the level of teacher computer skills and attitudes toward technology. In two of the studies covered by this review, teachers of low computer competence held negative views of ICT (Al-Oteawi, 2002; Summers, 1990). However, interestingly, in more others, teachers of no or low competence expressed positive attitudes toward technology (Al-Rabaani, 2008; Albirini, 2006b; Md Yunus, 2007). Furthermore, Egbert et al. (2002) revealed that positive attitudes toward innovations are no guarantee of technology adoption. These are good examples of how contextual barriers can cause dissonance between teachers' cognitions about the value of technology use, and their actual classroom practice. Researchers in such contexts, therefore, urge decision makers in educational institutions to build on these positive attitudes as essential preconditions for successful technology integration (Albirini, 2006b; Md Yunus, 2007).

2.2.3 Confidence

According to Ertmer and Ottenbreit-Leftwich (2010), despite the importance of computer competence, this remains insufficient if teachers do not have the confidence to use these skills to achieve better learning outcomes. Stressing the

significance of confidence for ICT integration, the researchers argue that, "unfortunately, learning about technology is equivalent to asking teachers to hit a moving object" (p. 260). Teachers, therefore, need to have the confidence necessary for dealing with constantly changing innovations.

This factor for adoption is of particular import since teachers of low confidence are more likely to avoid using technology (Bingimlas, 2009; Demetriadis et al., 2003; Jones, 2004). A review by Cox et al. (2003) suggests that a large number of instructors still fear using some kind of ICT, which constitutes an obstacle to their adoption of technology. These findings are echoed by both Jones (2004) and Al-Fulih (2002). A study by Lam (2000) also demonstrates how second language teachers might feel anxious about using technology, as exemplified in this statement by one of the teachers in the study:

... If you're a teacher, you don't want to step into a classroom with something you don't know how it works, because you look like an idiot. It's already stressful to use something in a classroom, but if you don't know [how to use it], that's adding more stress. (p. 405)

However, Lam (2000) makes a clear argument that, in reality, teachers are not technophobic; in fact it is the educational institutions themselves that rush to install new technologies without consideration for the teachers or their learners. She adds that avoidance of innovation is not due to their fears, but rather to the fact that the teachers might not be convinced of the value of using it in their teaching. In this context, we notice the influential role of teachers' beliefs for ICT adoption.

Further, a report by Jones (2004) asserts a mutual relationship between teacher confidence and other indicators, such as access to resources, computer skills, technical support, and ICT training. The report shows how lack of resources or access might deprive teachers of the opportunity to experiment with technological tools and, therefore, shake their confidence in utilizing them. Also, teachers with low confidence might be less inclined to look for ICT resources in their institutions or request them. Likewise, teachers with low computer competence might fear using technology in their classrooms. Furthermore, the report asserts a reciprocal relationship between confidence and teacher ICT training. Thus, teachers with little

or no training might not know how to integrate ICT into their work, and therefore, avoid it altogether. Also, teachers with low confidence might prefer not to attend training courses so as not to appear less competent in front of their co-workers.

As this constitutes a significant predictor for integration, the literature has addressed means of raising the level of teacher confidence. For example, Baylor and Ritchie (2002) argue that enhancing teacher competence is likely to improve learning outcomes, which, in turn, contribute to increased teacher morale. On the other hand, Ertmer and Ottenbreit-Leftwich (2010) propose that supporting teachers in gaining positive technology-related experiences would be "the most powerful strategy" (p. 261). This is echoed by Mueller et al. (2008) who argue that "it is positive experiences with computers in the classroom context that build a teacher's belief in computer technology and confidence in its potential as an instructional tool" (p. 1533). The researchers, therefore, accentuate the importance of providing opportunities for experimentation with technology in the classroom.

2.2.4 Technical Support

Technical problems play a key role in teachers' decisions to use digital resources. In analyzing barriers for uptake of ICT, Jones (2004) identified two kinds of technical difficulties: "fear of things going wrong", and "lack of technical support" (pp. 15-16). As for the first, there is evidence that fear of damaging equipment (Bradley & Russell, 1997) can deter teachers from even experimenting with these tools in the first place (Jones, 2004; Arab Republic of Egypt Ministry of Education, National strategic plan for pre-university education reform, 2007/2008 - 2011/2012).

With regards to the second sphere of problems, Pelgrum (2001) ranks lack of technical support among the ten most significant barriers to adoption among primary and secondary teachers. The absence of regular maintenance increases the risk of technical failures, and therefore of the equipment being out of service for a considerable period of time (Jones, 2004).

Naturally, both anxiety about damaging machines and lack of technical support are closely associated with the level of teacher trust in digital tools. Cuban, Kirkpatrick, and Peck (2001) assert that constant breakdowns do shake teachers' confidence in

ICT, hence, educators who use technology on a regular basis need reliable machines to work with. Technical support is, therefore, essential to integration (Ertmer & Hruskocy, 1999), and "can be provided through on-site teacher troubleshooters, part-time coordinators, parents or business volunteers, student assistants, online help, and university business partners" (Ertmer, 1999, p. 57).

2.2.5 Technology Training

Although developing teacher computer skills is crucial for adoption, literature from diverse international teaching settings has documented a marked lack of ICT teacher training. For example, research from Kenya (Wabuyele, 2003), Malaysia (Md Yunus, 2007), United States (Baylor & Ritchie, 2002), Canada (Wozney, et al., 2006), Greece (Demetriadis, et al., 2003), Turkey (Güven, Çakiroğlu, & Akkan, 2009), and Cyprus (Charalambous & Ioannou, 2008) have all reported the need for teacher training in technology as a necessary precondition for adoption. The same demand is identified in some Arab countries. For example, in a large-scale ICT language teacher development project in Egypt, Warschauer (2002) affirmed that although there was a moderate number of computers in schools and universities, very little was invested in professional development. This was expressed in a statement by one of the Egyptian professors in his study: "We have the hardware, we have the software, we lack the humanware" (p. 472). Likewise, in Qatar, a study on elementary school teachers reported the same need for ICT professional development. In Saudi Arabia, Al-Oteawi (2002, p. 278) reported that 93.3% of his sample asserted a need for training. Similar findings were documented by Al-Asmari (2005) who described training as "one of the teachers' major demands" (p. 156). In Morocco, a need for ICT training programs for language teachers was also identified (Hassim, 2002). Further, according to a study on Omani teachers, more resources should be allocated to teacher technology development (Al-Rabaani, 2008). In the context of the widespread shortage in ICT teacher education, Pelgrum (2001) states that the cost of training might account for this lack of necessary attention.

It should be noted, however, that for technology training to be effective, a number of considerations are to be taken into account, such as: First, training needs to focus on the pedagogical as well as technical aspects of ICT use (Jones, 2004). Second, it has

to be context-embedded and address the teachers' immediate needs (Egbert, et al., 2002; Vrasidas & McIsaac, 2001). Third, it has to take the teachers current belief systems into account (Antonietti & Giorgetti, 2006), an area that is still under-researched (Tondeur, Hermans, van Braak, & Valcke, 2008). Fourth, teachers should be given the opportunity to experiment with what they have learned (Md Yunus, 2007).

In addition to being closely tied to teacher cognition, ICT training is intrinsically related to other factors for technology integration: computer competence, confidence, time, colleagues, and institutional culture.

2.2.6 Teacher Collaboration

Along with formal training, informal learning plays an influential role in adoption of innovations. Teachers learn from each other as they exchange ideas and share experiences. Egbert, et al. (2002) identify teacher collaboration as the main source of ICT learning outside the institutional training context. Underscoring the role of colleagues, Granger, et al. (2002) state that "the importance of collaboration cannot be over-estimated: teachers need each other - for team teaching and planning, technical problem solving assistance and learning" (p. 486). However, the authors add that there is no evidence to suggest that informal learning is more effective than formal training. These findings stand in contrast to those of Gobbo and Girardi (2001) whose participants preferred informal learning through colleagues to formal training. The teachers in this study found it more convenient to share their weaknesses with co-workers who were more acquainted with their teaching realities. Zhao and Frank (2003) also underline the importance of informal learning over formal training, and argue that because learning takes place in social settings, colleagues have the ability to influence one another's beliefs and attitudes toward technology use. They therefore suggest giving the teachers more opportunity to interact for better uptake of ICT. The authors, however, note that given their profound influence, peers can also act as a "social pressure" against integration of innovations (p. 832). For example, this may be evident in teaching contexts where an individual use of technology might indicate ostentation or signal a break away from the community.

In addition to its influence on teacher cognition, peer collaboration affects and is affected by other factors for adoption, such as: institutional culture, computer competence, confidence, and time.

2.2.7 Time

Time repeatedly emerges as key for ICT integration. Teachers need time, among other things, to interact with colleagues, attend training sessions, practice what they have learned outside their classrooms, prepare computer-based material, and reflect on their progress. It is, therefore, not surprising that a large number of studies report lack of time as a major hindrance to technology implementation (Al-Asmari, 2005; Granger, et al., 2002; Hermans, Tondeur, van Braak, & Valcke, 2008; Lam, 2000; Md Yunus, 2007; Wabuyele, 2003).

Given the significant role of this factor, time is invariably associated with training, teacher collaboration, computer competence, confidence, and institutional culture. We have also seen how giving teachers time to search for culturally appropriate material might reduce their apprehensiveness toward ICT tools, especially the Internet (Al-Asmari, 2005).

Looking at time from a different angle, educators need to bear in mind that change in practice for better integration is by nature a gradual process. Baylor and Ritchie (2002), for example, explain that teachers need to be exposed to novel ways of using innovations for a relatively long period before they can realize its full potential. Similarly, Veen (1993) estimates that it can take two-three years before technology becomes part of a teacher's practice.

2.2.8 Institutional Culture

Institutional philosophies and policies have a profound impact on technology uptake. For example, in his three-year teacher development program in Egypt, Warschauer (2002) realized that teaching with ICT was impeded by such factors as large class size, exam-based curricula, and more broadly, by unsupportive institutional policies. In a later work, in addition to the authoritarian political system, he identified the hierarchal structure of educational establishments as a main barrier to ICT adoption in Egypt (Warschauer, 2006). In a similar vein, Al-Asmari (2005) reported that class size and curriculum feature among the hindrances to technology use by Saudi language teachers. Similar obstacles to adoption were noted by Albirini (2006b) in his Syrian educational context. Likewise, in a Greek study, language instructors identified "traditional" schooling systems as a barrier to ICT implementation (Demetriadis, et al., 2003, p. 32). Hennessy, Ruthven, and Brindley (2005), also reported that centralized educational systems like the one in place in England as well as other parts of the world, give teachers limited independence, which might stop them from benefiting fully from the affordances provided by educational technologies.

Zhao and Frank (2003) explain that technology use takes place within "ecosystems" (p. 833), in which different factors interact. Consequently, no ICT implementation will occur without consideration for the institution's inner social dynamics and the external constraints they may encounter.

2.3 Teacher Cognition as a Central Factor for Adoption

Having explored the various factors for ICT implementation, I now highlight the key role of teacher cognition in technology integration. Research has demonstrated that the mere presence of opportunities for adoption is no guarantee that it will take place, for what makes the real difference are the teachers themselves, the 'agents of change' (Dexter, et al., 1999). At the very heart of what teachers do lie their convictions, knowledge, and attitudes - their cognitions. It is, therefore, not surprising that international research on enablers for and barriers to ICT implementation identifies teachers' attitudes and beliefs as central to adoption (Albirini, 2006b; Baylor & Ritchie, 2002; Cox, et al., 2003; Demetriadis, et al., 2003; Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010; Gobbo & Girardi, 2001; Jones, 2004; Lam, 2000; Mumtaz, 2000; Tondeur, et al., 2008; Veen, 1993).

Realizing the importance of teacher cognition in relation to other factors, Ertmer (2005) questions whether it is really "the final frontier" for ICT adoption (p. 25). In her investigation of the relationship between beliefs and other factors for adoption, she draws on Brickner's (1995) classification of barriers to change: first order (extrinsic) and second order (intrinsic). Ertmer (1999) explains that first order

barriers may include unavailability of resources, lack of time, and insufficient technical support, while second order barriers would constitute elements such as teachers' attitudes, pedagogical beliefs, and resistance to change. According to the author, interactions between the two categories of barriers have not yet been fully investigated, nonetheless, based on her work, the relationship between these categories can be synthesized into the following points: First, changes in first order factors lead to *adjustments* (rather than fundamental changes) in teaching, but do not impact teachers' fundamental beliefs and values. Second order changes, on the other hand, target core beliefs and pedagogical theories, and propose different ways of perceiving things. Secondly, despite the prediction that highly competent technology users may encounter fewer first order barriers than their colleagues with who are less competent, the more profound distinction between the two types of teachers is to be found in the relative importance they give to first order barriers. Second order barriers shape the weight that teachers give to certain first order barriers, and thus affect their practice. For example, different teachers might perceive the same first order barrier (e.g. lack of resources) as inconvenient, problematic or a stumbling block. Thus, although first order barriers constitute obstacles to adoption, second order barriers can amplify or diminish their impact. This may explain why teachers working in the same environment under the same conditions might be at different stages of technology adoption. As a central indicator for integration, teacher cognition, therefore, merits further investigation.

2.4 The Scope of Teacher Cognition Research

Although the field of teacher cognition emerged over 30 years ago, the specific focus on foreign/ second language teachers was established in the mid-1990s, and has been increasing steadily since then (Borg, 2009). However, the great majority of work in this area still focuses on the US, United Kingdom, Australia, and Hong Kong. There is, therefore, a need for research in other foreign/ second language teaching settings, and caution has to be observed when extrapolating to other geographic locations (Borg, 2006, 2009). The main areas of language covered in these studies have been grammar, reading, and writing, and more research is needed in other areas (Borg, 2006).

As for foreign/ second language teachers and technology use, Lam (2000) confirms that this area of investigation remains under-researched. She adds that, generally speaking, within the field of computer-assisted language learning, little research has been conducted from the perspective of the teacher (Lam, 2000). Ertmer (2005) supports this view, noting that whereas the field of inquiry into teacher beliefs is a well-established one, that of teacher beliefs and technology is not. Similarly, Ruthven et al. (2004) lament 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" (p. 260). Supporting these findings, Tondeur et al. (2008) also stress that studies on the relationship between educational beliefs and technology implementation remain minimal.

Given the scarcity of research on teacher cognition outside English-speaking contexts, the lack of research on teacher beliefs and ICT, and the meagre attention given to foreign/ second language teacher cognitions and ICT, we recognize the considerable gap in research on Arabic language teachers' beliefs and technology, the necessity for much more investigation in this area, and the need for Arabic teaching contexts to make an impression.

2.5 The Nature of Teacher Cognition

Research on teacher cognition emerged as a result of an understanding of the profound impact teachers' thought processes have on their teaching (Borg, 2006). As noted by Kagan (1992a),

The more one reads studies of teacher belief, the more strongly one suspects that this piebald of personal knowledge lies at the very heart of teaching [...]. As we learn more about the forms and functions of teacher belief, we are likely to come a great deal closer to understanding how good teachers are made. (p. 85)

Similarly, in the context of technology integration, Ertmer (2005) affirms the necessity for educators to extend their knowledge of teachers' pedagogical beliefs for more effective ICT uptake.

As a tacit element of teachers' professional experience, teacher cognition is not readily understood. However, a number of generally accepted assumptions, supported by the literature, can provide some insight into the nature of this construct. Examples of such assumptions are synthesized in the following points:

- Teacher pedagogical beliefs develop over time through "a process of enculturation and social construction" (Pajares, 1992, p. 316).
- As beliefs are very personal and rarely revisited, they can become deeply rooted, extremely static, and highly resistant to change (Ertmer, 2005; Kagan, 1992a; Nespor, 1987; Phipps & Borg, 2007).
- Change in teachers' cognitions, though difficult, is possible (Borg, 2003, 2006; Ertmer & Ottenbreit-Leftwich, 2010; Kagan, 1990; Nespor, 1987; Pajares, 1992).
- New experiences (including the use of educational technologies) are constantly filtered through teachers' belief systems (Ertmer, 2005; Johnson, 1994; Nespor, 1987; Phipps & Borg, 2007).
- Teachers' cognitions develop though a series of personal and cultural experiences, where earlier events can have a powerful role in shaping later ones (Ertmer, 2005; Nespor, 1987).
- Early experiences as learners have a major effect on teacher cognition (Belland, 2009; Borg, 2003, 2009; Ertmer & Ottenbreit-Leftwich, 2010; Lortie, 1975; Nespor, 1987; Pajares, 1992; Phipps & Borg, 2007).
- Early experiences as learners can actually outweigh the impact of teacher education (Belland, 2009; Johnson, 1994; Lortie, 1975; Nespor, 1987; Pajares, 1992; Phipps & Borg, 2007).
- Teachers' cognitions mediate the way they internalize information in teacher education programs (Borg, 2003, 2009; Freeman, 2002; Johnson, 1994; Kagan, 1992a; Pajares, 1992; Phipps & Borg, 2007; Slaouti & Motteram, 2006). On the other hand, such programs can also have a remarkable impact

on teacher cognition (Ertmer & Ottenbreit-Leftwich, 2010; Freeman, 1991, 1993; Slaouti & Motteram, 2006).

- There is a close bi-directional relationship between teachers' cognitions and their classroom practice, where the first form and are informed by the latter (Borg, 2006, 2009; Phipps & Borg, 2007).
- There can be a mismatch between teachers' cognitions and their practice. Beliefs are sometimes not reflected in practice, and practice might not always reflect beliefs (Argyris & Schön, 1974; Borg, 2006; Calderhead, 1996; Ertmer, 2005; Fang, 1996; Phipps & Borg, 2009).
- Contextual factors have a strong influence on both teacher cognition and classroom practice (Borg, 2003, 2006; Granger, et al., 2002; Olson, 2000; Windschitl & Sahl, 2002; Zhao, Pugh, Sheldon, & Byers, 2002).
- Cognitions are mediated by the socio-cultural settings in which teachers work (Johnson, 2006, 2009). It is, therefore, important to examine these cognitions within their particular "ecologies" (Zhao & Frank, 2003), and to recognize the relationship between teacher cognition and institutional culture (Churchill, 2006; Windschitl & Sahl, 2002).
- It is also important to understand the relationship between teacher cognition, classroom practice, and learner outcomes (Borg, 2006; Pajares, 1992).

Borg (2006) sums-up these features of teacher cognition in the following:

Teacher cognition can thus be characterized as an often tacit, personally-held, practical system of mental constructs held by teachers and which are dynamic - i.e. defined and redefined on the basis of educational and professional experiences throughout teachers' lives. (p. 35)

As noted, teacher cognition affects and is affected by elements such as teachers' former experiences as language learners, their professional preparation, their classroom practice, and the actual contexts in which they operate. In Figure 2.1, (Borg, 2006) identifies these relationships within the area of language teacher cognition and encompasses complexities therein.


Figure 2.1 Elements and processes in language teacher cognition (Borg, 2006, p. 283)

Grounded in prior research into language teacher cognition, the diagram provides a conceptual framework for this study. It forms a basis for this exploration of teacher cognition and technology use, as will be detailed in subsequent chapters.

Drawing on this diagram, I examine the literature documenting the relationship between teacher cognition and a) early learning experiences (schooling), b) teacher education (professional coursework), c) classroom practice, and d) context, with specific reference to technology implementation. To convey an accurate sense of the scope of this research, some of the labels will be slightly modified. According to Borg (2006), *schooling* comprises cognitions about learning developed "through relationships with influential adults, such as parents" (p. 281). I have, therefore, replaced this label with *early experiences as learners*. Similarly, for greater terminological accuracy, *professional coursework* has been replaced with *teacher education*.

2.6 Teacher Cognition and Early Experiences as Learners

Evidence from the literature suggests that teachers' cognitions are influenced by their own experiences as learners (Borg, 2003, 2006, 2009; Ertmer & Ottenbreit-Leftwich, 2010; Farrell, 2009; Graves, 2009; Johnson, 1994; Lortie, 1975; Pajares, 1992; J. C. Richards & Lockhart, 1996; Windschitl, 2002). Lortie (1975) introduced the term "Apprenticeship of Observation" to refer to the often unnoticed impact of schooling years on teachers' pedagogical beliefs (p. 61). He explained that learners spend thousands of hours in classrooms interacting with teachers, and those who later decide to become teachers themselves enter the profession with the perception that "what constituted good teaching then constitutes good teaching now" (pp. 65-66). Windschitl (2002) argues that "this past furnishes them with mental models of instruction – models that shape behavior in powerful ways" (p.151). The influence of these early years should be accentuated, particularly in relation to introducing new methods of teaching or incorporating innovations. For example, as the majority of teachers have gone through traditional educational systems, persistent images from the past can make it difficult for them to adopt constructivist approaches to teaching, should they wish to do so (Windschitl, 2002). By the same token, since the majority of teachers nowadays did not work with computers throughout their schooling years, their well-established images of good teaching would probably not include such technologies. Based on their study on school teachers in Singapore, Lim and Chai (2007) report that since teachers' pedagogical theories are engraved during apprenticeship of observation, those who are products of traditional schooling may stick to traditional beliefs, and their use of ICT tools will reflect such beliefs. "These teachers may either not see the affordances of computers beyond those that are already afforded by existing tools in the classrooms or may take up only the

affordances that are consistent with their traditional beliefs" (Lim & Chai, 2007, p. 4).

The influence of apprenticeship of observation is further evident in a study by Lam (2000) on second language teachers' use of technology in Canada. One of her participants offers the following justification for using cassette players: "because my teachers used [them] with me, so it's natural that I tend to follow that line of thought" (p. 403). Although none of the other respondents refers to their history as second language learners, the researcher suggests that their use of cassette players and videos might be attributed to their past experiences, as all of them were taught with the help of these media, as indicated by the questionnaire data. Experience of computer use was less common, however. Only two out of the ten teachers were exposed to such tools in their second language learning, and five of them never used computers in their teaching. The influence of apprenticeship of observation is also recognized in a study on teachers' beliefs about the use of technology within Italian teaching contexts. The research suggests that teachers' former experiences both as learners and teachers may be associated with their pedagogical beliefs as well as their knowledge of computers (Gobbo & Girardi, 2001).

The influence of apprenticeship of observation on teachers' cognitions about ICT use is of particular significance, as many teachers nowadays did not use computers in their early learning years. The challenge faced by ICT teacher educators is, therefore, to prepare teachers and teacher-candidates for technology-supported educational settings that are different from the ones they were familiar with, and to do so without having experienced such educational settings themselves (Ertmer, 2005).

2.7 Teacher Cognition and Teacher Education

Pajares (1992) confirms that "there are good reasons why attempting to understand the beliefs of pre-service teachers is essential to teacher education" (p. 328). In the following, I will detail some of these 'good reasons' by shedding light on the relationship between teacher cognition and professional practicum.

2.7.1 The Impact of Teacher Cognition on Teacher Education

Various studies on teacher education document the influence of apprenticeship of observation on student-teachers' cognitions (Borg, 2003, 2006, 2009; Ertmer & Ottenbreit-Leftwich, 2010; Farrell, 2009; Johnson, 1994; Kagan, 1992a, 1992b; Legutke & Ditfurth, 2009; Pajares, 1992). Teacher candidates come to their courses carrying entrenched perceptions and deep-rooted beliefs about teaching and learning that have been imprinted over years of prior schooling. Through analyzing narrative data of teacher-candidates, Johnson (1994) confirms that pre-service teachers' pedagogical beliefs are heavily influenced by representations from former experiences as second language learners. She concludes:

Probably the most striking pattern that emerged from these data is the apparent power that images from prior experiences within formal language classrooms had on these teachers' images of themselves as teachers, teaching, and their own instructional practices. (p. 449)

Kagan (1992b) also affirms that pre-service teachers come to their courses with established cognitions that affect the way they internalize information.

The personal beliefs and images that pre-service candidates bring to programs of teacher education usually remain inflexible. Candidates tend to use information provided in course work to confirm rather than to confront and correct their pre-existing beliefs. Thus, a candidate's personal beliefs and images determine how much knowledge the candidate acquires from a pre-service program and how it is interpreted. (p. 154)

While teacher cognition is a well-established field of inquiry, few studies have examined the influence of trainees' cognitions on teacher education in ICT (Belland, 2009; Kay, 2006). One reason might be that research on teacher education in technology is itself still in the early stages (Reinders, 2009), and studies on teacher education in CALL, in particular, are slowly emerging (e.g., Hong, 2010; Hubbard & Levy, 2006; Kassen, Lavine, Murphy-Judy, & Peters, 2007).

The evidence available to us suggests a close relationship between teacher cognition on the one hand and the role of ICT in teacher education on the other. For example,

Belland (2009) remarks that since prior learning experiences affect the way information is internalized, the absence of a technology element in schooling years might influence teachers' perceptions of the role of ICT in education, and cause them not to use it in their subsequent teaching. He adds that if teacher educators, as role models for student-teachers, use very little or no technology in their courses themselves, they indirectly convey the message that ICT is not a significant element of teaching or learning. Belland (2009) further asserts that many teacher education programs lack a technology component and even if one exists, it is introduced in the form of a self-contained course, independent of others in the program. As a result, ICT is not incorporated in the learners' overall learning experience. Moursund and Bielefeldt's findings (1999) support this line of argument. In a national study, they surveyed 416 educational institutions in the US to obtain a clearer idea of how student teachers were being trained to use technology in their work. "The most important finding" in their research was a correlation between stand-alone technology courses and the inability to integrate ICT in practice (p. 10). In terms of field experiences, Belland (2009), Ertmer and Ottenbreit-Leftwich (2010), as well as Moursund and Bielefeldt (1999), affirm that teacher-candidates need to be placed in authentic educational settings where they witness technology being used, and get the chance to employ it in teaching. In other words, they need to 'experience' teaching with technology in real contexts for more efficient technology integration afterwards.

Pre-service teachers' cognitions act as a filter through which they internalize their teacher education experiences, and without recognition of these established cognitions very little technology integration will take place (Ertmer, 2005; Inan, Lowther, Ross, & Strahl, 2010; Tondeur, et al., 2008). If we assume that learning occurs through constant interaction between established knowledge and new experiences, then addressing former beliefs and unpacking prior experiences become a priority for teacher educators (Borg, 2009).

Having addressed the impact of teacher cognition on teacher education, we now examine whether or not teacher education programs mediate pedagogical beliefs.

2.7.2 The Impact of Teacher Education on Teacher Cognition

As explained earlier, teachers' cognitions may outweigh teacher education in affecting what teachers actually do in their practice. However, this does not mean that professional training does not impact on cognition. Although there is some evidence to suggest that teacher education has a minimal impact on teacher cognition and classroom practice (Kagan, 1992a, 1992b), the majority of studies have demonstrated the transformative effect of teacher education (Borg, 2003). In their work, Cabaroglu and Roberts (2000) question Kagan's (1992b) view that teacher beliefs are 'inflexible'. They followed 20 PGCE teacher trainees through a teacher education program, and noted changes in the cognitions of all teachers, with the exception of one. The researchers cited that the pre-existing beliefs that the participants came with developed gradually, and that there were differences among the teachers in the way their beliefs evolved.

Another example that confirms the impact of professional training on teacher cognition is a piece of longitudinal research by Freeman (1993). Working with four in-service teachers for 18 months, he documented how teacher education helped them to develop their awareness of the professional discourse used in their field, and to use it in sharing their pedagogical beliefs and reconstructing their practice.

Similarly, in the context of an MA program in Educational Technology and TESOL, Slaouti and Motteram (2006) explained how the course helped the learners reconstruct their practice through metacognitive processes that encouraged "reflection, recognition, and conscious articulation" (p. 90). Additionally, the program enabled teacher educators to reconstruct their own practice, which was facilitated mainly through close collaboration between the tutors and the learners.

Furthermore, in their research on pre-service teachers' cognitions and the use of ICT, Ertmer and Ottenbreit-Leftwich (2010), affirmed that teacher training courses can affect pre-service teachers' beliefs and practice by defining effective teaching as that in which ICT is fully integrated for better learning outcomes.

From the accounts explored above, we understand that teacher education can play a significant role in shaping trainees' cognitions. Borg (2006) concludes that most of

the studies that have suggested a minimal impact of the practicum on student teachers' cognitions have focused on the "contents" of these cognitions. He adds that research investigating the "processes" and the "structure" of the teachers' cognitive change has shown that developments in cognitions do occur as a result of teacher preparation programs. There is, therefore, a need for longitudinal studies on such processes and structures, which would enable us to gain a broader grasp of the relationship between teacher cognition and the practicum (Borg, 2006, 2009).

2.8 Teacher Cognition and Classroom Practice

A myriad of research studies have investigated the relationship between teacher cognition and classroom practice (e.g., Borg, 2003, 2006; Burns, 1992; Calderhead, 1996; Ertmer, Gopalakrishnan, & Ross, 2001; Fang, 1996; Garton, 2008; Lam, 2000; Lim & Chai, 2007; Niederhauser & Stoddart, 2001; Pajares, 1992; Webb & Cox, 2004). Others have specifically highlighted the bi-directional nature of this relationship (Foss & Kleinsasser, 1996; Haney, Lumpe, Czerniak, & Egan, 2002; Tondeur, et al., 2008).

Among the prime influences on teachers' cognitions is their teaching experience. Through hours of interaction within educational contexts, teachers build images of what constitutes best practice, and develop their own understandings of different aspects of their work (J. C. Richards & Lockhart, 1996). On the other hand, teachers' cognitions are the best predictor of instructional decisions (Pajares, 1992), and subsequent ICT implementation (Churchill, 2006).

An issue of bourgeoning interest to educators in the area of CALL is whether introducing computers into educational settings affects teacher cognition and practice. A question that is often posed is: Does technology shape pedagogy, or does pedagogy shape technology?

2.8.1 The Impact of Teacher Cognition on Technology Practice

A number of researchers have argued that there is nothing inherent in technology that leads to reform in pedagogy, and that as a tool, its value lies in how it is used by the teachers themselves (Ferdig, 2006; Vrasidas & McIsaac, 2001). Maddux (1993)

affirms that "nothing miraculous happens automatically as a result of putting a child and a computer in the same room" (p. 14). In support of the same argument, Bruce (2002) states:

Unfortunately, new technologies are no panacea for problems in education and by themselves they at most enable, rather than create, change. It is ironic that the research showing how powerful computers can be ultimately brings us back to the idea that it is the teachers who make the difference. (p. 17)

Research from different educational settings across the world supports this argument. It suggests that ICT does not embody any specific pedagogy, and that teachers use technology in accordance with their cognitions. A number of examples are outlined below.

Niederhauser & Stoddart (2001) conducted a US-based study on the relationship between teachers' beliefs and their use of educational software. The researchers concluded that ICT itself does not represent a specific educational approach as teachers used computer-based material to support their own pedagogical beliefs, which were reflected in a wide array of educational approaches.

Similarly, a study in a secondary school setting in Greece demonstrated that teachers integrated technological tools to support their traditional approaches of teaching, which placed great emphasis on the central role of the teacher and the test-driven curriculum (Demetriadis, et al., 2003).

In the same vein, Zhong and Shen (2002) examined two technology-based secondary EFL classrooms in China. Their study revealed that innovations had no significant effect on the dynamics of teaching and learning. The teachers remained the center of interaction within traditional settings. As ICT was used to support centuries-old educational practices, it only changed the physical look of classrooms. The researchers underscored the importance of targeting teachers' pedagogical beliefs as a necessary precondition for effective technology integration.

The vital role played by teachers' cognitions in determining ICT use, was emphasized by Veen (1993). He conducted a longitudinal case study of four Dutch teachers with the aim of understanding and explicating why and how they use technology in their teaching. The findings indicated that teachers used computers in accordance with their established practice, and that they were willing to give up using technology altogether if its use implied a remarkable break away from their customary ways of teaching. Veen (1993), therefore, identified teachers' pedagogical beliefs as the central factor for adoption.

Lam (2000) also emphasized teachers' beliefs as key to integration. In her study of Canadian second language teachers, she demonstrated that those teachers who avoided using innovations, did so not because of technophobia, but because they were not convinced of the educational value of technology.

Finally, based on research into the use of technology in Italian schools, Gobbo and Girardi (2001) stipulated that although most of the teachers held positive attitudes toward ICT, they were unwilling to replace their traditional teaching routines. The researchers explained that the findings of their study do not support the common view that introducing technology into classrooms changes teachers' established approaches to teaching.

As indicated, implementation of educational innovations is highly mediated by teachers' cognitions. However, research has also demonstrated that the use of technology by teachers may affect their cognition, as detailed in the following section.

2.8.2 The Impact of Technology Practice on Teacher Cognition

Although teachers' beliefs are deeply entrenched, this does not mean that they do not change. Teacher cognitions and practice interact within "symbiotic relationships" (Foss & Kleinsasser, 1996, p. 441), so that cognitions affect practice, which in turn leads to new, re-conceptualized, or reasserted cognitions (Haney, et al., 2002; Tondeur, et al., 2008). It is, therefore, documented that change in teacher beliefs results from practice (Churchill, 2006; Guskey, 1986; Pajares, 1992). This indicates that instructional practice (such as ICT integration) can result in changes in teacher cognition (Albion & Ertmer, 2002).

In the context of the impact of technology use on teacher cognition, a number of studies have concerned themselves with technology and evidence of what they define

as constructivist approaches (e.g., Becker, 2000a; Becker & Ravitz, 1999; Honey & Moeller, 1990; Windschitl & Sahl, 2002). For example, Becker and Ravitz (1999) argue that teachers' cognitions and practices are dynamic in nature and that in the presence of supportive circumstances such as peer encouragement, a local network, and availability of resources, technology use can lead to cognitions and practices consistent with constructivist approaches. In their study of 441 school teachers, they identified the following five elements as the main characteristics of constructivist teaching:

- Designing activities around teacher and student interests rather than in response to an externally mandated curriculum,
- Having students engage in collaborative group projects in which skills are taught and practiced in context rather than sequentially,
- Focusing instruction on students' understanding of complex ideas rather than on definitions and facts,
- Teaching students to self-consciously assess their own understanding,
- Engaging in learning in front of students, rather than presenting oneself as fully knowledgeable. (p. 356)

The researchers note that frequent use of computers and the Internet is related to certain changes in cognition and practice. Specifically, these changes are associated with a) greater willingness on the part of the teachers to learn new things from their learners, b) facilitating a number of simultaneous in-class activities, c) requiring students to complete detailed project-based assignments, d) giving students more freedom to choose the means with which to complete these projects, and e) the kind of effort that students make to carry out complex tasks outside the classroom. Based on these findings, Becker and Ravitz (1999) conclude that the use of technology can facilitate changes in pedagogical perceptions and practices toward more constructivist methods of teaching.

It seems that the relationship between technology use and pedagogical change is truly causal and not the mere conjunction of innovative teachers who happen to both use technology and develop a more constructivist pedagogy. (p. 381)

However, the authors have not been able to confirm whether the causal effect was confined to teachers who already professed constructivist cognitions but just needed a suitable opportunity, or whether technology can actually lead teachers who do not employ constructivist approaches in their teaching to reconsider their cognitions and practice.

This causal relationship between ICT use and transitions toward more constructivist pedagogy has been commented on by a number of researchers. For example, Albion and Ertmer (2002) argued that there is no clear evidence for such a causal relationship. A similar conclusion was drawn by Dexter et al. (1999). They examined the use of ICT by 47 school teachers, and investigated its effect on their pedagogy. Over the course of the study, the teachers who adopted more constructivist approaches reported that utilizing technological tools assisted them in changing their pedagogical beliefs, but they did not identify ICT as 'the catalyst for change'. Instead they mentioned reflecting on their own experiences, teacher education, and a supportive institutional culture. The researchers concluded that "the computer did not automatically cause more constructivist practices" (p. 236), and explained that attributing pedagogical change to ICT, underrates the influence of teachers' cognitions on their practice, overlooks the dynamics of professional development, and bypasses the role of contextual factors in affecting change.

Commenting on the argument that the use of technology can lead to adoption of constructivist approaches, Tondeur et al (2008) noted that proponents of this position do not really explain why changes in teachers' cognitions take place. The same opinion was expressed by Windschitl and Sahl (2002). They observed that although some literature affirms that "teachers can and do change their instructional practices when using technology" (p. 166), and although some studies suggest that teachers who used technological tools are inclined to adopt constructivist pedagogical orientations, no details have been presented as to *why* and *how* such transitions take place. Windschitl and Sahl (2002) carried out a two-year ethnographic study in

which they examined the use of laptops by three teachers within a school laptop project. To provide a clear description of the change in the respondents' practice when the using ICT, the researchers adopted the same five criteria for constructivist pedagogy delineated by Becker and Ravitz (1999). Their findings revealed that the way laptops were integrated into teaching was highly dependent on the participants' individual beliefs about what constituted best practice within their work environment, and about the importance of technology to their learners. This may explain why, although all three teachers worked under the same conditions, their use of ICT was different. Furthermore, the researchers concluded that "the technology did not initiate teachers' movements toward constructivist pedagogy" (p. 198). Rather, laptops assisted one of the participants, who was already dissatisfied with her teacher-centered approach, in changing her teaching through student collaboration and independent learning.

2.8.3 A Continuously Evolving Relationship

Contributing to the above-mentioned debate, Ruthven, Hennessy, and Brindley (2004) explain that, lately, studies that attempted to investigate the association between teachers' pedagogical beliefs and uptake of technology have applied correlational methods and perceived the relationship in terms of a continuum with constructivist pedagogy at one end and traditional/ transmissionist pedagogy on the other. The authors commented that "while this approach has proven a convenient means of characterising broad relationships between pedagogical orientation and technology integration, it may oversimplify the perspectives and practices of teachers" (p. 261).

This stance was later corroborated by a further study in which Hennessy, Ruthven and Brindley (2005) examined how secondary school teachers in the UK used ICT in certain subject areas. The researchers argued that their findings supported those of earlier studies in that teachers tended to adapt the use of technology to suit their pedagogical beliefs. They noted, however, that "the situation is not as straightforward as this" (p. 183). Their study observed that teachers' pedagogical beliefs and classroom practice were slowly evolving, affecting and being affected by the wider classroom culture. The following sketches these evolutionary processes: The new experiences arising in the course of getting to grips with this powerful new cultural tool for learning, which is itself continually evolving, in turn lead learners to develop new strategies and teachers to start to re-evaluate and modify aspects of their practice and thinking. The nature of the socio-cultural system which frames classroom activity thereby begins to shift. (Hennessy, et al., 2005)

Based on the literature covered in this review, the answer to the question of whether technology *changes*, or *is changed* by pedagogy, can be summarized as follows. Technology in and of itself does not embody any pedagogical orientation, and can be used to support a wide range of belief systems. However, there is ample evidence for teachers adapting the use of ICT to suit their own cognitions. Some studies on teacher cognition have also documented that technology in and of itself does not transform teachers' cognitions toward more constructivist pedagogy, even in educational contexts of ubiquitous networking. Nevertheless, it has been demonstrated that if the teachers themselves are convinced that constructivist approaches are best for their teaching, and in the presence of favourable contextual circumstances, technology can stimulate pedagogical transformation. This emphasizes the importance of teachers' cognitions in initiating change, and highlights the role of the work environment in facilitating and maintaining that change. However, the relationship between cognitions and practice is not that simple or straightforward. In reality, it is very dynamic, intricate, detailed. In addition, it affects and is affected by the socio-cultural context in which the teachers work. The relationship between teacher cognition, practice and context, therefore, merits further investigation.

2.9 Teacher Cognition, Practice, and Context

The importance of investigating teachers' contexts for understanding ICT integration cannot be overestimated. Kerr (1991) confirms that "if technology is to find a place in classroom practice, it must be examined in the context of classroom life as teachers live it" (pp. 259-260). Similarly, Olson (2000) affirms that "the problem of assimilating new technology is a cultural problem" (p. 5). In fact, it is argued that the reason behind the absence of sufficient literature on *why* and *how* teachers change

their practice is that research has mostly focused on detecting transformation in beliefs and practice, while disregarding the reality that teachers' instructional theories are largely framed by their socio-cultural environment (Windschitl & Sahl, 2002). As reported by Borg (2003),"the study of cognition and practice without an awareness of the context in which these occur will inevitably provide partial, if not flawed, characterisations of teachers and teaching" (106).

2.9.1 The Role of Context in Shaping Cognitions and Practice

Earlier in this review, I discussed a range of factors for adoption of technology, namely availability of resources, computer competence, confidence, technical support, ICT training, teacher collaboration, time, and institutional culture. Interactions amongst them were highlighted, and a specific emphasis was placed on the relationship between these factors and teacher cognition as key to technology implementation. The literature, however, reflects a burgeoning interest in the role of a teacher's overall socio-cultural environment in shaping cognitions about ICT use. Although it is difficult to draw clear lines between the physical, the psychological, the intellectual and the social, this section sheds light on the role of the latter in impacting cognitions and practice as reflected in a number of studies.

There is a growing body of literature which supports the argument that teacher cognition is socio-cultural in nature (Johnson, 2006, 2009; Windschitl & Sahl, 2002) and that teachers' decision-making processes take place within "complex socially, culturally, and historically situated contexts" (Johnson, 2006, p. 239). Since teacher cognition is also socially distributed among members within certain contexts (Putnam & Borko, 2000), attention should be given to communities of practice to which teachers belong (Lave & Wenger, 1991). Such environments are invested with conceptions of ideal individual and communal prospects which are advocated through the structures of educational institutions (Grossman, Smagorinsky, & Valencia, 1999). Consequently, "the knowledge of the individual is constructed through the knowledge of the communities of practice within which the individual participates" (Johnson, 2006, p. 237).

With respect to educational technologies in particular, research has confirmed the importance of communities of practice in shaping teachers' pedagogies (e.g.

Granger, et al., 2002; Hennessy, et al., 2005), and the role of such communities in facilitating ICT integration.

It is these learning communities, their cultures formed and informed by all the practices, relationships and philosophies of their individual members, that facilitate and carry out work of technological implementation as they engage in the teaching, learning and inquiry that unite the interests of the individuals and the communities they serve. (Granger, et al., 2002, p. 488)

A similar interpretation is offered by Becker (2000b). He surveyed 516 computerusing teachers, of whom 45 were identified as exemplary computer-using teachers. The findings of this research revealed that exemplary teachers work in a milieu that assists them in becoming more efficient technology users.

Conversely, it is suggested that if technology tools are distant from a prevailing school culture, teachers will be less inclined to adopt them (Zhao, et al., 2002). Also, a study by Zhao and Frank (2003) revealed that social pressure within teaching communities can have a powerful negative as well as positive impact on technology use. In fact, the study showed that socialization by peers was more powerful in transforming teachers' beliefs about technology use than in-service teacher education. Windschitl and Sahl (2002) also emphasize the role of colleagues in promoting adoption of innovations, in the following statement: "teacher learning and instructional innovation thrive in environments where there are others who are experimenting with technology" (p. 168). A similar conclusion was reached by Becker (2000b) who stressed that practitioners "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" (p. 279). Based on these findings, it is suggested that the following points be taken into account for more efficient teacher education:

It is important that teachers have the opportunity to see models of successful technology integration (Belland, 2009; Dexter, Doering, & Riedel, 2006; Ertmer, 1999, 2005; Ertmer, Addison, Lane, Ross, & Woods, 1999; Ertmer & Ottenbreit-Leftwich, 2010), whether through organized on-site observation

sessions, or through other media such as video and the Internet (Ertmer, 1999).

- Teachers should be given time to reflect on using new innovations with other teachers whether on-site or online, and be encouraged to publish their experiences as a way of articulating beliefs and practices (Ertmer, 1999). As stated by Persky (1990) "when teachers engage with others in ongoing reflection about their instructional use of technology, they are more likely to critically evaluate their practice and redesign instruction to better meet student needs and curriculum goals" (p. 37).
- Allocating regular time for collaboration with peers with similar aspirations for advancing their practice through the use of ICT is vital for innovation uptake (Windschitl & Sahl, 2002), particularly when it provides them with situated learning experiences and addresses their immediate needs (Granger, et al., 2002). Furthermore, constant interaction with fellow teachers and seasoned practitioners, involvement in cross-institutional ICT initiatives, and sharing preparation time with others, gives teachers opportunities for establishing valuable connections and helps them envisage and then execute successful ICT implementation (Ertmer, 1999).
- Forming small communities of practice helps teachers exchange ideas, share experiences, and help one another as they develop new understandings of teaching and reconstruct their practice (Ertmer, 2005; Hennessy, et al., 2005).

In addition to the significant role played by the various contextual factors in shaping both cognitions and practice, it is now accepted that these factors may also account for lack of congruence between teachers' stated beliefs and actual classroom practice (Borg, 2006).

2.9.2 The Role of Context in the Mismatch between Cognition and Practice

Research has shown that the relationship between cognition and practice is not always a direct one, and that inconsistencies between teachers' espoused theories and theories-in-action may occur (Argyris & Schön, 1974; Borg, 2006; Calderhead, 1996; Ertmer, 2005; Fang, 1996; Phipps & Borg, 2007). Such incongruence can

sometimes be attributed to the teachers themselves, but often contextual factors account for the mismatch (Borg, 2006).

Earlier in this review, examples were given of different educational contexts in which teachers held positive attitudes toward digital technologies but were unable to integrate them into their teaching for various reasons, such as unavailability of resources, lack of training, or time pressure (e.g., Al-Rabaani, 2008; Albirini, 2006b; Md Yunus, 2007). We have also seen how teachers' implementation of ICT was hampered by institutional constraints such as exam-driven curricula (Demetriadis, et al., 2003), class size (Al-Asmari, 2005), or hierarchal educational systems (Warschauer, 2006).

Hennessy et al. (2005) elaborate on the role of contextual factors by explaining that teachers often claim that their practice has changed with the use of ICT, when in reality they merely use these tools to support existing pedagogies. According to the researchers, one plausible explanation for this is that traditionally, teachers are rarely involved in the decision making processes within their own schools. The result is that, in reality, no effective integration occurs. Rather, "established curricula and teaching methods remain in place under the thin coating of technological glitter, and available technology is often underused and poorly integrated into classroom practice" (p. 159).

As mentioned at the beginning of this review, while it is essential to recognize the impact of the different factors on teacher technology implementation, they should not be examined independently of one another or from the system in which they interact (Windschitl & Sahl, 2002; Zhao & Frank, 2003), but rather investigated within their distinctive 'ecologies'. Perceiving them as such shifts our focus, from merely describing them to capturing the complexities of the various "interactions, activities, processes, and practices" involved (Zhao & Frank, 2003, p. 833).

Viewing the relationship between cognition, practice, and context from an ecological perspective implies that transformation for technology adoption is a gradual developmental process. Hennessy et al. (2005) argue that "the research literature offers little support for the popular (though perhaps unrealistic) rhetoric about technology *revolutionizing* teaching and learning" (p. 156, emphasis added).

Similarly, Zhao et al. (2002) argue for a slow but steady progression toward technology integration, and cite that "teachers should take an evolutionary rather than a revolutionary approach to change" (p. 512). Likewise, Kerr (1991) describes teachers' uptake of technology as a gradual process which transforms teachers' understanding of their pedagogical roles. In the same vein, Ertmer (2005), Ertmer and Ottenbreit-Leftwich (2010), and Inan et al. (2010) support a gradual approach for integration that begins with tools that facilitate ongoing practice and slowly moves to more complex objectives, backed up by consistent technical support.

The idea that technology integration is a gradual process that requires time is encapsulated in this concluding remark by Warschauer (2006) in the context of his contribution to an ICT development program in Egypt:

... Bear in mind that development occurs not through transmission but through a long-term process of experience and reflection. We cannot rush our own development or that of anyone else. In that sense, the Nile itself is a good metaphor. Its course can gradually change, but attempts to suddenly reverse it would be completely futile. (p. 172)

2.10 Conclusion

By focusing on teacher cognition, this review accentuates the central role of the teacher in the integration process. As Dexter et al. affirm (1999), "we should frame teachers as agents of change in need of a supportive context" (p. 237). If we perceive teachers as such, we will realize that technology integration is a personal decision founded on complex pedagogical beliefs (Dexter, et al., 1999; Lam, 2000). Teachers, therefore, need to be given the opportunity to reflect on their practice (Ertmer, 2005), to observe models for situated ICT use (Belland, 2009; Dexter, et al., 1999; Ertmer, 1999, 2005; Ertmer & Ottenbreit-Leftwich, 2010; Mueller, et al., 2008), and to collaborate with others within a supportive professional environment (Windschitl & Sahl, 2002; Zhao & Frank, 2003). Pedagogical transformation is not about totally discarding earlier beliefs, but about slowly replacing them with new ones (Nespor, 1987). It is, therefore, vital to perceive professional development in technology as a evolutionary process rather than a revolutionary change (Warschauer, 2006; Zhao, et al., 2002).

This review has covered the main factors for ICT integration, and highlighted the different associations between them. It has identified teacher cognition as the most significant one, and explicated the intricate relationship between this factor for adoption in particular and several others. The review then shed light on the scope of research into teacher cognition and identified the main gaps in the literature. Subsequently, it addressed the nature of teacher cognition, and zoomed in on the relationship between teacher cognition and a) teachers' early experiences as learners, b) teacher education, c) classroom practice, and d) context. The relationship between these elements is summarized in Figure 2.1 (Borg, 2006), which constitutes a starting point for my exploration of teacher cognition in relation to the use of technology in TASOL, and a conceptual lens through which this area will be further investigated in the chapters which follow.

CHAPTER 3: METHODOLOGY

3.1 Introduction

Building on Chapter 2's review of the literature, and identification of gaps therein, exploration of conceptual frameworks and location of the study within the field, Chapter 3 describes the methodology which underpins this investigation. It begins by restating the research questions, and presents a rationale for the choice of a qualitative research design. A case study approach was chosen from among the many different techniques typically used in naturalistic inquiry. The chapter explains the principle behind this choice, and details the process of selecting the three cases. This is followed by a discussion of the various methods of data collection used, and the analytical procedure employed. Attention is then given to means of establishing trustworthiness and maintaining rigor.

The research questions that have informed this investigation comprise an overarching one, and four sub-questions.

What is the relationship between teacher cognition and the use of technology in teaching Arabic to speakers of other languages?

- What is the relationship between teacher cognition and teachers' early experiences as learners?
- What is the relationship between teacher cognition and teacher education?
- What is the relationship between teacher cognition and classroom practice?
- What is the relationship between teacher cognition, classroom practice, and context?

3.2 A Qualitative Research Design

Informed by the research questions, a qualitative research design has been selected for this project. In what follows, I will present a rationale for choosing this design by a) defining a 'qualitative design' and detailing its main characteristics, and b) highlighting the relationship between this description and my specific area of investigation.

3.2.1 Definition and Characteristics of a Qualitative Design

According to Stake (1995), "there is no single wellspring of qualitative research" (p. 35). The design has a long, remarkable history that cuts across different fields such as sociology, anthropology, social psychology and history. It also encompasses different philosophical traditions, and research approaches (Creswell, 2007; Denzin & Lincoln, 2008; Stake, 1995). A definition of qualitative research is, therefore, more appropriately presented within a specific historical context (Denzin & Lincoln, 2008). This might explain why several introductory texts on qualitative research lack a clear definition of this paradigm. Nevertheless, the following provides a basic, global definition of this research design.

Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them. (Denzin & Lincoln, 2005, p. 3; 2008, p. 4)

A significant body of literature has probed the main features of the qualitative paradigm as distinct from the quantitative one. The following is a synthesis of such characteristics.

 Qualitative research takes place in natural environments (Creswell, 2009; Marshall & Rossman, 2006) where people's lived experiences are examined (Marshall & Rossman, 2006; Strauss & Corbin, 1990) within social contexts (Berg, 2009).

- Such design attempts to understand situations from the perspective of the participants themselves, and perceives the world through their lens (Cohen, Manion, & Morrison, 2007; Creswell, 2009; Marshall & Rossman, 2006; Merriam, 2002b; Robson, 2002).
- It is research that investigates interactions, processes, and intricacies (Marshall & Rossman, 2006).
- It presents subjective understandings and is mainly interpretive (Creswell, 2009; Marshall & Rossman, 2006).
- This design is, therefore, based on multiple realities of situations, rather than a single definite one (Cohen, et al., 2007; Marshall & Rossman, 2006; Merriam, 2002b; Robson, 2002).
- A Qualitative research design is "emergent" (Creswell, 2009, p. 175), and "evolving" (Robson, 2002, p. 166).
- Different approaches are used in conducting this type of research (Flick, 2009), and multiple methods of collecting data are involved (Creswell, 2009; Denzin & Lincoln, 2008; Marshall & Rossman, 2006; Robson, 2002).
- The researcher is the central instrument in the research process (Creswell, 2009; Merriam, 2002b) which, in turn, is affected by his/ her background (Denzin & Lincoln, 2008).
- Generally, qualitative research is conducted because there is little information or theory on a certain phenomenon (Creswell, 2008; Marshall & Rossman, 2006; Merriam, 2002b), or to acquire new perspectives and deeper understandings on issues already explored (Strauss & Corbin, 1990).
- With this type of design, inductive data analysis approaches are followed (Creswell, 2009; Merriam, 2002b).
- Rich and holistic accounts are produced (Creswell, 2009; Marshall & Rossman, 2006), in which text and images are used more than figures (Merriam, 2002b).

3.2.2 Relating Definition and Characteristics to This Study

This research explores new educational terrain, namely that of utilizing ICT in teaching Arabic as a foreign language. It investigates teachers' cognitions, a hidden yet central aspect of their professional lives, and delves deep into their individual experiences within a particular socio-cultural context. Relating the characteristics of this study to those of qualitative inquiry justifies the choice of this research design.

Furthermore, investigating the literature on teacher cognition in particular, we notice early support for qualitative designs. Munby (1982, 1984), for example, has advocated the use of qualitative methods for studying teacher thinking. Later, Pajares (1992) affirms that some researchers regard qualitative designs as particularly useful for the study of teachers' beliefs. Over the years, research on teacher cognition has been heavily affected by developments in cognitive psychology (Calderhead, 1996), in addition to the increasing acceptance of ethnographic methods and qualitative designs (Fang, 1996). In fact, looking at the literature on teacher cognition today, there is little evidence of empirical laboratory research within this area of investigation (Borg, 2006).

Considering the characteristics of both qualitative design and teacher cognition, it is difficult to envisage examining the latter without the former. Describing his understanding of qualitative research, Creswell (2007) states: "I think metaphorically of qualitative research as an intricate fabric composed of minute threads, many colors, different textures, and various blends of material. This fabric is not explained easily or simply" (p. 35). Interestingly, if we contemplate this metaphor for a moment, we notice that it accurately describes teacher cognition as well.

3.3 A Case Study Approach

After situating the study within a qualitative research paradigm, I chose the case study approach for my inquiry. In the section which follows, I present a rationale for this decision by addressing a) the definition of a 'case study' and the main characteristics of this approach, and b) the relationship between this description and this study.

3.3.1 Definition and Characteristics of a Case Study

Case study research has been perceived in different ways, depending on what researchers mean by 'a case'. For example, Yin (2009) defines case study in terms of the *strategy* used in conducting research, and presents the following two-fold definition:

- 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 the 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. (p. 18)

Stake (1995), on the other hand, views a case as the actual *object* of investigation. He, therefore, defines a case study as "the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances" (p. xi). The researcher further argues that Louis Smith, one of the first ethnographers in the field of education, defines a case as a 'bounded system' and as such, views it as an object of inquiry rather than a methodology.

On the other hand, if we look at the definition provided by Merriam (1988), we notice a focus on the descriptive and analytical aspects of inquiry. "A qualitative case study is an intensive, holistic *description* and analysis of a single instance, phenomenon, or social unit" (p. 21, emphasis added).

In terms of definitions, Creswell's (2007) is the more inclusive, as he accepts a case study as a *strategy*, an *object* of inquiry, and a *description*.

Case study research is a qualitative approach in which the investigator explores a bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information (e.g., observations, interviews, audiovisual material, and documents and reports), and reports a case description and case-based themes. (p. 73)

The literature has identified a number of general characteristics associated with case study inquiry. They may be synthesized as follows:

- Case studies focus on examining particularity, uniqueness (Pring, 2004; Simons, 2009; Stake, 2005), and complexity (Cohen, et al., 2007; Stake, 1995, 2005).
- Cases are examined temporally within defined contexts which might be organizational, geographical, institutional (Cohen, et al., 2007), socio-cultural, political, economic, ethical (Stake, 2005), or other contexts that enable some kind of border to be defined around the case (Cohen, et al., 2007). In fact, it is argued that it is impossible to fully understand a case unless it is studied within its wider system (Pring, 2004).
- Case studies focus on rich accounts and result in detailed records, or what Geertz (1973) referred to as "thick description" (Merriam, 1998; Stake, 1995, 2005).
- Case studies draw on multiple data collection methods (Creswell, 2007; Punch, 2009; Yin, 2009).
- Depending on the purpose of inquiry, a case study takes different forms. Stake (1995, 2005), divided case studies into three types: first, an *intrinsic case study* focuses on a specific case because of its special concern to the researcher. Second, an *instrumental case study* focuses on an issue of interest. The case is still closely examined within its bounded context because it improves our understanding of that issue. The choice of the case is informed by the issue in question. Third, *a multiple case study* or a *collective*

case study is an instrumental case study that is extended to a number of cases.

3.3.2 Relating Definition and Characteristics to This Study

As a research approach, case studies have been widely used in investigating teacher cognition. For example, Calderhead (1996) explains that "detailed case studies of teaching using a variety of observational and interview procedures have frequently resulted in well-documented and insightful accounts of teachers' thoughts and practice" (p. 712).

This research attempts to capture the subtleties and complexities of teachers' mental lives in addition to the particularities of using technology within certain educational ecologies. As teachers' cognitions are socially constructed (see Chapter 2), attention to the context is integral to the research process. In line with Creswell's (2007) encompassing definition, I use the term *case* or a *case study*, to refer to the research approach, my particular informants, and the profiles that have emerged from the analysis.

Reflecting on the characteristics of case studies, I chose a multiple/ collective case study approach for this research. It is consistent with the situated nature of this study, allows for in-depth understandings and rich descriptions of the issue in question, and emphasizes contextual uniqueness.

3.4 Identifying the Cases

Creswell (2007) describes case selection as one of the characteristic challenges in undertaking this type of inquiry. Informed by a specific area of investigation and corresponding research questions, I defined a number of criteria for selecting the cases.

3.4.1 Criteria for Identifying Cases

Stake (1995) explains that case study research is not based on statistical sampling but rather on thoughtful selection of cases. In the same vein, Silverman (2010) affirms that "sampling in qualitative research is neither statistical nor purely personal: it is,

or should be, theoretically grounded" (p. 143). Conceptual framework and research questions play a central role in the selection of cases. Hence, the guiding factor in our decision making should be: which case(s) can we learn the most from? (Stake, 1995). Given the nature of this inquiry, the procedure commonly used in case selection is what Patton (1990) refers to as "purposeful sampling" (p. 169) described as follows:

The logic and power of purposeful sampling lies in selecting *information-rich cases* for study in depth. Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the research, thus the term *purposeful* sampling. (p. 169, emphasis in original)

As stated by Miles and Huberman (1994), in multiple-case sampling, "the choice of cases usually is made on conceptual grounds, not on representative grounds", and generalizations are theoretical, not to a wider population (p. 29).

3.4.2 Identifying the Cases in This Study

This research is situated in the ALI which constitutes the bounded system or the defined context of this case study investigation. At the time of data collection it hosted 32 full-time and 36 part-time teachers. As I was selecting my cases, several points were taken into account:

First, in order to acquire a deeper understanding of teachers' cognitions in relation to ICT implementation, I decided to use a multiple-case study approach. On the other hand, I limited the number to three teachers due to restrictions on time and resources, and to allow for the detailed investigation and thick description of the cases in question.

Second, I confined my search to full-time in-service teachers for several reasons: a) this group of teachers has a longer teaching experience, and is more likely to hold well-established cognitions about teaching and learning. b) Generally, in-service teachers have more access to technology as they teach longer hours in smart classrooms, in addition to being given portable computers by the ALI. c) Pre-service teachers enrolled in the TAFL program within the ALI are apprenticed to in-service teachers. The latter's cognitions about adoption (or non adoption) of innovation may indirectly be conveyed to the younger generation of teachers. This may have serious

repercussions on the future of ICT integration in the ALI, especially if the majority of teachers use very minimal technology.

Third, to gain deeper insights into teacher cognition, I was specifically interested in operating with teachers whose practice was already characterized by the use of technology, and who had plans to move ahead in this direction. I decided to select teachers who were on different rungs of the technology ladder, and displayed a variety of perspectives on using innovations in teaching Arabic as a foreign language. In this respect, my purposeful sampling was of the "maximum variation" type (Merriam, 1998; Miles & Huberman, 1994; Patton, 1990). This was to allow for rich data on teacher cognition and ICT, and therefore, clearer comprehension of the issue in question.

Fourth, I was also keen to develop a broader understanding of the uniqueness of the teachers' shared context, and therefore, chose ALI teachers who had a similar profile to other in-service teachers in the ALI, specifically in terms of former teacher education experiences, and current work environment. In this respect, I was also looking for a "typical" sample (Merriam, 1998; Miles & Huberman, 1994; Patton, 1990), so the cases were different in terms of approach to innovation, but similar in terms of professional background.

Several factors facilitated the selection of cases. First, given my former work experience at the ALI, I had some insider knowledge about the teachers' use (or non use) of digital resources within the Institute, which helped me screen for potential cases. Second, teachers who were interested in educational innovations or had actually used technology in their teaching were limited in number, connected through personal and professional ties. Since my area of investigation is exploring teacher cognition in relation to ICT use, I selected my cases from within this group. Third, one of the data collection instruments employed in this study is a questionnaire, distributed to all the teachers in the ALI at the beginning of the study. One of its main objectives was to confirm my selection of cases.

3.4.3 Who Are My Cases?

Dalal Abo El Seoud, Heba Salem, and Laila Al Sawi were selected from among the group of technology using practitioners in the ALI to take part in the study. The following introduces the three teachers, and presents a brief rationale for the selection of each one of them. (The information below is what I had already known about the three teachers before my field experience in Cairo, and constitutes the basis on which they were selected. Naturally, my understanding of their cognition and practice was remarkably enriched during the course of the study, as reflected in the case profiles).

3.4.3.1 Dalal

Dalal has a BA in Arabic Studies from AUC, an MA in TAFL from the same university, and a PhD in language teaching methods from Ain Shams University. She has been teaching in the ALI for 22 years, and has led the Institute's summer program for several years.

Dalal was chosen for this study due to her recent efforts to introduce technology into her teaching, and to develop computer-based material, especially in the area of teaching Arabic poetry and prose. She provides a perspective on early experiences of innovation adoption within a particular professional environment.

3.4.3.2 Heba

Heba has a BA in Media and Mass Communication, and an MA in TAFL from AUC. She has been teaching in the ALI for 15 years, but her professional experience extends to teaching children too, as she worked in a nursery for several years before joining the ALI.

Heba was chosen for this study as one of the early producers and users of technological resources, especially in the area of listening. She has taken part in computer-based materials development projects in the ALI, the latest of which was a colloquial Egyptian course for advanced Arabic language learners.

3.4.3.3 Laila

Laila has a BA in Arabic Studies from AUC, and an MA in TAFL from the same university. She has been teaching in the ALI for 30 years, and considers herself of the 'old guard', the early generation of teachers there. Given her professional history, she has witnessed the developments that have taken place over the years and is, therefore, a credible reference on the evolution of technology in the language program.

Laila was particularly chosen for this study as she is one of the first Arabic language teachers to develop complete course material using PowerPoint. Her forthcoming computer-based Arabic grammar publication is currently being tested by colleagues.

3.5 Methods of Data Collection

Since exploring teacher cognition implies dealing with hidden aspects of teachers' professional lives, a careful choice of data collection methods is necessary for such investigation (Borg, 2006). Data collection methods used in this study included a baseline questionnaire, semi-structured interviews, video recorded stimulated recall, classroom observation, and teacher reflective writing. Appendix 1 presents an overview of the data collected in relation to every case. Pilot work conducted with part-time teachers in the language program allowed all research methods to be trialled and refined before the beginning of the data collection period. Fieldwork took place in the ALI and lasted for nine months (November 2007 - July 2008). The following presents a detailed account of the instruments used, and the rationale for choosing them.

3.5.1 Questionnaire

The *ALI Language Teaching and Technology Questionnaire* (Appendix 2), was derived from an earlier study by Slaouti and Barton (2007), and adapted to suit the particularities of the ALI teaching environment. It was administered and sent to all in-service teachers prior to the beginning of fieldwork in Cairo. In this study, the questionnaire was used for very specific research purposes: first, it was designed to set a baseline for technology use within the Institute. Although I had some insider knowledge of the degree of ICT implementation in the Institute, I preferred to gain a

broader perspective of the state of technology use in the language program, the context of this study. The main purpose of the questionnaire was, therefore, exploratory. Second, as mentioned, this instrument was helpful in the process of selecting the cases. Third, during the data collection process, it offered different probes for interviews and introduced new topics for discussion. In fact, toward the end of the fieldwork period, two of the three particular informants filled out the same questionnaire again, and the differences in their responses were marked and discussed. The questionnaire was, therefore, neither a 'stand alone' strategy for data collection, nor was it employed in a quantitative manner.

Studies have shown that questionnaires suffer limitations when used in researching teacher cognition, and are not ideal for deep examination of issues and phenomena (Moser & Kalton, 1971). As stated by Dörnyei (2003) "no matter how creatively we formulate the items, they are unlikely to yield the kind of rich and sensitive description of events and participant perspectives that qualitative interpretations are grounded in" (p. 14). Further, this tool is commonly criticized for being low on "ecological validity" which Kagan (1990) defined as "the kinds of evidence researchers provide concerning the relevance of a measurement technique to classroom life" (p. 422). In other words, when teachers are presented with abstract situations, their responses might reflect what they think constitutes good teaching, rather than what they actually do in practice (Borg, 2006; Fang, 1996). This may lead to serious misguidance in terms of the data obtained and the subsequent reports developed. Borg (2006), therefore, concludes that "theoretical measures of teacher cognition cannot be used as measures of actual practices. This is a fundamental principle in teacher cognition research" (p. 184). For these reasons, it is advisable to combine questionnaires with other sources of data (Dörnyei, 2003), such as observations and interviews (Borg, 2006).

3.5.2 Semi-structured Interviews

Interviewing is widely used in naturalistic research. In fact, it is described as "the most often used method in qualitative inquiries" (Dörnyei, 2007, p. 134). This is reflected in the generous coverage dedicated to this instrument in introductory methodology textbooks (e.g., Cohen, et al., 2007; Creswell, 2008; Flick, 2009;

Punch, 2009; Robson, 2002; Silverman, 2004; Silverman, 2006), as well as specialized references (e.g., Drever, 1995; Gillham, 2005; Kvale & Brinkmann, 2009).

The literature has documented different types of interviews, and a variety of labels have been used to refer to these differences (e.g., Cohen, et al., 2007; Drever, 1995; Freebody, 2003; Gillham, 2005; Patton, 1990). However, generally speaking, interviews can be classified into: *structured*, *semi-structured*, and *unstructured* (e.g. Merriam, 1998; Punch, 2009; Robson, 2002). In structured interviews, researchers are confined to a definite number of specific questions usually asked in a particular order. In contrast, un-structured interviews are characterized by informality and spontaneity, where questions are generated along the natural progression of the conversation. Semi-structured interviews, however, "aim to have something of the best of both worlds" (Freebody, 2003, p. 133). They are guided by certain themes, but the conversation does not have to follow a specific order.

Interviews have often been used in the study of teacher cognition (Borg, 2006; Calderhead, 1996). They allow the researcher to move beyond the observable, to visit inner worlds, and develop deeper understandings of reality as perceived by the respondents. As stated by Patton (1990), "the purpose of interviewing is to find out what is in and on someone else's mind" (p. 278). Elaborating on the objectives of this method, he adds:

The fact of the matter is that we cannot observe everything. We cannot observe feelings, thoughts, and intentions. We cannot observe behaviors that took place at some previous point in time. We cannot observe situations that preclude the presence of an observer. We cannot observe how people have organized the world and the meanings they attach to what goes on in the world. We have to ask people questions about those things. The purpose of interviewing, then, is to allow us to enter into the other person's perspective. (p. 278)

As teacher cognition cannot be directly deduced from behavior (Kagan, 1992a), indirect strategies for data collection are called for. Semi-structured interviews are an old, well-established method in research on teacher cognition, which has proven to be effective in this area (Mangubhai, Marland, Dashwood, & Son, 2004). They

provide teachers with an informal atmosphere to express thoughts and share experiences without being confined by a specific set of questions. At the same time, within this flexible structure, researchers have the opportunity to cover themes relevant to their inquiry.

Although interviews are widely used in teacher cognition, they are often ineffective by themselves. Given the tacit nature of cognitions, the teachers themselves may not be aware of their own mental processes, or be able to articulate them (Calderhead, 1996; Munby, 1984). Hence, "a direct question such as 'What is your philosophy of teaching?' is usually an ineffective or counterproductive way to elicit beliefs" (Kagan, 1992a, p. 66). In fact, when teachers are asked abstract context-free questions about their beliefs, they are likely to provide general idealized responses (Woods, 1996). Interviews, on their own, are therefore, insufficient in exploring teacher cognition (Borg, 2006), and additional strategies for data collection that pay close attention to the teachers' contexts have been used, such as observations and stimulated recalls (Fang, 1996).

Along with other instruments of data collection, a total of 22.7 hours of semistructured interviews were administered in Arabic with the three teachers (Appendix 1). All interviews were audio recorded (though few were video recorded due to the inclusion of images or printed/written text). Some additional interviews were conducted with other teachers in the ALI for a broader understanding of the context. Furthermore, administrators within the Institute (Appendix 8, Appendix 9, Appendix 10), and support providers at AUC were interviewed for triangulation purposes (Appendix 11, Appendix 12).

Interviews were informed by the research questions and the conceptual framework (Borg, 2006). The broader areas covered were a) teachers' early experiences as language learners, b) their teacher education, c) their classroom practice, and d) their context. Further, there was emphasis on specific areas that teachers might have cognitions about. These were: the self, teacher, teaching, learning, material, activities, colleagues, assessment, and the language program (Borg, 2006). I added two other items to this list, *the Arabic language*, and *the field of TASOL*. Since a 'technology layer' was added to the framework, the questions focused on teacher

cognition about ICT in relation to these areas. However, teachers' non-ICT beliefs were also probed, as there was evidence for co-occurrences with what they thought and did with technology. In this respect, I found Richards & Lockhart (1996) particularly helpful as I was preparing interview questions. The reference included detailed suggestions for the explication of teachers' non-ICT beliefs, which I modified to suit the context of this study. In addition, the questionnaires, teachers' reflective writing, and their member checking accounts² constituted an essential source of probes for a deeper investigation of teacher cognition.

Since exploring beliefs in context is central to this study, in addition to pre-scheduled conversations, short interviews followed observation sessions. Upon finishing her class, the teacher would comment on her teaching, and we may discuss specific aspects of the observed session. I have found such situated commentaries powerful in eliciting cognitions, for a number of reasons. First, as they occur right after the teaching session, usually what the teacher chooses to focus on is what is most important to her. Second, they are emotionally laden. Often, if a teacher has had an exceptionally good or bad class, her feelings would fade over the day. She remembers the experience, but does not narrate it with the same enthusiasm, sense of pride, disappointment, or anger. This twin-method of observations followed by interviews captures both critical moments as well as the affective elements that envelop them. Third, such interviews did not require preparation on my part or that of the teacher. As she knew that every class visit was followed by a commentary, she always dedicated a couple of minutes after class to that. The short interview could take place in the classroom, in the corridor, on the stairs, or in the teacher's office.

In addition to standard and mini-interviews, the teachers were each given the chance to showcase computer-based material of their own production. Narratives were prompted on issues such as how they came to develop the material, their inspiration, how it enabled them to achieve their educational goals, and what they would do without technological methods. The interviews were video recorded to include the

² Further details on member checking accounts will follow under section 3.7.1.3 *Respondent Validation* and section 4.3.1 *From Trust to Trustworthiness*.

material as well as the teachers' commentaries, and are marked in the data as *Materials Development Interviews*.

In terms of the scope of the interviews, although the vast majority focused on the specific area of investigation, at the end of the study the teachers were also interviewed about the impact of their participation in the study on them, positively and negatively.

To summarize, interviews with the particular informants were of three kinds: first, main interviews which explored teachers' early experiences of language learning and teacher education (Appendix 3), teachers' computer-based materials development (Appendix 4), teachers non-ICT beliefs, based on Richards & Lockhart (1996) (Appendix 5), and the impact of the study on the participants (Appendix 6). Second, follow-up interviews based on other types of data, such as the questionnaire, the participants' reflective writing, and their member checking accounts. Third, mini-interviews which followed classroom observation, or were initiated through casual encounters with the teachers. Both the first and the second types of interviews were usually completed over a series of pre-arranged meetings with the informants.

3.5.3 Stimulated Recalls

Another form of verbal commentaries used in this study was stimulated recall. As stated by Calderhead (1981):

The term 'stimulated recall' has been used to denote a variety of techniques. Typically, it involves the use of audiotapes or videotapes of skilled behaviour, which are used to aid a participant's recall of his thought processes at the time of that behavior. (p. 212)

Since it is impossible for teachers to talk about their thought processes while teaching, this retrospective method is used in explicating cognitions underlying former practice (Borg, 2006; Lyle, 2003; Meijer, Zanting, & Verloop, 2002) by allowing the teacher to "relive" past teaching situations (Calderhead, 1981, p. 212). Nevertheless, the instrument has been questioned, particularly on the grounds of validity. For example, Yinger (1986) argues that "there is good reason to doubt the validity of stimulated recall as a means for accurately reporting interactive thinking"

(p. 268). He explains that teachers might present descriptions or post hoc rationalizations for their practice rather than recall their actual thinking then. As such, this method becomes a tool for "reflection-on-action" rather than "reflection-in-action" (p. 273). Realizing the threats associated with using stimulated recalls, Gass and Mackey (2000) suggest several measures to be taken into account, such as arranging the recall sessions soon after the events. This is especially important if the stimulus is to trigger teacher thinking at the time of the recorded event. However, the literature has shown that recalls can also be used to generate talk about pedagogical practice in general (Borg, 2006; Woods, 1996).

For this study, I conducted nine stimulated recall sessions (three for each teacher), over a total of 7.1 hours. Following the guidelines set out by Gass and Mackey (2000), the recalls occurred within a week of the recorded events. In fact, before recording a particular lesson, the time and place of the subsequent recall session were already agreed upon with the teacher.

Before every session, I reminded the teacher of the purpose of using this instrument of data collection, encouraged to her recall her thought processes at the time of the event, and gave her complete freedom to pause when she wanted to express her thinking, decision-making, or feelings. I also told each teacher not to feel pressured to pause even if this meant that we had a whole session without a single commentary (which never happened). In addition to eliciting teacher cognition at the time of events, recalls were also administered to facilitate discussion about teaching in general. In terms of duration, they were designed to last for a maximum of 30-40 minutes to avoid "participant fatigue" (Gass & Mackey, 2000, p. 85). In general, the teachers and I watched their lessons on my computer, and a camcorder was installed behind us, to record the recall sessions.

Although stimulated recalls constituted a powerful method of inferring cognitions in this study, in terms of practicalities, it raised challenges. For example, due to the physical layout of the classrooms, and because most lessons were back-to-back, setting up the camcorder often caused some initial disruptions. Further, it was not easy to find a vacant room in the ALI for the recall sessions during the day. As a
result, we had to travel to other parts of the university, or schedule our sessions very early in the morning.

3.5.4 Observation

Observation is an integral aspect of qualitative research (e.g., Allwright, 1988; Cohen, et al., 2007; Flick, 2009; Patton, 1990; Punch, 2009; K. Richards, 2003; Robson, 2002). In fact, Merriam (1998) argues that the terms *field study* and *fieldwork* denote interviews and observations more than any other sources of data collection. In the same vein, Simons (2009) suggests that, generally speaking, observation exists all through the research process right from the moment of entering the field to the point of departure.

As to the rationale for using observation, Pring (2004) comments that "it may seem common sense that, if one wants to know something, one goes out and has a look" (p. 33). The merits of observation are numerous, especially as they allow the researcher to collect "live" information from everyday settings (Cohen, et al., 2007, p. 396), where the researcher does not intend to change or stimulate behavior (what happens in reality might be different though). As stated by Adler and Adler (1994), "one of the hallmarks of observation has traditionally been its non-interventionism. Observers neither manipulate nor stimulate their subjects" (p. 378). Furthermore, due to the situated nature of observation, it tends to be "particularly context sensitive and ecologically valid" (Denscombe, 2007, p. 224). However, as we cannot observe everything in a certain context, what we observe should be guided by our area of interest and research questions (Merriam, 1998; Simons, 2009).

As with interviews, Simons (2009) states that observations may be viewed on a continuum with *structured* observations on one end and *unstructured* on the other. She explains that in a structured observation, the researcher has a pre-determined agenda, focuses on it, and ignores the rest. With unstructured observation, the researcher observes the setting without being restricted by pre-set criteria. The researcher concludes that such observations normally yield rich descriptions, and are common in case study research. However, one could argue that since field observation is "purposeful looking" (K. Richards, 2003, p. 110), directed by some

kind of research interest, in reality, there is no such thing as unstructured observation in naturalistic inquiry.

While in the field, observers might assume different roles depending on the objective of their investigation. Gold's (1958) well-cited typology explicates such roles, as he has classified them into the following groups:

- *Complete participant:* It is covert observation where the researcher interacts with subjects but his/ her identity is not disclosed to them. Of course, there are ethical questions pertaining to this role.³
- *Participant-as-observer:* The researcher's identity is clear to the subjects. S/he observes them by participating in their activities and nurturing good relationships with them. Participant observation is a well-established practice in qualitative research (e.g., Cohen, et al., 2007; Denscombe, 2007; Moyles, 2002; Punch, 2009; K. Richards, 2003; Robson, 2002; Silverman, 2006), and "the central data collection technique in ethnography" (Punch, 2009, p. 157). In fact, Atkinson and Hammersley (1994) perceive participant observation as the backbone of every social inquiry.

In a sense, *all* social research is a form of participant observation, because we cannot study the social world without being part of it... From this point of view, participant observation is not a particular technique but a mode of being-in-the-world characteristic of researchers. (p. 249, emphasis in original)

• *Observer-as-participant:* The observer's identity is clear to the subjects, and contact with them is normally formal and brief.

³ Interestingly, although Gold (1958) refers to the feelings of having "taken" one's subjects "in ways which are difficult to justify", and the "severe qualms" that the researcher may experience as a result of that (p. 220), he presents no clear statement of the ethically contestable position of this kind of observer role, unlike more recent references which elaborate on this point (e.g., Adler & Adler, 1994; Cohen, et al., 2007; Flick, 2009; Patton, 1990; Robson, 2002). As Gold (1958) is a relatively early reference, this might reflect developments in social research ethics over time.

Complete observer: The researcher has no social interaction with the observed, and they are not aware that they are being observed. Such a role might be assumed in preparation for a more active one.

As for the use of observation in teacher cognition research in particular, Borg (2006) affirms the key role this method plays in exploring beliefs "by providing a concrete descriptive basis in relation to what teachers know, think, and believe can be examined" (p. 231). Given the close relationship between teacher cognition and classroom practice, classroom observation is especially helpful in identifying congruence and lack of congruence between the two. According to Argyris and Schön (1974), when people are asked about their behavior in a specific situation, usually the response they offer reflects their "espoused theory of action", which is the theory they adhere to and convey to others. However, the theory that actually directs their behavior is their "theory-in-use", which might or might not be consonant with their espoused theory. The authors conclude that "we cannot learn what someone's theory-in-use is simply by asking him. We must construct his theory-inuse from *observations* of his behavior" (pp. 6-7, emphasis added). However, as noted earlier, dissonance between teachers' stated beliefs and actual classroom practice is not always attributed to inconsistencies on the part of the teacher, since contextual factors may account for this tension (Borg, 2006).

The literature on qualitative research has stressed the use of observations in combination with other sources of data (Adler & Adler, 1994; Allwright, 1988; Merriam, 1998). Within the area of teacher cognition, since teachers may exhibit similar behavior for totally different motives (Kagan, 1992a), observation is not used as a singular method of data collection. Rather, it is associated with other instruments, such as interviews and stimulated recalls (e.g., Borg, 2006; Calderhead, 1981, 1996; Golombek, 1998; Woods, 1996).

Observation was one of the main data collection strategies used in this study, as it provided deep insights into *how* technology was used in Arabic languages classrooms. Observed sessions were divided into two types:

a) *Sessions recorded as field notes:* These were approximately 20 lessons for every teacher, a total of 75.8 hours (Appendix 1). Field notes were typed in both

English and Arabic within the observed lessons, and questions for the postobservation interviews were taken down. Field notes were then reviewed, and important points were highlighted, before any deeper analysis took place.

b) *Video recorded sessions:* These were a minimum of three sessions for every case (used for subsequent recalls), in addition to supplementary sessions where the teacher invited the camcorder into her class because she was trying out a new teaching technique, or using a different technological tool. A total of 22.8 hours were recorded on video (Appendix 1). The files were then downloaded and reviewed, in preparation for the stimulated recalls.

Following the common use of flexible observation in teacher cognition research (Borg, 2006), observed sessions were conducted in this manner. As a method of data collection, observation was also compatible with the case study approach chosen for this inquiry as it allowed for detailed descriptions of events, yielded rich accounts, and shed light on different context-specific features (Simons, 2009).

With respect to the role of the observer, Borg (2006) asserts that "there is very clear preference in language teacher cognition research for non-participant observation - i.e. where the researcher in the classroom typically sits at the back, makes notes and avoids interacting with teacher or students during the event being observed" (p. 231). The author adds that non-participant observers might be approached by teacher or students for assistance or to make a specific contribution to the lesson. In such case, ethical considerations should be adhered to, and observers should be completely aware of the impact of their intervention on the research.

In keeping with the prevailing 'non-participant observation' in teacher cognition research, I attempted to be as unobtrusive as possible in the classes I visited. Usually I found a place to the side of the class where I could take notes on my computer (if I was taking field notes), or manage the camcorder (if I was recording the class). Occasionally, the teacher or a student would ask me a question or invite me to take part in a specific activity. Also, when technical breakdowns took place, I would come to the teacher's assistance if that was appropriate (sometimes the teachers swiftly switched to a Plan B, without disrupting the flow of their lessons).

3.5.5 Technological Reflections

Reflective writing in the form of journals or diaries have been used in generating qualitative data in areas of teaching (Burgess, 1981; Pennington, 1995), teacher cognition (Johnson, 1994; Numrich, 1996; Woods, 1996), and teacher cognition and ICT (Churchill, 2006; Veen, 1993). Reflective writings are often used to enrich other sources of data such as interviews or observations (Borg, 2006; Burgess, 1981), or to provide primary information on research scenes that the inquirer might not have access to (Burgess, 1981). They are also used to draw out informants' own representations of social phenomena, hence, "diary data is by definition an insider account" (Dörnyei, 2007, p. 157).

Upon entering the field, I distributed small notebooks to a number of teachers in the ALI for what I named 'Technological Reflections'. Recipients of these notebooks were invited to record impressions and experiences of technology use that they wished to share. As informants need to be given directions on handling diaries (Burgess, 1981), I provided the teachers with some focus for their reflections. I therefore developed an electronic version of Technological Reflections (Appendix 7), headed with the following statement: "[This is] an open space for the free expression of thoughts, opinions, convictions and biases about using - or not using technology in teaching Arabic". The sheet was divided into several sections following the conceptual framework adopted in this study (Figure 2.1). Respondents were, therefore, invited to add reflections under specific headings such as ICT and the Teacher, ICT and Learning, ICT and Language Activities, ICT and the Arabic Language, and at the end there was a section for ICT and Anything Else. With a similar objective to use of the questionnaire, asking the other teachers in the ALI to reflect on their technology use provided broader insights into the particularities of ICT use within this 'ecology', and deeper understandings of the work environment of my cases. Another, purely psychological, reason for inviting the teachers to document their reflections was that I did not want the less competent ones to feel that they were of no use to the study. The statement that topped Technological Reflections inviting teachers to add their thoughts on using *or not using* ICT, was to give this large group of teachers the opportunity to have their voices heard.

As for my particular informants, one filled out the form, and we had a two follow up interviews. The other two preferred to provide their specific reflections over a series of interviews for they did not have the time to write down all the details, though one of them continued to use the small notebook. The open space that the teachers were provided with generated valuable data about their cognitions, for the issues they chose to address were the ones that they felt most strongly about. It is, therefore, not surprising that the cognitions that emerged from Technological Reflections were repeatedly echoed during the data collection process. As such, this form of reflective writing was a central research method in this study.

3.5.6 Interactions between the Different Methods of Data Collection

That a variety of different data collection methods were used meant that each strategy added a dimension that the others were, to some degree, short on. For example, whereas the questionnaire provided an initial baseline and a broader idea of ICT use in the ALI, Technological Reflections delved into the teachers' subjective realities, and offered deep insights into pedagogical beliefs that were of particular significance to them. On the other hand, the interviews constituted a main gateway toward understanding the unobservable aspects of the participants' professional lives. These conversations took place in parallel with the observations, which provided a live verification of the teachers' accounts. Stimulated recalls combined interviews, observation, and teachers' reflective moments for a broader grasp of their cognitions.

Interactions between the different data collection methods took place in a recursive fashion, where observed actions, for example, led to certain discoveries, which were then probed further using the most appropriate methods, and so forth. The process continued until a larger picture, corroborated by different sources of data, was formulated. Table 3.1 exemplifies this mutual corroboration of data collection methods.

Example I. Laila is committed to ICT learning and development				
I see myself fully integrating ICT in my teaching in five years time - Strongly agree	Questionnaire, May 2008			
Clock hands never move backwards, and God willing, neither will my journey ©.	Technological Reflections, 18.01.2008			
I don't want to fall behind, be out-of-date, or anything like that. I want to develop, and to present new and better material.	Interview, 26.05.2008			
Example II. Laila is pleased with her new of way of teaching Arabic grammar using PowerPoint				
I never felt so pleased with my teaching, or that it was yielding such positive results, as much as I did when I started using PowerPoint presentations.	Recall, 19.02.2008			
There are many things I have done [in PowerPoint] that I am proud of, and it was difficult to choose which one to show you.	Materials Development Interviews, 24.01.2008			
Laila then displays a PowerPoint presentation of the word bita' [belonging to] and how it is used in Arabic. She lists examples where suffixes fall into place. Animation and color variation are used.	Field notes, 16.03.2008			
Example III. Laila believes technology is unreliable				
I think ICT is not reliable (things may go wrong) – Agree	Questionnaire, May 2008			
(in response to a technical failure:) Of course, the feeling of confidence was shattered and every time I remember it my neck stiffens.	Interview, 18.11.2007			
The biggest Nakba (catastrophe) to the department's server took place about three months ago when there was a power outage in Tahrir Square [in central Cairo]. This caused the loss of loads of material of high importance to their owners. I had been told that the server was the safest place to protect our files from being lost.	Technological Reflections, 18.01.2008			

3.6 Data Analysis

As stated by Stake (1995), "there is no particular moment when data analysis begins. Analysis is a matter of giving meaning to first impressions as well as to final compilations" (p. 71). In this study, analysis started in the field, immediately after the initial pieces of information were gathered. Hence, division between data collection and analysis is mainly organizational here.

Data collection continued until the categories were "saturated", that is when collecting new data no longer generated further understanding (Charmaz, 2006). With the exception of a few instances, all interview and recall data collected from the three teachers was fully transcribed in Arabic. The process was carried out by the researcher herself. First, it allowed me to think, compare, and develop preliminary codes. Second, as I had promised the teachers that their data would be kept confidential, I did not seek assistance for transcription, although such service was very affordable in Egypt.

An orthographic approach to transcription was employed, whereby prosodic features such as stress, intonation, and short pauses were overlooked (Crystal, 1985). This is because the focus was more on the information given by the teachers rather than how it was stated. Initially, I translated all transcripts into English, but soon decided not to continue down this path. The process was largely time consuming, and as there is a natural loss of nuances when data is transferred into text (through transcription), I did not wish to lose more (through translation).

In the following, I present the main analytical tools and processes employed in this research.

3.6.1 Analytical Tools

Several tools were used to aid the analytical procedure.

Using MAXQDA Qualitative Analysis Software: From the early stages of fieldwork, I decided to use qualitative analysis software for the following reasons: first, given the amount of raw data I had, and the detailed accounts that were to emerge, I searched for tools that would help me manage the information, provide an organized

framework for analysis, and therefore, enhance the validity of my study (Kelle, 1995). Qualitative analysis software is systematic and facilitates the storage of data in one place, which is particularly important when wanting to locate case material (Creswell, 2007). Second, qualitative packages increase the researcher's access and proximity to data, which according to Lewins and Silver (2007), "is the key benefit of using software" (p. 10). Third, computer-based analysis gives the researcher the opportunity to scrutinize data, carefully read through it, and consider meanings behind it (Creswell, 2007). Using software as a thinking tool is, in my opinion, one of its major advantages. A simple action such as dragging and dropping codes is an experience of pairing senses with intellect for deeper interpretation. Fourth, computer programs include a distinct element of visualization which helps draw associations and analyze relationships (Creswell, 2007). Fifth, by tracking the analytical procedure through its stages, computer software can present an 'audit trail', necessary for maintaining 'reliability' in interpretive designs (Corbin & Strauss, 2008). After some research into the market, I chose MAXQDA mainly because it was supportive of Arabic.

Besides the software, a number of other analytical tools were used in this study, most of which were informed by Corbin and Strauss (2008, pp. 65-86). Examples include:

Raising Questions: This powerful tool was used throughout the analysis for interrogation of data. For example, when examining the transcripts of a particular case, I often asked myself: "So, what does this sentence tell us about the teacher?", or "How does this information relate to that?" Asking questions about the data allowed for deeper understanding of the teachers, and often opened the door for more questions to be asked in subsequent encounters with them.

Making Comparisons: Comparing data highlighted salient features and directed my attention to certain properties that might not have otherwise been sufficiently examined.

Developing Concept Maps: Visualizing relationships through drawing concept maps was a powerful analytical tool. It presented comprehensive images of the cases in light of my research questions and theoretical framework.

Monitoring the Language: Key phrases such as "I believe", "I think", or "I am convinced" were indicators of core cognitions held by the teacher. They were underlined in transcription and further examined in the analysis.

Checking Emotions: The affective element often spoke louder than words. This included change of tone, laughter, smiles, sighs and even silences. There were a few occasions when the teachers wanted to vent some feelings off-record. Although what they expressed was not recorded in words nor included in the 'official' analysis, it rested deep inside, and indirectly affected the way I perceived my research.

Employing Personal Experience: As an insider researcher, I share a long professional history with the participants. Reflecting on such experiences aided my understanding of the cases. It should be noted, however, that there is a difference between drawing on one's experience to advance analysis and enhance interpretation, and imposing that experience on the data (Corbin & Strauss, 2008; Strauss & Corbin, 1990).

Writing Memos: I found the memo function in MAXQDA very helpful in this regard. It allowed me to attach reflective notes to codes, and as such, constituted a bridge between fresh data on the screen, and old experiences in memory.

3.6.2 Analytical Processes

Following Stake (1995), an inductive approach to analysis was adopted. It advanced systematically through a process of "categorical aggregation" (p. 74), whereby instances in the data were investigated for deeper meanings. Stake (1995) stipulates that "the search for meaning is often a search for patterns, for consistency", (p. 78), and that these patterns are either informed by the research questions, or originate from the analytical process itself. In this study, data was examined in small segments, and basic categories were identified. Corresponding instances were then re-categorized under broader conceptual themes. The research questions and the theoretical framework guided the analytical procedure by identifying the main areas of investigation. However, they did not constitute fixed templates for categorical aggregation. As this project explored a relatively new area of study, a balance was necessary between preconceived information with which one approaches the data

(e.g., the literature, fieldwork experience, research questions), and the 'fresh' understandings to emerge from the analysis.

The establishment of this balance is highly dependent upon the purpose of the study. For example, during the process of analysis, there was a moment when I realized that my understanding of certain aspects of the theoretical framework (Figure 2.1) was not useful in eliciting teacher cognition in relation to ICT. Following this framework, Borg (2006) suggested a number of issues that language teachers can have cognitions about, such as teaching, learners, colleagues, and activities. As stated earlier, I added an ICT element to the framework, and examined teachers' cognitions about: ICT and the self, ICT and the teacher, ICT and the learners, ICT and teaching, ICT and learning, ICT and teaching materials, ICT and language activities, ICT and assessment, ICT and colleagues, ICT and the ALI, ICT and the CALL Unit, ICT and the Arabic language, and ICT and the field of TASOL. As I was working on the analysis, I realized that compartmentalizing such elements was not very helpful in exploring the complexities of teacher cognition. Since the participants perceived relationships between these elements to be highly interwoven, the differentiation between the categories becomes almost an artificial one. A clear example was the difference between teacher cognition about ICT and teaching, and teacher cognition about ICT and learning. It was very difficult to draw a dividing line between the two in the analysis. Attempting to do so resulted in repetitive accounts. I therefore decided to focus on teacher cognition about ICT, and recognize other elements as part of the underlying foundation of these cognitions. I find the analogy of a pastry pertinent here. Instead of investigating each ingredient separately (e.g. learning, teachers, material, Arabic language), I chose to examine the pastry (cognitions about ICT), which is made out of these ingredients.

I was confident about the decision behind this approach to analysis since perceiving cognitions in such an integrated manner was in congruence with their complex and intricate nature as evidenced by the literature. In fact, in drawing a comparison between the cognitions of experienced and non-experienced teachers, Borg (2006) states that the cognitions of the former are more interwoven.

More expert language teachers are characterized by cognitions in which different forms of formal and experiential knowledge function as *an integrated whole* and which enable such teachers to envision learning potential in instructional contexts, to anticipate problems and to respond (often improvisationally) in ways which are both technically skilled and sensitive to learners. (p. 278, emphasis added)

The analytical procedure includes several examples of identifying categories and developing themes. For instance, in Heba's data, *Placing the Technology in the Learners' Hands*, *Giving Students Access to Material*, *Students as Producers of ICT Material*, and *Learning Extending Beyond Classroom Boundaries* were grouped under the main category *Supporting Learner Autonomy*. We then notice that Heba likes to take responsibility for her own technology development, and therefore objects to top-down arrangements for ICT teacher collaboration. That sense of responsibility relates not only to herself, but also to her colleagues who should take on responsibility to get things accomplished rather than depend on support, and to her students who should be working autonomously. Consequently, these major categories were grouped under the overarching theme *Responsibility*.

Data	Sub-category	Category	Theme
I think they have to understand that they shoulder the bigger burden. In other words, they bear the weight of their learning. I will give them things that will help them, but in essence, the work is theirs, and if they make progress, then it is they who progress not I (Interview, 01.07.2008)	Learners taking responsibility for their learning	r autonomy	BILITY
I like it this way. I came to understand that my role should be reduced as much as possible and that he [the student] should be doing the work, for after some time neither I nor any other teacher will be with him. So, he should learn how to go away and research. He should know how to ask others and this will be the thing that I have taught him (Interview, 13.02.2008)	Learners given responsibility for their learning Rationale for giving learners responsibility	Supports learne	RESPONSI

[An effective teacher] has to know how to engage the students, [and] let them do the work, do the questioning, and do the researching (Interview, 01.07.2008)	}	Learners given responsibility for their learning		
Each student will take a [DVD] exactly like this one I work from. It has [everything] on it. Of course, this wouldn't have been possible without this type of technology (Interview, 07.11.2007)	}	Giving learners access to material + Learning extending beyond classroom boundaries	•	
This week I asked each of the students to present a song, [to consider] how they will deliver it in class, and how they will talk about it. I asked them to ask people about it, to practice speaking (Interview, 13.07.2008)	}	Learning extending beyond classroom boundaries		
The sense that they come up with a product. When it is developed so that they record [their voices] to accompany the pictures, and it is present as a final project, this has a most beautiful effect on [their confidence]. They graduate from the course with a product in their hands, and presented that product to all the students in their class (Technological Reflections, 17.03.2008)		Learners as producers of ICT material		
<i>If everyone is really involved</i> , we will definitely talk to each other. When I know that there are several teachers interested in this and are learning it In other words, I do not see a specific role for the department here (Technological Reflections, 17.03.2008)		Teachers taking responsibility for their own learning	Supports teacher autonomy	

Table 3.2 Demonstration of coding - Theme: Responsibility

Similarly, in Dalal's data, she expresses a need for time. She needs *Time for Learning, Time for Designing Activities, Time for Experimentation, Time for Collaboration,* and *Time for Materials Development.* These sub-categories are then grouped under the wider category *Time for ICT Development and Use.* On the other hand, being *Occupied*, and *Overloaded* are grouped under *Reasons for Lack of Time,*

which together with *Time for ICT Development and Use* are grouped under the broader theme *Time*. However, we also note that *Time* is not an ordinary contextual factor, but one that is identified by the teacher as *The Most Critical Factor*. A memo is, therefore, added next to this segment, and *Time* is labelled as the most critical factor.



Table 3.3 Demonstration of coding - Theme: Time

3.6.3 Writing the Report

Following data collection and analysis, a case profile for each teacher was developed. Stake (1995) argues that case reports are produced in light of defined research questions, a deep understanding of the impact of specific circumstances on

the cases, and a certain chronological framework. He adds that "these questions, the contexts, the history, the case itself need more than to be described, they need to be developed" (p. 123). He concludes that a case report is, therefore, not a collection of parts but rather a construction of elements that enables the case to be understood by others.

It is important to note that the same data may generate multiple accounts, as researchers are different in the conceptual background they bring to analysis and in their approach to the process. The idea that data analysis may reflect every possibility that an inventive mind might conceive, is exciting and troubling at the same time. It is amazing to see how the same data might yield different interpretations depending on which angle one takes. However, the thought is also worrying, especially when considering the importance of doing justice to one's informants, and monitoring the validity of one's accounts. This point was raised during a discussion around this work, to which the following comment was made:

Another researcher given your data could find completely different things, with just the same amount of validity that you could. That's where we live. We live in a world of multiple realities, and you are articulating yours. (Supervisory Meeting, 16.03.2010)

This also lead to the sharing of the following insight by Novak and Gowin (1984).

We cannot say that this or that is true; what we can say is that, based on the educational events observed, the kind of data collected, and our data transformations, our knowledge claims are valid, and that we recognize that a different structure of educational events and/or the collection of different data or the use of different data transformation procedures may have led to different (perhaps in some cases diametrically opposing) knowledge claims. (p. 171)

3.7 Establishing Trustworthiness

Very few researchers argue that because qualitative research is a manifestation of multiple realities it cannot be subject to external judgment or verification (Kelle, 1995). In fact, there is a general consensus that qualitative researchers have to present evidence for the credibility of their accounts (Creswell & Miller, 2000), and

that it should be accessible for assessment and criticism (Long & Johnson, 2000). It is, therefore, not surprising to find a considerable amount of literature which emphasizes the importance of establishing rigor in qualitative inquiry (e.g., Lincoln & Guba, 1985; Merriam, 1998, 2002a; Miles & Huberman, 1994; Robson, 2002; Seale, 1999; Silverman, 2010).

Breaking away from positivism, Lincoln and Guba (1985) introduced the terms "credibility", "transferability", "dependability" and "confirmability" as replacement for "validity", "generalizability", "reliability", and "objectivity" respectively. Another group of researchers preferred to stick to the traditional terms arguing that instead of changing them to suit the nature of qualitative research, they are operationalized to encompass the distinctive features of this kind of inquiry (e.g., Kvale & Brinkmann, 2009; Long & Johnson, 2000; Robson, 2002). Some go as far as to argue that replacing the terms may indicate that qualitative research is neither *valid* nor *reliable*.

To state that reliability and validity are not pertinent to qualitative inquiry places qualitative research in the realm of being not reliable and not valid. Science is concerned with rigor, and by definition, good rigorous research must be reliable and valid. If qualitative research is unreliable and invalid, then it must not be science. If it is not science, then why should it be funded, published, implemented, or taken seriously? (Morse, 1999, p. 717)

3.7.1 Validity

Safeguarding validity is essential to establishing rigor in qualitative research. As stated by Simons (2009), "validity is concerned with how you establish the warrant for your work; whether it is sound, defensible, coherent, well-grounded, appropriate to the case" (p. 127). In this study, a number of techniques have been employed to achieve this goal.

3.7.1.1 Triangulation

Among the commonly used strategies for safeguarding validity is triangulation (e.g., Creswell & Miller, 2000; Lincoln & Guba, 1985; Long & Johnson, 2000; Maxwell,

2005; Merriam, 1998, 2002a; Patton, 1990; Seale, 1999). According to Creswell (2008),

Triangulation is the process of corroborating evidence from different individuals (e.g., a principal and a student), types of data (e.g., observational field notes and interviews), or methods of data collection (e.g., documents and interviews) in descriptions and themes in qualitative research. (p. 266)

Triangulation is a relatively early practice in qualitative research that can be traced back to the forties, when Foreman (1948) supported "the technique of using independent interviewers to establish validity through pooled judgment" (p. 413). Triangulating across methods is the most widely used technique today (Silverman, 2006). It minimizes biases that may arise from the use of one instrument of data collection, and raises researcher confidence in the findings, especially if such strategies are different from one another (e.g. questionnaire data versus observation) (Cohen, et al., 2007).

In this study triangulation was applied:

- across subjects, through interviews with other teachers, the director of the program (Appendix 8), the head of the CALL Unit (Appendix 9), and members of the computing units at the university (Appendix 10, Appendix 11, Appendix 12).
- across types of data, such as field notes, interview transcripts, questionnaire and diary outcomes.
- across methods of data collection, in the form of the questionnaire, observation, stimulated recall, interviews, and Technological Reflections. As demonstrated earlier, I have found triangulating across methods especially useful in saturating categories, identifying recurrent themes, and raising confidence in findings.

3.7.1.2 Prolonged Stay in the Field

Long engagement with participants is one of the well-recognized strategies for maintaining validity (Flick, 2009; Lincoln & Guba, 1985; Long & Johnson, 2000;

Maxwell, 2005) and a central factor in the success of fieldwork (Collings, 2009). My visit to the field lasted for nine months (November 2007- July 2008) during which I was in close connection with the teachers and their context. This impacted the research in several ways. First, it contributed to the generation of rich data and the development of thick descriptions, which are, in themselves, main strategies for validation (Creswell & Miller, 2000; Maxwell, 2005; Merriam, 2002a). Second, it resulted in the early saturation of categories. Third, in the beginning, the presence of the camcorder was a challenge, and the teachers reported its initial impact on their performance. However, toward the end of the fieldwork period, it was they themselves who invited the camcorder into their classes.

Among the reported dangers of long interaction with participants is "going native", that is a researcher adopting their views as his/ her own (Lincoln & Guba, 1985). Having worked in the ALI for over ten years, I was already native, and therefore the challenge was to "make the familiar strange" (Hockey, 1993, p. 208) as explained in the following chapter.

3.7.1.3 Respondent Validation

There is evidence in the literature that taking accounts back to informants for validation is a powerful method of establishing trustworthiness in qualitative inquiry (e.g., Merriam, 1998; Miles & Huberman, 1994; Robson, 2002; Seale, 1999). In fact, Lincoln and Guba (1985) identify it as "the most crucial technique for establishing credibility" (p. 314), probably as it is the only profound way of clearing any errors in interpretation, in addition to being a significant means of identifying one's own subjectivities and misconceptions (Maxwell, 2005).

In this study, member checking was employed as a strategy for maintaining validity. The teachers were presented with emergent stories during the early stages of analysis. Their comments were recorded and discussed (referred to in the data as *Member Checking Interviews*), and changes were made to the interpretation accordingly. Toward the end of the study, draft accounts were sent to them again for validation. I explained to them that since case profiles are temporal bounded by a certain context, I was not looking for a recent update of information, but rather a verification of the accuracy of representation within a certain context during a

particular point in time. In that sense, each account constituted 'a snapshot of experience', or what Guba and Lincoln refer to as "a slice of life" (Guba & Lincoln, 1981, p. 377).

3.7.1.4 Researcher Diary

Interestingly, on Page 1 of Robson's (2002) extensive reference, the author addresses the issue of maintaining a researcher diary. He highlights some of the merits of keeping records such as noting down references, documenting thoughts, writing down problems, and monitoring with one's reflexive processes.

In this study, I kept an electronic diary for fieldwork, in which I noted new ideas, important moments in the research process, reflexive thoughts, and points of validity. The following is an example from my diary which later changed the course of the research:

On January 21st, 2008, I noted down that one of the non-technology-using teachers was observing from a distance as I was interviewing her colleague in the corridor. She stood for a while, and it was obvious that she wanted to contribute but knew that she did not have much to offer. Later, I told her I would like to set an appointment for an interview, and she seemed very pleased. The interview was a positive experience for both of us. Reflecting on this situation, I realized that in addition to its psychological effect on the teacher, it added a wider perspective to the context in which my three cases were operating, and the factors that impacted teachers' decisions to use or not to use technology in teaching. More importantly, ethically-speaking this research was not meant to create friction among teachers or cause non-technology-users to feel inferior to others, especially given the fact that the majority of them are seasoned teachers with a professional history to be admired and respected.

3.7.2 Reliability

Keeping an audit trail is a significant strategy for establishing rigor in qualitative research (e.g., Flick, 2009; Merriam, 2002a; Robson, 2002). In fact, according to

Lincoln and Guba (1985) "the audit may be the single most important trustworthiness technique available to the naturalist" (p. 283). Establishing an audit trail means keeping records of all research procedures (Creswell & Miller, 2000; Long & Johnson, 2000). As Dey affirms (1993), "if we cannot expect others to replicate our account, the best we can do is explain how we arrived at our results" (p. 251).

In this study a detailed audit trail was maintained through various techniques.

- For each case, different types of data (e.g., field notes, audio content, video material, respondent validation notes, and samples of her teaching material) were dated, labeled, and grouped for easy retrieval.
- Folders were created for each stage of the research (e.g., fieldwork, analysis, case profiles, discussion).
- Files saved in MAXQDA qualitative analysis software constitute a complete, detailed, and organized record for data analysis. As mentioned previously, in addition to reinforcing reliability in qualitative research, computer programs may safeguard validity. This is because they can improve the management of large amounts of information, and advance the retrieval of data pertaining to specific areas (Kelle, 1995).
- The researcher diary holds significant thoughts and reflections that have informed research decisions during the fieldwork period.
- Fieldwork progress reports sent to supervisors during my stay in Cairo provide a detailed record of the development of the project during this period.
- From the early stages of this project, all meetings with supervisors were audio recorded, and with the exception of a few, all were transcribed and reviewed. In addition to the remarkable benefit of such transcripts in guiding the research process, they constitute a powerful source of documentation on the development of my doctoral experience as a whole, and this study in particular.

3.7.3 Generalizability

Given its concern with the unique and the particular, one of the hallmarks of case study research is the absence of statistical generalizability. According to Stake (2006), "the power of case study is its attention to the local situation, not in how it represents other cases in general" (p. 8). Case studies, therefore, call for analytical, theoretical (Punch, 2009; Robson, 2002), or naturalistic generalizations (Simons, 2009; Stake, 1995). In other words, through thick description and rich accounts certain general understandings are discerned that can be applicable or beneficial to other contexts (Lincoln & Guba, 1985). As highlighted by Sim (1998):

Here the data gained from a particular study provide theoretical insights which possess a sufficient degree of generality or universality to allow their projection to other contexts or situations which are comparable to that of the original study. (p. 350)

It is, therefore, hoped that conceptual understandings derived from this study are transferable to other language teaching contexts worldwide, leading to further research in the same direction.

CHAPTER 4: ETHICS AND CULTURE

4.1 Introduction

One of the main considerations in this study is the researcher's relationship with the informants, which were built and nourished over the years. As a window into the world of insider academic research, this chapter presents an argument for the importance of the affective elements of fieldwork methodology, in the particular instance of an inquirer investigating her own backyard. The impact of relationships within the field is addressed in the context of four main aspects of insider research, namely researcher identity, access, advanced knowledge, and disengagement. The chapter further discusses relationship-related measures of establishing trustworthiness in naturalistic inquiry.

4.2 Relationship-based Insider Research

Research has identified specific aspects related to examining one's own backyard (Brannick & Coghlan, 2007; Creswell, 2007; DeLyser, 2001; Edwards, 2002; Glesne & Peshkin, 1992; Hockey, 1993; Labaree, 2002; Mercer, 2007; Platt, 1981; Robson, 2002). The following section elucidates the distinctive role of the affective relationship-related element of field research, in association with four distinctive features of backyard inquiry.

4.2.1 Researcher Identity

Unlike many insiders who assume the role of researcher in addition to their preexisting one, I chose not to undertake any teaching responsibilities while carrying out research in my workplace. However, with the emergence of my new identity as a researcher, a growing sense of commitment toward my colleagues started to develop, especially as a result of the experiences I had during my initial research training year abroad. At the same time, I knew that as an insider, my community would have greater expectations of me than they would of a complete outsider. All this was woven into the timeline of my research plan. Because my status as a researcher was known amongst my colleagues, I was perceived accordingly and, therefore, in addition to collecting data, I often found myself in the position of being asked for academic assistance or professional advice. For instance, I was approached to recommend books for the library, give a presentation on using technology in Arabic language teaching within the postgraduate teacher education program, review master's research plans, provide advice on opportunities for postgraduate studies or recommend conferences on technology and language teaching. Sometimes, expectations were higher than I could deliver, especially when I was perceived as the computer wizard who was back to save the technological situation in the language program. This was somewhat problematic given my asserted identity as a PhD researcher in the field of computerassisted language learning (CALL). Another challenge, clearly ethical, had to do with suggesting new ideas for ICT use, while at the same time investigating teachers' beliefs about technology. The dilemma was: Do I provide advice and risk the credibility of my data? Or do I keep advice to the minimum and feel ashamed? This was gradually resolved. First, through reflexive thought processes, I became more conscious of the advice I offered and somehow tracked it in the data. Second, after being involved in the study for some time, the teachers themselves would often tell me if they were experimenting with new methods or activities and also comment on its source, whether myself or others, usually colleagues.

My newly developed status as a researcher did not isolate me from the other teachers in the language program. On the contrary, during the fieldwork period, old relationships grew closer for a number of reasons. First, the distinct nature of my role stimulated interest and inquiry from my colleagues. Second, due to my prolonged visits to the field on a self-regulated schedule, I was more available on a personal and professional basis than when I worked as a teacher, and because the fieldwork period was known to be limited, there were more social events to be arranged, and thus I was more able to keep up with the pulse of the place. Third, the dynamics of field research itself with all its data collection instruments meant that I became a "guest [..] in the private spaces of the world" (Stake, 2005, p. 459). In this regard, I was able to observe that which happened behind closed doors, to wander into the hidden alleys of professional experience, and consequently to develop clearer insights into the tacit aspects of the teachers' identities. Over time, the quality of rapport changed and the nature of relationships altered.

DeLyser (2001) refers to "shifting from being one of the gang to being a researcher" as one of the relationship dilemmas that insider researchers might face (p. 444). In my case, it was not a clear either-or situation, but rather my researcher identity developed within the existing identity of being a member of 'the gang'. So, at times the researcher identity would glow and at others it would fade away, but I was always a colleague, a friend and a 'daughter of the department'. However, such combined identity brings certain complexities. For example, occasionally data collection would take place in a coffee shop, in a corridor, in a car, or in a garden. My colleagues knew that I always carried a recorder or a camcorder with me, but when to record and when not to, was never an easy decision. It required a level of emotional and social sensitivity and a deep understanding of the nature of interactions and the context in question. Sometimes collecting data in the middle of a social setting makes people feel complimented or esteemed. On other occasions, the same act might be intrusive or repressive. Clearly, insiders with a combined colleague-inquirer role need to be very flexible and tactful (Hockey, 1993). Nevertheless, in principle, I never favored data collection over personal relationships no matter how tempting that might sometimes be.

4.2.2 Access

One of the frequently cited merits of insiderness is the ease of negotiating entry into the field (Brannick & Coghlan, 2007; Mercer, 2007), which Labaree (2002) describes as "the most universally accepted advantage given to being an insider" (p. 104). Unlike outsider researchers, insiders gain easier entrée to their environments and permission to undertake research therein. However, better access is not absolute, and insider researchers might face limitations in this respect. Brannick and Coghlan (2007) distinguish between two types of access: primary and secondary. They explain that while the first is associated with acquiring entrée into one's organization, the second refers to aspects like permission to review documents, obtain information, or meet people. They conclude that obtaining primary access does not necessarily guarantee secondary access, and insiders should be clear about the kind of access they are allowed. Naturally, former relationships with the participants constitute a major factor for gaining access. Researchers could obtain both primary and secondary access but still be unable to gather valuable information due to the nature of relationships they have with their informants (Collings, 2009; Robson, 2002). Hence, maintaining personal relations is what gives insider research its hallmark.

The entry I had into my community was qualitatively different from experiences typically described in the literature. First, it was of a transcendent nature that rose above the physical and the social. It was of the type that not only gave you access to the place and the data, but also motivated your respondents to embrace the idea, and commit themselves to it. There are numerous examples of this transcendent access, such as participants providing personal documents without being asked, sacrificing time and effort to video-record stimulated recalls over and over again when things went wrong, inviting me into their homes to complete unfinished research-related work, and suggesting new angles from which to approach the investigation.

Secondly, access, thus defined, has to be conceptualized within a specific cultural context. Located in the Arab world, fieldwork dynamics were shaped by culture in many ways. For example, 'asham is a well-established social concept in Egyptian culture. It may be defined as "an expectation and hope that one gets a 'preferred' response, that is, acquiescence to a request" (W. Samy, personal communication, 17 December, 2010). Given the context of this study, the concept becomes essential to the whole research process. Based on 'asham, full access was guaranteed and complete assistance was granted. 'Asham was also the basis on which I was approached for ICT advice and other types of technology-related requests by colleagues. Perceiving fieldwork through the lens of 'asham, my constant worry was not that the participants would withdraw in the middle of the study, but on the contrary, that they would remain longer than they wished to, out of a feeling of social and moral obligation. It was, therefore, necessary to be vigilant and sensitive to ensure that the teachers were not subject to this kind of pressure. Gauging the affective was by far the most challenging part of the fieldwork experience. The following example was written in the context of the initial difficulties I encountered with the video recorded stimulated recalls:

At some point I felt that I was withdrawing too much from the 'personal credit' I had with my colleagues because of these recalls (Fieldwork Report 13.12.2007).

The anticipation of assistance that I returned with was based on a history of shared lived experiences which in Arabic may be referred to as *'ishra*. The concept is related to "a kind of expected solidarity and mutual assistance stemming from belonging to a *'asheera*, that is, a tribal community, clan, or kinsfolk" (W. Samy, personal communication, 17 December, 2010). In a modern context, this concept would normally be used to describe relationships such as those between friends, neighbors and colleagues. My long *'ishra* with colleagues was reflected in the close contact I kept with many of them while being away, and their sustained interest in the progression of my research plan. Because my topic of investigation, the exploration of teachers' beliefs about ICT, emerged from a genuine concern within the department, many could relate to it, and were keen to share their experiences. The following extract from my fieldwork report, sketches the situation in the field:

.. I also distributed small notebooks to them for what I named 'Technological Reflections'. Over the past six weeks most of them have come back with experiences of success and frustration, and ideas for further development. Almost every day, I am stopped in the corridor by a teacher who would like to report an idea or a situation. I also had teachers refer me to others who might have had a good or bad 'technology day' (Fieldwork Report 13.12.2007).

Initially, I debated whether or not I should be completely overt about my area of investigation, especially since it involved exploring teachers' personal theories about using technology. My concern was that disclosure would contaminate the data, and thus affect the fieldwork adversely. However, upon entering the field, I realized that a mixture of clarity of purpose and *'ishra*, in addition to having the reflexive monitor constantly on, produced remarkable results. Gradually, the teachers helped fill in gaps in the data collection process that I was unaware of. Examples included: facilitating access into a specialized library at Cairo University to obtain material in Arabic, inviting me to video record sessions where the teacher would be trying out new activities using technology (such as Skype in assessing oral proficiency), and

sharing end of semester student evaluations even if negative comments about ICT use were stated. With the passing of time, the project developed into a kind of collaborative research. Theoretically speaking, I was the researcher and they were the participants; however, at times the demarcation line would disappear, and we would perceive the fieldwork experience as ours rather than mine.

Informants reported that their participation in the study had a profound impact on how they viewed themselves as teachers and the way they perceived the role of technology in their teaching. Within their busy schedules, it gave them moments of reflection and "a genuine space within which teachers as educational practitioners [could] reveal what is real for them" (Smyth, 1999, p. 75).

In the process, the teachers' reflective thinking often led to discussions about avenues for further ICT professional development, and we considered the possibility of utilizing my recordings of their classes and their recalls in their respective workrelated projects. Interestingly, this growing cooperation between the teachers and myself was mirrored in the specific wording of the informant consent forms distributed to the students; so, while initially they only included the goals of my research, midway through fieldwork, they were rephrased to encompass the teachers' ICT professional development objectives as well (Appendix 13).

Hockey (1993) notes that one of the challenges of studying one's colleagues is the likelihood that the research process is subjected to close examination by them. In my situation this was a major advantage. I was often asked questions about the nature of my research methodology training, what I plan do after the fieldwork period is over, how I will analyse the data I was collecting, and how the results will be presented. Addressing these questions every now and then was not only evidence of their interest in my work but also an opportunity for me to rehearse my larger plan, which was sometimes eclipsed by the day-to-day details of data collection.

Another dimension related to insider access is that of hierarchy. Evidence shows that a researcher's position within an institution plays a crucial role in determining his or her level of access to certain kind of information (Brannick & Coghlan, 2007; Hockey, 1993). In a culture where seniority is held in high regard, it is important to understand the dynamics of fieldwork in this light. The relationships I had with my superiors dated back to the time when I was a student-teacher. At that time, teacher education tended to follow the "craft model", based on the traditional concept of the craft (Wallace, 1991, pp. 6-7). A student-teacher was 'adopted' by one (or more) of the "master" teachers and taught the 'secrets of the craft' through intensive apprenticeship (Stones & Morris, 1972, p. 7). Mentors not only provided professional learning, but also emotional backing and insights into managing institutional politics. With the passing of time, the trainees became mentors themselves and the cycle continues. Of course, the craft model of apprenticeship, being so conservative, has its negative repercussions, such as the slow adoption of technology by the teachers. Since many senior teachers teach with the minimal use of technology, teacher trainees rarely experience the use of ICT in their training. On the other hand, one of the main advantages of the craft model is the affective dimension that slowly develops into 'ishra (shared lived experiences) with the passing of time. Grounded in the social and emotional principles of community ethos and built on the concept of 'asham (anticipation of solicitude and support), gaining access into my workplace was never in question.

4.2.3 Advanced Knowledge

One of the inherent characteristics of insider research is the inquirer's a priori knowledge and former experience founded upon a long history of relationships that frequently extend beyond the work environment (Edwards, 2002). This background information provides researchers with valuable insights into the complexities of their contexts and deeper understandings of the organizational culture (Labaree, 2002; Robson, 2002). Intimate knowledge of my workplace and familiarity with the social interactions therein aided me in every stage of my research, starting from choosing my area of inquiry and formulating research questions to choosing the cases and implementing my research plan.

As much as it is a great asset to the insider researcher, familiarity with contextual details poses distinct challenges too (Alvesson, 2003; DeLyser, 2001; Edwards, 2002; Hockey, 1993; Mercer, 2007). Developing an understanding of a situation while being part of it might be difficult, for "that which is closest may well be that which is most difficult to see" (Hockey, 1993, p. 221). Researchers might take much

for granted and, therefore, probe little, and they may fail to take notice of the mundane activities of everyday life (Brannick & Coghlan, 2007; Labaree, 2002). The preconceived ideas and conceptions they hold may also impact their perceptions of their research environment. On the other hand, respondents, due to their former relationships with the researcher will have their assumptions too, and act accordingly. For example, they may not provide certain data thinking that it is well known due to their history of shared experiences with the researcher (Platt, 1981). It is, therefore, believed that the real challenge that insiders face upon gaining access is questioning their former intimate knowledge and attempting to "make the familiar strange" (Hockey, 1993, p. 208).

To help researchers meet this challenge, different strategies have been suggested, such as intentionally asking basic questions (Hockey, 1993). However, this method should be pursued with care as it might impinge upon relationships. In the context of interviewing one's peers, Platt (1981) explains that because assumed information is based on a history of a shared membership, asking for obvious details, might indicate that researchers no longer perceive themselves as part of their own communities, which could bring tension to close relationships. Insider researchers might find themselves resorting to alternative ways of interviewing their peers, such as non-structured interviews (DeLyser, 2001) or role-playing (Platt, 1981).

In addition to other more traditional interviewing styles, I used both informal interviews and role-playing to ask simple questions. With the former, the teacher was told that the interview was an open space for expression. We discussed a specific matter such as handling technical problems in the classroom, and once in a while I would interfere to request a clarification or ask a specific question. This method of questioning gave room for many subtle details to be mentioned (Burgess, 1994). As for the role-playing, occasionally, I would run an interview as if there was an audience listening. So, I would start by saying something along the lines of: "Thank you very much for wanting to share with us your insights into...", or "Could you please tell us more about...", and perhaps end an interview with "... and on this note, ladies and gentlemen, we end our...". Because the teachers knew that the data they provided was going into a study that will probably be read by others outside our familiar context, imagining an audience was neither awkward nor artificial. In both

interviewing styles, I was able to ask very simple questions to which I often received responses starting with "As you know.." or "It is obvious to everyone that..". Because most interviews took place in a friendly and light atmosphere, I had the opportunity to experiment with different interviewing styles before choosing the most appropriate one that would foster our close relationship, and at the same time help me achieve the distance necessary for collecting rich data.

Given my a priori knowledge of the context and familiarity with the state of technology integration in the ALI, I was careful not to influence the data provided through the kind of questions asked, or the manner in which they were put forward to the teachers. Following Garton and Copland (2010) reflexivity was called for in the design of the interviews, and attention was given to the possible impact of former relationships on the data generated. An example of interview construction and interaction can be found in Appendix 14.

It was easier to maintain distance in light of the fact that I had spent a training year away from the program. Upon my return, I found that a number of developments had taken place such as the appointment of a new team for the CALL Unit and the adoption of new technologies by some of the teachers. Also, because of understandings I developed during the research training, I came back with new "intellectual luggage", and started to perceive my workplace with a different eye (Hockey, 1993, p. 209).

In addition to the physical and intellectual distance, a conceptual distance represented in reflexive thought processes had to be maintained. Reflecting on the influence of one's advanced knowledge, subjectivities, values and beliefs on shaping the research, is important for conducting rigorous qualitative research (Creswell & Miller, 2000; Etherington, 2004; Kleinsasser, 2000; van Heugten, 2004). This "metaunderstanding of the character of research work" gives a field study its scope and significance (Alvesson & Sköldberg, 2000, p. 288), and becomes even more important when researching a familiar territory to which a researcher comes back with a host of past experiences and background information (Brannick & Coghlan, 2007). It is, therefore, imperative that such a priori understanding is not only acknowledged but questioned as well (van Heugten, 2004).

4.2.4 Disengagement

The issue of disengagement might not have received much attention in the literature because methodologically speaking, insiders never really leave their environments and their accounts will tend to accompany them back into their communities (Labaree, 2002). Like many insider researchers, I am still connected to the field. The end of my fieldwork was clearly demarcated by me leaving the institution and returning to university abroad, but I remain in contact with my colleagues both as a researcher and as a friend. They continue to volunteer their experiences in the hope that any additional information will help me in my research.

Writing the final report is certainly a major responsibility, not just because I would like to honor our *'ishra* and live up to my colleagues *'asham*, but also because I understand the significance of the data I am now entrusted with. I know they look forward to reading my interpretations and to learn more about their own pedagogical beliefs about technology. Nevertheless, I also hope that what they read will reflect a sense of value and respect for their lived experiences and help them advance further in their practice.

Associated with drafting the final report are issues of confidentiality and anonymity. At the onset of the project, I had assured the teachers that their accounts would be confidential and anonymous. However, as the project was progressing and the teachers were becoming more engaged, I found it difficult to avoid the identification of individuals, especially because there are so few technology users in the language program who maintain close ties with one another. They frequently talked about their participation in my research and occasionally referred to themselves using the pseudonyms that I had given them. Toward the end of the study, I asked them if they wanted their real names to be published. In principle, they did not mind, and preferred to leave the final judgement to me, a decision clearly based on principles of *'ishra* and *'asham*. Of course, mentioning their real names gives me the opportunity to officially acknowledge their contributions as a small token of my appreciation and gratitude. However, Richardson (1992) notes the ethical question of having "right" accounts but doing "wrong" to those who invited us into their lives (p. 119). Since not all the data is positive, caution has to be observed as to the impact of what will be

written on their own relationships within the their workplace and in consequence, my relationships with them.

4.3 Emotional Rigor in Fieldwork Methodology

As mentioned in Chapter 3, a considerable amount of literature addresses the importance of maintaining rigor in qualitative research (e.g. Lincoln & Guba, 1985; Miles & Huberman, 1994; Robson, 2002; Seale, 1999; Silverman, 2010). The issue of establishing trustworthiness is of specific importance to insider researchers, since meeting the standards of academic rigor in this kind of inquiry can be very challenging (Alvesson, 2003; Brannick & Coghlan, 2007). Drawing on my research experience, I will highlight the power of the affective element underpinning a research process to meet measures of methodological trustworthiness.

4.3.1 From Trust to Trustworthiness

Unlike outsider researchers who seek to build trust over the course of their research, insiders' pre-established level of trust is the vehicle for their work. Building and maintaining trust are central to field research, without which valid accounts are very hard to obtain (Lincoln & Guba, 1985). A high level of trust and rapport is likely to give access to more candid data, and thus more accurate accounts (Mercer, 2007). In her discussion of methods of safeguarding validity in case study research, Simons (2009) affirms:

Even more critical are the relationships you create in the field, which enable you to gain 'quality' data that accurately represent the phenomena you are studying and negotiate meanings that are valid for the specific purpose in the particular context. (p. 129)

Additionally, because the researcher comes from the same environment as the respondents, disclosure might be easier (Hockey, 1993; Platt, 1981), which may add clarity to the general picture. I would, therefore, argue that trust may constitute a powerful guarantee for acquiring candid data especially in a context where the participants are able to relate to the study and envisage the change it might bring to their conditions. In addition to accurate accounts, trust also gives access to detailed

information. This in itself provides the researcher with the 'thick description' necessary to facilitate theoretical generalizations to similar settings (Creswell & Miller, 2000).

Trust was one of the foundational elements upon which my research was established, and an affective element of rigor deeply embedded in the encompassing notions of *'ishra* and *'asham*. A considerable degree of sensitivity and flexibility was, therefore, required throughout the fieldwork experience. For example, whereas informant consent forms were distributed to all international students involved in the study, none were distributed to the teachers. Asking them to sign would have indicated that the *'ishra* upon which our relationship is built was not sufficient. Another example was 'respondent validation' or 'member checking', returning the data back to the participants for validation. In my research, I named it 'member sharing', and the accounts were given to the informants on these grounds.

4.3.2 From Collaboration to Corroboration

One important source of credible data is close collaboration between the researcher and the respondents (Creswell & Miller, 2000). The participation of my teachers was of a special nature and their involvement in my study increased with the passing of time. The following is an extract from my researcher diary:

There is more involvement on the part of my teachers now, and they approach me perhaps more than I approach them. During some observations, a teacher might quietly ask me to take note of something in the class - a specific student, for example, or some strange feature on her computer screen. After class, instead of me asking her, she might ask me: So, what do you think of my teaching today? How could this class have been better? (Researcher Diary, 26.04.2008).

Other examples of teacher collaboration were passing on documents or emails, inviting me to view their ICT teaching material or telling me about training sessions they were organizing for the postgraduate students, the work they were about to publish, or papers they were preparing for conferences. As mentioned earlier, in my fieldwork, I used triangulation as a strategy for data validation (e.g. Creswell, 2008;

Creswell & Miller, 2000; Lincoln & Guba, 1985; Long & Johnson, 2000; Maxwell, 2005; Merriam, 1998, 2002a; Patton, 1990; Seale, 1999). So, in addition to triangulating across subjects, by interviewing the teachers, the head of the CALL Unit, the director of the program, and members of the computing services at the institution, I also triangulated across methods through interviews, observations, stimulated recalls, and written accounts. By providing additional sources of information, the teachers were contributing to the development of a more rigorous account, and gradually the picture began to come together corroborated by the individuals I was writing about.

Built on my advanced knowledge of the context and its sub-culture, my regular visits added to my understanding of the field, and fostered my relationships therein. Also, as an insider researcher, I never had to worry about being perceived as a "foreign intruder", and thus a source of suspicion (Nukunya, 1969, p. 19), a problem that outsider researchers might face. In fact, because insider researchers are relatively invisible, they have a better chance of not changing their research settings due to their presence (Hockey, 1993). Hence, 'reactivity', or the impact of the inquirer's presence on the setting (Guba, 1978; Robson, 2002), was minimal, and decreased over the course of the study.

It should be noted, however, that relationship-based fieldwork comes with its sensitivities too. One of the challenges I faced had to do with sharing the video material. Amidst recording a number of class sessions and recalls, I was asked if it was possible to use the video files of my study for the TAFL postgraduate teacher education program. This was likely to change my teachers' in-class behavior from the 'real' to the 'ideal', which would, in turn, have affected the validity of the study. In light of the social constructs of *'ishra* and *'asham*, my validity argument was respected, but I volunteered to video-record classes of other teachers for teacher training purposes.

Close interpersonal ties in relationship-based research play a pivotal role in establishing rigor. However, the question that researchers need to address is how to develop a deeper understanding of the social and emotional dynamics within their respective fieldwork settings that will enable them to harness the methodological opportunities provided by these environments, and rise to their challenges.

Recounting a personal research experience in a familiar territory, this chapter sought to highlight the importance of relationship-related elements of field research and the power of emotional rigor in naturalistic inquiry. Rather than explicitly summing up the affective parameters that emerged from my investigation, I chose to leave the text open for the various personal resonances that it might evoke. Both Borg (2006, 2009) and Zembylas (2005) note that very little is known about the role of emotions in teaching contexts. I, therefore, share this account with the hope that it will be of a particular relevance to fellow teacher-researchers investigating their own backyards and that, in a broader sense, it will contribute to opening up new horizons of research on the role of affect in fieldwork methodology.

PART II: ARTICULATING TEACHER COGNITION AND TECHNOLOGY

This section introduces profiles of the three main informants: Dalal (Chapter 5), Heba (Chapter 6), and Laila (Chapter 7). The case reports represent a within-case analysis of the key themes to emerge from examination of the data collected from the respective teachers. With each theme discussed, a new feature emerges and is added to the picture which, when it is completed, will demonstrate each teacher's unique characteristics.

A visit to the teacher's classroom sets the scene at the beginning of each chapter. The detailed description is intended to introduce the teacher to the reader through her speech and actions, and to provide the latter with a sense of her use of ICT in context. In line with the research questions and the conceptual framework that have informed this work, the case studies are constructed around the following broad research areas:

- Teacher cognition and early experiences as learners
- Teacher cognition and teacher education
- Teacher cognition and technology practice
- Teacher cognition, practice, and context

The profiles end with a summary of the salient themes which have emerged from the within-case analysis, and which characterize each teacher as a technology user within her particular context.
CHAPTER 5: DALAL'S COGNITIONS AND TECHNOLOGY USE

5.1 A Visit to Dalal's Class

It's 8:00 on a chilly morning. Seven students have just taken their seats ready for their Arabic media class. They sit in two rows facing each other with the teacher's console at one end of the class, and the smart board at the other. There are two wide whiteboards on the side walls behind the students. By the teacher's console, we see Dalal's watch, white board markers, and several stacks of photocopies.

Dalal moves closer to the students as she flips through their marked listening exams. She explains that while they work on their listening pieces they should not just focus on how the words sounds, but employ some of the listening strategies they have learned, such as making use of their background knowledge of certain news. She gives the example of the minimal pair kasafa [to eclipse] and qasafa [to strike] explaining how, in case of doubt, knowledge of the context will help in selecting the right one. She concludes that the exam was generally good.

Dalal goes back to the teacher station and says: "Let's start, Allen is not here, who would like to be today's teacher instead of him. Any candidates?". Nora volunteers. The others look at her, smile and seem ready to contribute with their self-chosen pieces of news. She starts by asking Emma: "What are the most important news stories today?" Emma looks at her notes and tells the class about the visit of President Nicolas Sarkozy to Algeria. Nora then turns to Michael and asks: "What is the purpose of the visit?" He answers: "to discuss relations between the two countries". "What sort of relations?" she asks again. "Economic relations", he answers. Next, she turns to Sarah and asks her for her choice of the most important world news. Sarah talks about discussions held in Bali on the Kyoto Protocol on climate change. Nora then turns to Paul and asks him what happened in Bali, and he gives a summary of Sarah's news. In the meantime, Dalal, sitting at the teacher station, writes down vocabulary that emerges from the interactions on a piece of paper, which she has placed under the document camera next to the teacher's console. Her hand-writing is reflected on the smart board and the students copy down the new words. She also interjects once in a while to correct structure or

pronunciation. Nora then moves to Michael and asks him about his chosen world news. He tells the class about a new CIA report about the Iranian nuclear program. Nora smiles, asks him to repeat the news again without reading it out from his notes, and they laugh. Michael says the news again, but does not complete it as the class continues laughing. Toward the end of the activity, Nora asks her colleagues to select words from the board that they think will be useful to their learning in the future. They seem accustomed to this practice for they are quick with their suggestions. Dalal draws a circle around every suggested word and explains its meaning in further detail. The students look at the board and copy down the terms.

Dalal then says they will start the listening activity and explains that it is different from previous activities, as they will not just listen to the headlines but to a whole news briefing. She adds that there will be many details but they should only focus on the main points. The DVD starts playing and news from Al-Jazeera is displayed on the smart board. The students focus on the screen while Dalal takes notes. She pauses after the first news item, rewinds and tells them: "Please concentrate on verbs and verbal nouns". They watch the first news segment again. She then asks: "So, who has a piece of information?" Nora responds: "There is a summit in Doha". Dalal asks: "Have we heard about this summit in any of your [in-class] news before?" Nora says yes, and the others nod. "So, please utilize the information you have heard", she adds. They listen to the summit news again for more information. She discusses more vocabulary items and writes them on one of the white boards to the side of the class. Dalal then moves on to the next news story about the CIA report on the Iranian nuclear program. She rewinds and they watch the news items again. Sarah says she listened to the word tasmiim [determination], but does not know what it means. Dalal writes the word on the board and asks the class what form of word it is. Nora says it's a verbal noun. Dalal then asks what the corresponding verb is, and Paul answers sammama [to determine]. She asks if they know the verb, and when they do not answer, she writes a synonym next to it. She then points out that this is the same piece of news that Michael had presented earlier, and invites the class to recall the information that he gave them before. She says they will listen again for more details. After some time, Dalal asks them which vocabulary items they would like to keep from the first two news stories. They look into their notebooks and Paul suggests takaamul [integration]. She then asks about words from the second piece of news and Emma suggests sammama [to determine].

Dalal then says she would like them to finish lesson five on page 52 in their media book. The lesson consists of a piece of news about the Moroccan secretary of state, followed by a vocabulary list and a number of exercises. Dalal says she will give them some verbs from the lesson that they will use in forming questions about this specific piece of news. She looks at the text, assigns a verb to every student and asks them each to form a question. She gives them two minutes to complete the task. While they read the news and prepare their questions, she circulates, monitors the activity, and answers some quick side questions. Dalal asks Emma to start. She reads out her question, and Dalal asks her to whom she would like to direct it. Emma directs her question to Paul. He looks at the text, and asks her what the question was, and she repeats it for him. As the activity progresses, Dalal, standing by the teacher station, interjects to correct pronunciation and structure, or provide hints and clues that will help the students formulate appropriate sentences. She stands by the students as they read out their questions, and sometimes takes a quick look at what they have written especially if their pronunciation is incorrect. She briefly explains structure and helps them understand the meanings of verbs by reminding them of others with the same root.

Dalal then asks them to take out a sheet entitled 'From the Newspaper # 17'. The handout consists of a list of short pieces of news with thumbnail pictures next to them. It looks like a collection of short news items that Dalal has printed off an Arabic newspaper website, and developed into a worksheet. She assigns a piece of news to every student and asks him/ her to formulate questions about it. While they do so, she moves around supervising the activity and responding to inquiries. She then turns on the document camera and places the sheet under it. After a while, she asks Michael to start. She zooms in on his particular piece of news while he reads out the headline about attacks in the governorate of Dialy in Iraq. Michael says: "First question: How many were killed in the Dialy attacks?" He directs his question to Nora. She responds that fourteen people were killed. Dalal comments: "This is an easy question, very easy. Let's have another question". The students smile. Michael to responsible for the

attack in Dialy?" While Michael is asking his question, one of the ALI secretaries comes in and says it is time for the student semester evaluations. Dalal says they will answer Michael's last questions, and continue tomorrow. She then gives them a commentary article about news from Sudan and tells them that they will discuss it on the following day.

(Video recorded session, 04.12.2007)

5.2 Teacher Cognition and Early Experiences as a Learner

As Dalal's parents were studying abroad when she was young, she grew up between Egypt and the USA. In the States, she used to play with the neighbors and learned English mainly through communicating with them. This childhood experience of second language acquisition remained with her, so that up until the present day she advocates communicative approaches, and always considers ways of improving her teaching so that it is most relevant to students' daily lives.

I try as much as possible to implement the communicative approach. I always think: How will they benefit if I give them such and such?... If there are activities that they will enjoy and benefit from in their practical lives, this will be best (Interview, 21.01.2008/**D1**).

Dalal found her own learning experience in the States valuable and constructive. She read numerous stories, learned silent reading, took part in group projects, and appreciated language learning as exciting and enjoyable. Influenced by these past experiences, she tries to draw on them in her present practice.

I always try to think of group projects that students can work on together in a way that is useful to their learning (Interview, 21.01.2008/**D2**).

Because of her frequent travels, and the method in which Arabic was (and often still is) taught in Egyptian schools, she encountered many problems in learning the language. Again, this has affected the way she teaches Arabic now. She tries to avoid those aspects that she disliked then, such as rote memory, slow reading out loud sessions, and dry grammatical lessons.

To me, Arabic was a huge obstacle. I, therefore, want to teach it the simple way. I don't like complicating things. It [my experience] made me think: How can I facilitate [learning] this language? (Interview, 21.01.2008/**D3**).

Dalal's mother was herself a TASOL teacher. She used to invite Dalal to observe classes at university, and to help her when she was writing her textbook. Dalal's mother also encouraged her to explore teaching the language, and to pursue her MA and PhD later on.

She used to come back [from work] and tell us: "Today I gave the kids this and that... and for the first time, they were able to do this and that". She also used me and my brother as she was developing her audio material and we couldn't help laughing in the middle of her recording (laugh). So, mum had a very profound effect on me. I used to tell her: "No, no. I won't be like you", and I became just like her (laugh). (Interview, 21.01.2008/**D4**).

5.3 Teacher Cognition and Teacher Education

Joining the MA in TAFL program in the ALI was a turning point for Dalal as it transformed her perceptions of Arabic language completely. In the past, she had disliked grammar, but the courses she took within the TAFL program were very different from the ones she had in school. Within months, she grasped grammar, liked it, and became motivated to teach it.

My view of grammar changed totally. Throughout my life, grammar was incomprehensible. So, how did I grasp it so easily? I wanted to improve myself as a teacher, was happy in the field, had passion for learning, and the way things were taught stimulated interest... This or that? Why this and why not that? (Interview, 21.01.2008/**D5**).

Methodology courses had the most profound impact. They directed her away from the traditional lecturing style to more inductive methods of teaching.

..Methodology courses made a big difference. In fact, this was the greatest influence on my teaching. My method of teaching. I used to go in and lecture. Slowly, I started integrating activities and employing different methods. I also moved to using more inductive ways of teaching. When I teach grammar I ask them: "What is the difference between this and that?" I let them think, analyze, recognize differences, and come to their own conclusions. I use this quite often (Interview, 21.01.2008/**D6**).

The grammar and methodology courses, therefore, not only introduced her to new approaches to teaching and learning Arabic, but the principles advocated were actually embodied in the way these classes were taught.

Dalal likes to reflect on her teaching, and is fully aware of what she teaches and for what purpose. This has helped her improve her performance over the years.

Sometimes, I catch myself teaching in the traditional [lecturing] way, which I don't like. I notice that, and change my way again (Member Checking Interview, 08.04.2008/**D7**).

Despite the distinct advantages of the TAFL program, looking back on her earlier teacher education experience, Dalal feels it lacked elements of CALL, contrastive analysis, and Arabic linguistics.

5.4 Teacher Cognition and Technology Practice

This section addresses Dalal's cognitions of herself as a user of digital resources within her specific Arabic language teaching environment. An examination of her technology implementation reveals the following salient themes:

- An Uphill Struggle for Integration
- Perfectionism, Image, and Fear of Failure
- Deliberate Steps toward Integration
- Teacher Orchestration

5.4.1 An Uphill Struggle for Integration

Dalal holds firm beliefs about the value of educational technologies for teaching and learning, and appreciates the remarkable difference that these resources have made to the landscape of TASOL specifically.

Of course, all these satellite channels, and all the programs. All these are on the Internet. You can listen to programs, opinions... All this has enriched teaching Arabic immensely (Interview, 20.05.2008/D8).

According to Dalal, ICT has revealed a wide array of previously inaccessible material, and as such made the Arabic heritage available to everyone.

You will find classical material all on the Internet. The very old things that show the majesty of the language, and its extension over the centuries. You find all this on the Internet. You find the modern and the ancient (Interview, 20.05.2008/**D9**).

She also holds views about how ICT can be used to teach the derivational system, one of the language's richest characteristics.

Of course... programs on the derivational system will make it easy for the student to quickly grasp what we keep on explaining in classrooms. For example, if we have a word, then ta-ta-ta, we get pictures of all the derivatives. Something like that will give students a quick perception, accompanied by a lot of visualization. This could be better than having a teacher explain (Interview, 20.05.2008/**D10**).

Although Dalal expresses a multitude of ideas about how she thinks digital resources can be utilized to enhance Arabic language instruction, in reality, she finds her ambitions slow to materialize. Dalal identifies a rough road to ICT implementation, and a notable discrepancy between her espoused theory and theory-in-use is observed. She attributes this to perceived obstacles, which she feels unable to overcome. So, how is that the case?

From Dalal's data, we notice that she always reflects on her teaching, and is conscious about what methods to use, for what purposes, and what changes can be introduced to yield the best learning outcomes.

Just because teaching has taken place, this does not mean that they [students] have learned. It is possible that I teach and they do not learn. So, one always has to think of what method to use, and whether it will be beneficial to their learning... As I teach, I always try to be conscious about the method I use and whether it is good, or useless and therefore has to be changed (Interview, 22.05.2008/D11). In a different context, the same concept of reflection, and subsequent change and improvement was reinforced.

I always think: "How will I present this material?", "Is this the boring way, in other words, the traditional way?", "How can I change it to improve it?"... I always think about what I will teach, and how I will teach it (Interview, 20.05.2008/**D12**).

In the specific case of technology, Dalal reflects on her adoption, and recognizes a real need for change and development.

Given the fact that I am a teacher, and that all teaching now is dependent upon technology to a great extent, for me to be able to keep up with this progress, I need to be versed in such matters (Interview, 20.05.2008/**D13**).

The same thoughts were later reaffirmed in a different context.

Surely, technology should have a major role [in my teaching] but what I am doing, is not major... I should be using more ICT (Interview, 21.05.2008/**D14**).

The challenge that Dalal faces is that although she identifies a necessity for change and recognizes her responsibility to bring about that change, she finds herself unable to do so.

I feel that I should be versed in so many things related to technology, which would assist me in my teaching, facilitate things for me and for the students, and help them with their learning strategies. However, I feel impotent in the face of this. The problem is that I am busy with many other things and don't have the time to learn or practice (Technological Reflections, 23.04.2008/**D15**).

When asked about the implications of these feelings of helplessness, she mentioned:

Frustration. Really. I feel I want... I should learn to develop new things... I should, but when and how? (Technological Reflections, 23.04.2008/**D16**).

We therefore understand that although Dalal holds positive views about the value of ICT for TASOL, upon reflecting on her own practice, she feels unable to make full use of these resources. Her journey of integration becomes a difficult one, and she gets frustrated.

5.4.2 Perfectionism, Image and Fear of Failure

As we learn more about the distance between Dalal's cognitions and her use of technological resources, we notice a close association between her uphill struggle for integration on the one hand, and perfectionism and fear of failure on the other. As a reflective teacher, she is fully aware of this connection, and clearly articulates her feelings.

...When I want to do something but can't. I don't know how it is done. And my fear that things will go wrong. This point, I have come to realize, this is the thing that influences me the most. I fear that in front of the students, I am unable to present something. Though we always joke about it [technical failure] and I ask them: "Who is the engineer here? Would you please come forward and fix this for us?" and so. But, of course, I feel very embarrassed (Technological Reflections, 23.04.2008/D17).

Fear noticeably emerges as a central theme in Dalal's data, and technical breakdowns seem to be the main culprit. They waste class time, spoil lessons, and cause her to avoid using digital resources.

Sometimes, when I ask them to turn on their computers, there is a problem in one of the machines. This wastes time, when I have one student unable to turn on his computer, while the others already have. He sits there doing nothing, and I don't have another machine to move him to. I always fear that things like this will happen and waste my time or that some student won't be working. So, I avoid it altogether (Recall, 10.12.2007/**D18**).

Dalal's fear of failure seems to be closely associated with her sense of perfectionism. This places her in a dilemma: on the one hand she feels that to be a good teacher she needs to use technology, but on the other, she also believes that to remain a good teacher she has to avoid using technology. In a way, she cannot teach with it, nor can she teach without it.

Her fear of failure is also linked to self-image. We notice that although her fears are associated with a sense of perfectionism, they are intensified in the presence of others. As a reflective practitioner, Dalal is able to identify relationships between affect and action, and to articulate specific aspects of herself as a teacher.

It's a personality trait that I fear failing in front of others. In other words, this is what causes me the greatest fear, and makes me avoid this matter until I master it... I cannot go in, give it a try, it might work, it might not. I am terrified of doing something like this (Technological Reflections, 23.04.2008/**D19**).

Dalal believes that maintaining a positive self-image is important for gaining student confidence, and given her 22 years of teaching experience, we understand that she does not want her level of ICT competence to shake this confidence, and spoil her otherwise very positive image as a teacher.

Yes. It [self-image] is important, for.. even if you are a very good teacher, because of a very trivial technology-related thing that you can't operate in front of the students, the image they have of you will definitely be shaken (Interview, 20.05.2008/**D20**).

She believes that teachers should know more about their field than their learners, and that when the former appear less competent, this has a negative effect on their professional image. This applies to teaching with or without digital resources.

Well, I don't like the fact that they know more about my field than I do.. Therefore, when I teach a course, and [I notice] that they have much more information about a certain topic than me, I read a lot about it, because I don't like my image to be shaken nor do I like to say to them "I don't know". I try as hard as I can (Interview, 20.05.2008/**D21**).

Dalal believes that lack of knowledge about educational technologies reflected in a teacher's inability to handle technical difficulties affects his/ her image. Further, limited ICT competence, indicated by the quality of learning activities designed, can also place the teacher in an unfavorable position, especially if his/ her learners are taught by technology-versed teachers in other classes during the same semester.

This difference happens and it is very obvious to the learners. They see what this teacher does, and what that teacher does. One is more in control [of the technology],

and does... better and more diverse activities than the other (Interview, 20.05.2008/ **D22**).

By the same token, according to Dalal, expanded knowledge of ICT enhances teaching quality as well as boosts a teacher's image. Consequently, one of her motives for discovering more about technology is her overall development as a teacher.

One of the most influential factors that affect my use of ICT is improving my image and enhancing my abilities as a teacher. This is the thing that I would like to do the most. When I improve my abilities, teaching will definitely improve. I will prepare material in easier and more diverse ways (Technological Reflections, 23.04.2008/ D23).

Dalal believes that the use of technology per se does not advance teaching, but it is the manner in which it is used that makes the real difference.

A smart teacher is one who harnesses technology, and uses it in the best way to the service of the learners (Technological Reflections, 23.04.2008/**D24**).

5.4.3 Deliberate Steps toward Integration

As a theme, deliberation is evident in Dalal's data. In fact, the association between fear of failure, striving for perfectionism, and concern about self-image may explain why Dalal only uses the technologies that she is fully confident with, and avoids taking risks. She is careful about what she chooses to adopt and moves in slow but steady steps.

I fear that anything might go wrong in class. I have limited time and want to accomplish specific things, and if, say, ten minutes are gone, well, aside from the fact that I will look bad in front of the learners (laugh), aside from that, I don't want to lose ten minutes of class time. I am in need of every minute... Therefore, I avoid all that which I am not sure about, and always keep a Plan B, so that if the things I am sure about don't work, I use the alternative immediately (Technological Reflections, 23.04.2008/**D25**).

Observing her practice, we notice that she prefers to only use the tools that she is familiar with, such as the document camera, the video DVD, satellite channels, and the Internet.

I don't have enough time to learn, practice, and be confident about certain things so they become very easy, and I can then use them in class. Therefore, I use things that I already know, that are easy for me to operate, and that I have confidence in, such as the computer, satellite channels, and the video DVD related to the textbook (Interview, 24.06.2008/**D26**).

In a different context, when discussing the media that she is most confident using, she mentions:

I have good confidence in things I already know... such as the document camera (laugh). Basic things. Accessing the Internet, and of course Al Jazeera, BBC, and all the things that I am familiar with (Technological Reflections, 23.04.2008/D27).

Because Dalal does not take risks and only uses the technologies that she is very familiar with, she always comes across as a confident teacher and technology user. Her choice of certain technologies reflects a preference to work within the boundaries of her current computer competence in a way that provides a degree of security, and enables her to remain confident and feel comfortable as she teaches. In one of the recall sessions, as she was watching herself confidently using the teacher console, she commented:

I wish the rest of the tools were that easy and that comfortable to employ, and that *I* felt confident using them (Recall, 10.12.2007/**D28**).

When asked what she meant by "the rest of the tools", she mentioned the smart board and computers.

5.4.4 Teacher Orchestration

If we move from *which* tools Dalal uses to *how* she uses them, we notice that in general, she espouses a teacher-orchestrated style of teaching. She is at the center of action as a facilitator of learning and a mediator between the different elements of her educational environment. For example, she chooses when to stand in front of the

class and when to leave the floor to her students, when to give direct feedback and when not to, when to encourage learners to talk and when to get them to listen, when to use technology and when to work without it.

Upon analysing Dalal's in-class practice, we notice that she utilizes the technologies for presenting and displaying material. So, she uses the document camera to project text, pictures or handwriting, video DVD for presenting news, and the smart board for displaying instructional material. The same principle applies to PowerPoint. The following excerpt from my field notes sketches her ICT use.

Dalal moves to a reading exercise from their lesson on Arabic calligraphy. She places a page from their textbook under the document camera, divides the class into groups and asks them to read a segment and answer a specific question. Later, using the document camera, she underlines the answers in the text (Field notes, 20.11.2007/**D29**).

In a different context, Dalal reflects on how she uses ICT in teaching:

As for the media, there is listening and there is reading from the Internet. I like to do the speed reading activity where they read the running news banner. I like to do this because it is repeated. So, I ask everyone to check what he has read, try to guess, and then see if it's correct. It's a light activity. Or they can turn on their machines and proceed to read different things quietly. In writing, we correct sentences from their homework collectively... I write the sentences on the computer, and they identify mistakes and comment on writing style with the help of the document camera (Technological Reflections, 23.04.2008/**D30**).

Although Dalal's teaching exhibits the employment of ICT for display of material mainly generated by the teacher, we notice that she also has ideas for engaging students in computer-based activities such as online discussion forums, or sending learners away to prepare ICT-based material and later share it in class.

Closely related to the use of digital resources for presentation and display is the issue of visualization. With and without the use of technology, it is evident that the use of visual representation is an essential dimension of Dalal's cognitions and practice. This is reflected, among other things, in her use of drawings, tables, photos, and concept maps. She recognizes the benefits of using such tools in catering for students with different learning styles, especially visual learners.

Quite often I have students who tell me: "I am a visual learner. The thing has to be there in front of me for me to be able to work on it" (Technological Reflections, 23.04.2008/D31).

One clear example of the role of graphic representation in Dalal's teaching is her use of mind maps and concept maps. After attending a workshop at AUC, she read Tony Buzan's work, and started including graphical images in her teaching. Slowly, she showed her learners how to review their vocabulary using mind maps and concept maps.

I really like to read about teaching activities, especially new ideas or activities that will convey information in a better way, and therefore lead to learning. I don't like students to feel bored... I try, as much as I can, to incorporate pictures, or things that involve some kind of creativity (Interview, 24.06.2008/**D32**).

As for teaching with ICT in particular, it seems that the value of educational technologies is associated with the remarkable visual promise they offer, especially presentation tools like PowerPoint. This was reflected in one of her earlier excerpts which addressed her cognitions about the importance of ICT for Arabic language teaching (D10). The pedagogical role of ICT was almost defined in terms of "visualization".

Dalal has started introducing PowerPoint into her teaching, and finds it a convenient way of conveying information visually.

[Using] PowerPoint with weak verbs, the prefix enters from one side [of the slide] and the suffix from the other. The students notice this. As a way of explaining, this facilitates things for the teacher and for the students, especially if it involves colors... highlights, and the like. This makes a huge visual difference (Technological Reflections, 23.04.2008/D33).

Similarly, in an attempt to bring elements of Arabic literature closer to her learners, she enhances a short piece of prose by Naguib Mahfuz (an Egyptian Nobel Prize

Laureate) by drawing consecutive images. She then uses PowerPoint animation to explain the sequence of events, and the old Arabic prose is turned into an attractive slide show.

I felt technology was very important here for it was beneficial to the students. They understood the story, and knew the words without asking me (Technological Reflections, 23.04.2008/D34).

Dalal also has ideas for assisting visual learners with their out-of-class activities.

Visual learners are supported and do their homework better when they have it on the computer with a link to a grammatical rule... or a list that they can go back and look at. There are people who have to have the thing in front of them to be able to work on exercises (Technological Reflections, 23.04.2008/**D35**).

5.5 Teacher Cognition, Practice, and Context

As a reflective teacher, Dalal is aware of the role of ICT in her practice. She expresses her goals for technology development and is clear about how she would like to attain them. In the following section, I will address her stated needs and suggested means for integration. Where there is relevant evidence, I will also examine the way in which her cognitions about strategies for ICT implementation are mirrored in her own teaching of Arabic.

The relationship between Dalal's cognition, practice and context is represented in the following interrelated themes.

- Institutional Philosophy and Policy
- Time
- Teacher Collaboration
- Learning Opportunities

5.5.1 Institutional Philosophy and Policy

Dalal believes that her workplace is generally supportive of technology use, but there is scope for effective planning and a more active institutional role to be played. She argues that this role is necessary for ICT use and development, and stresses the responsibility of the language program to minimize differences between teachers in this respect.

These teachers are affiliated with this department. They should be at a certain level of computer competence. How will they achieve this? There have to be definite procedures that will enable all the teachers to reach this point (Technological Reflections, 23.04.2008/D36).

Due to lack of time and considering her level of computer knowledge, Dalal would like to see support made available, mainly in areas of training and materials development.

We need someone specialized and available, for the development of activities for teaching grammar or listening, for example. Now, when I want to teach listening I either use my stuff, or I check with colleagues. Where is the material in the department that I can take with confidence, that I can choose from without feeling embarrassed? (Technological Reflections, 23.04.2008/**D37**).

When asked about means of integrating more technology into Arabic language teaching, she again expressed a need for institutional support.

There should be a group that will work on these things which is, at the same time, specialized in teaching Arabic. This will be their job, to produce programs (Interview, 20.05.2008/**D38**).

In this respect, we notice that due to perceived contextual constraints, Dalal finds herself more in the position of a consumer of technology than a producer of it. As teachers are unable to develop computer-based material, it becomes the responsibility of the language program to do so. We need a unit to develop this [ICT material]... someone who is experienced in teaching and understands our needs, since we have no time to do that ourselves (Materials Development Interview, 27.01.2008/**D39**).

In a different context, the need for prepared materials was re-emphasized.

As I mentioned to you earlier, [we need] a curriculum development unit or a materials development unit that would prepare these things and show us how to use them (Recall, 10.12.2007/**D40**).

5.5.2 Time

Lack of time is a recurring theme in Dalal's data and explicitly identified as *the most critical factor* for adoption.

The things that I have seen are numerous. I wish I could use them all... There is no opportunity, no time. Time is the most critical factor (Technological Reflections, 23.04.2008/**D41**).

Examining what Dalal needs time to do, we realize that it is 'the most critical factor'. For example she needs time for learning, practice and design of activities.

The problem is that one is occupied with so many other things, and cannot find time for learning, practice... and designing activities. This kind of thing takes up a lot of time (Technological Reflections, 23.04.2008/**D42**).

She also needs time for materials development and experimentation.

Everyone is overloaded with work and there is no time at all for developing new things or experimentation. You don't have time. There is no time (Recall, 10.12.2007/ **D43**).

Time for opportunities for teacher collaboration is also emphasized.

There is no time for us to sit and discuss things together. It's the same problem, time. We are all overloaded and there is no time to sit and talk to each other (Recall, 10.12.2007/**D44**). Dalal attributes lack of time for ICT use and development to work overload and occupation with various professional responsibilities. This critical contextual factor impacts her confidence in digital resources, contributes to slowing down her progress, and may explain her preference for using technological tools that would help her remain confident within the boundaries of her ICT competence.

5.5.3 Teacher Collaboration

Colleagues play a central role in Dalal's technology adoption. In fact, they are one of her main sources of learning, as she mostly acquires her computer knowledge the informal way.

*Of course, colleagues play a role but it is informal. There are no workshops especially for this [discussing ICT-related matters]. Just casual incidental chats (Materials Development Interview, 27.01.2008/***D45***).*

Learning among peers takes place primarily through sharing new ideas, exchanging educational materials, and managing perceived difficulties.

Of course, they [colleagues] are very important. In our informal meetings we exchange information and material. "Take this", "give me that". "This would be better this way". When I don't know something, I ask: "how do you do this?" Or someone asks me the same question: "How do you handle this matter?" "What did you do in your previous course?" So, colleagues are crucial and we collaborate a lot (Interview, 24.06.2008/**D46**).

In a different context, she reasserts the notable role that fellow teachers play in her ICT education.

Colleagues are of major importance because I always turn to them when I want to learn something, and they ask me too. Everyone knows bits and pieces that we assist each other with, particularly, [in relation] to matters that are not complicated, nor require lengthy explanations. We seek each others' assistance on the go, and this is useful to us all (Technological Reflections, 23.04.2008/**D47**). According to Dalal, situated computer-based learning provided by colleagues is the most effective because it is practical, addresses the teacher's immediate need, and leads to further practice.

She [a fellow colleague] tells me: "Do this, access that". Of course, they are not major things, but once I do it, I know it and I can do it by myself afterwards. If things don't work out, I go back to her and I tell her: "This doesn't work", she responds: "Ok, do it this way". So, it's hands-on, and immediate (Interview, 20.05.2008/**D48**).

Dalal's cognitions about the importance of peer collaboration for effective learning are manifested in her own teaching. For example, we notice that she uses group work in all subject areas and across all levels of proficiency.

Sometimes, students learn from each other more than they do from their teacher. They are not afraid to direct questions to each other or to inquire about something... So, pair work [is] a way of learning... They sit together, think together, help each other, and ask each other. Consequently, they benefit from one other (Interview, 20.05.2008/**D49**).

5.5.4 Learning Opportunities

Upon examining Dalal's data, we notice that she is very specific in describing her technology-related learning needs. She likes to see teacher education that is structured, situated, and makes a difference. Upon examining these needs, we notice that they are all mirrored in her practice.

5.5.4.1 Structured Learning

There is evidence in Dalal's data of the need for more organized ICT teacher training.

Well, they [the CALL Unit] are ok. When you need them, you find them. Machines are working. When things break down, they fix them. When I ask for recorded news once a week, they send it to me. However, training in a structured way is missing (Interview, 20.05.2008/**D50**).

Dalal believes that her ICT learning, particularly through her colleagues, can be enhanced if it takes place within a well-structured institutional framework, so that teacher collaboration is fostered and directed by the language program.

Other than time, we need encouragement from the department or structured procedures. For example, on Thursday, there will be a session about such and such, and you have to attend and complete your homework or present something that you have done using whatever. This will be useful to us all. We learn a method of using something, and everyone then thinks about his presentation on using this method. After that, we all meet and everyone shows his method or idea. Imagine the variety of ideas we will have (Technological Reflections, 23.04.2008/**D51**).

In a different context she mentions the role of structured arrangements for teacher collaboration on combating fears and anxiety, and again the role of the institution is noticeable.

We need a shared space, for all the teachers, where everyone, individually or in pairs, is required to develop something together. This way they are more **encouraged**, and they think better. They then exchange it with other colleagues. All this can then be brought together to form a reference... If we could share everything, that would be great (Technological Reflections, 23.04.2007/**D52**).

Dalal seems to depend on colleagues for confidence building, and her use of the verb '*encouraged*' may suggest a specific understanding of the role of structured collaborative work in combating feelings of fear and anxiety. These cognitions were emphasized when she was asked about the most important change that she would introduce to promote more ICT in the ALI, if she was to become the director.

I would introduce reflective teaching. A small group of teachers will work together. Each teacher develops something related to the smart board, for example. [Teachers] will present their work to each other regularly... Well, this way I will develop material without fearing that things will go wrong, and if they go wrong, no problem. [This will continue] until wheels start spinning and I develop material around the smart board. It is then when I will implement it in my classrooms (Recall, 10.12.2007/**D53**). The statement is also emblematic of Dalal's support of group reflection among teachers working within the same professional context, and at the same time reaffirms the major role of her institution in providing structure for such reflective practice. Further, her comment '*I will develop material without fearing that things will go wrong, and if they go wrong, no problem*' again shows her reliance on fellow teachers for confidence.

Moving on to how Dalal runs her own classes, there is ample evidence that she prefers to have a clear structure for her teaching. Observing her lessons, it is notable that activities take place in consecutive stages marked by clear transitions.

As much as I can, I always try to maintain a systematic way of managing the classroom... For example, within the first ten minutes we review. After that, we work on speaking skills. Following that, we work on listening. Then, we concentrate on production... When I work like this, in a systematic manner, students know what they will be doing, and what to expect, so they are comfortable. However, by 'systematic' I do not mean monotonous. For example, within the time allocated to listening, we can have various listening activities (Interview, 22.05.2008/**D54**).

Earlier, I mentioned how Dalal is in favor of structured and guided teacher collaboration where individuals or groups are assigned specific tasks. Upon observing her classes, we notice that she teaches very much the same way. In other words, she sets a system of group work where people are assigned specific responsibilities. After a while, it is as if her sessions progress by themselves. We have seen evidence of this practice in the section 5.1 *A Visit to Dalal's Class*. The following is another example from a different lesson:

Dalal tells them that starting next session, she will divide the class into two groups and that students will lead the discussions for both the world news and the article. She asks for volunteers and some students raise their hands (Field notes, 10.03.2008/ D55).

5.5.4.2 Situated Learning

Dalal believes that for any ICT training to be effective it has to be structured but, more importantly, it should meet her pedagogical needs and teaching objectives.

I need structured courses on things I can use, that can serve me and benefit the learners simultaneously (Technological Reflections, 23.04.2008/**D56**).

In fact, given her limited time, one of the main factors that affect Dalal's decision to join or not to join training sessions is whether ICT education is contextualized enough to address her pedagogical needs.

... Sometimes, I don't attend. I think to myself: "This workshop sounds very good, but why join it?" I sit and write and that's it. I should... go home and try to do something, ask Kamal [head of the CALL Unit], and continue to work on my own. I don't know why I don't do so. Maybe it is the time factor. Maybe this is not really what I want (Technological Reflections, 23.04.2008/**D57**).

When comparing Dalal's beliefs about the importance of situated need-based teacher training with her own practice, we notice close similarities. As a reflective teacher, she is conscious about what she teaches, and tries to employ the methods that she thinks would best serve her learners' educational needs.

Because teaching happened, this does not necessarily mean that learning has taken place. I might teach and they do not learn. One must always think about the best method to use, and whether the method chosen will help them learn... When teaching, one must think: "Why am I explaining this grammatical rule?" "Is it going to be helpful?" "Will they use it?" "If yes, for what purpose?" An Arabic language teacher has to think about these things before he teaches (Interview, 22.05.2008/ **D58**).

Dalal's sensitivity to her students' needs leads her to constantly gauge their learning, and adjust her teaching.

It depends on the feedback that I get from the learners. In other words, when I design an activity and realize that they have not learned from it, I try to think, maybe it should have been at a lower level, maybe I should be a bit slower. I try to see what method suits them best and employ it (Interview, 24.06.2008/**D59**).

5.5.4.3 Learning that Makes a Difference

Dalal aspires to improve her practice by learning about the affordances of new technologies. However, she needs to see the real difference that these tools bring to the educational setting before actually using them.

When teachers see how [their teaching] can be done differently, they will definitely want to change and learn... It is not training that will convince teachers to use technology, but when they see how they can teach what they teach in a different way (Technological Reflections, 23.04.2008/**D60**).

In many of the workshops that Dalal has taken part in, the added value that ICT brings to Arabic language classrooms is not clear. She, therefore, prefers learning which starts from where she is in terms of technology use.

When I need something I ask, know, practice, and [therefore] do not forget it. The workshops that I have gone to are more of: "Now, you have this and you have that... See how you can use it". I don't have the time, and also I think to myself: "How is this different from giving the same thing to the students on paper? "... It's not just a matter of being convinced that there is a difference, but there has to be a real difference. [For example] if I display something to the students on the smart board which I might as well distribute to them on paper. They can see it here and they can see there. What is the difference? (Member Checking Interview, 08.04.2008/**D61**).

Dalal believes that her level of computer competence prevents her from making use of the affordances of certain technologies, as she cannot see how her teaching can be enhanced through the employment of these tools. She believes that the most effective way of showing her these differences is, again, situated ICT education.

It should be on a one-to-one basis. Someone tells me: "Look, you teach this way. How about doing it that way?"... and I see that it really is better... I don't have the time to see what's possible... Maybe, I can't see it because, well, I don't have a good background or enough knowledge about ICT. So, I don't see that it can make a difference. So, you tell me. At this point, I will use it and we will discuss it together (Member Checking Interview, 08.04.2008/**D62**). As she supports a bigger institutional role in arranging structured and situated learning, Dalal thinks it is the responsibility of the language program, specifically the CALL Unit, to help her see the affordances of different technologies.

There have to be one-to-one meetings. Someone who would ask me: "How do you use ICT?" I would answer: "This way". "He would ask: Just that?" I would say: "Yes". They would suggest: "But you can do this as well". I would ask: "How?" They will show me and I will see that there is a difference. This is how I will learn. But when it is just a very general talk addressed to everyone, i.e. not specific, I will not see the difference (Member Checking Interview, 08.04.2008/**D63**).

A closer look at Dalal's teaching reveals the individual attention she prefers to give to her learners, and the step by step strategy of starting from where they are and showing them how alternative methods may improve their learning. In this respect, she adopts exactly the same techniques that she recommends her institution use with her.

When students come to me during office hours and tell me "we can't study", for example... or "we have problems understanding this matter", I always help them with their learning strategies. I ask them: "How do you study?" They tell me that they use flash cards for vocabulary, for example. I tell them: "Well, there are other ways", and try to direct them to these other ways, to the best of my knowledge (Interview, 24.06.2008/64).

5.6 Summary of Teacher Cognition and Technology

This section summarizes the main themes that make up Dalal's profile. In light of the theoretical framework that has informed this investigation (Figure 2.1) and the research questions, these themes are addressed in relation to her early experiences as a language learner, teacher education, classroom practice, and teaching context.

Dalal's pedagogical beliefs are influenced by her early learning experiences at home, at school, and within her wider social context. For example, she advocates a communicative approach to teaching for this was how she enjoyed learning English as a child. On the other hand, she avoids monotonous aspects of language learning which she used to dislike during her schooling years. Drawing on her early experiences, Dalal thinks of ways of raising learner motivation and facilitating student learning, both with and without the use of digital resources.

The TAFL teacher education program had a transforming effect on Dalal's cognitions. The courses directed her away from lecturing and introduced her to inductive ways of teaching. Although the program lacked an element of technology, it had a lasting influence on the way she teaches today, both with and without the use of ICT. However, the impact of apprenticeship of observation remains powerful as she sometimes catches herself reverting back to old habits.

Although Dalal believes that the digital medium has contributed markedly to enriching the teaching of Arabic, she faces an uphill struggle for integration. Fear of failure, closely associated with a sense of perfectionism and a desire to maintain a positive professional image, may explain this struggle. Unsurprisingly, her practice is characterized by deliberation as she only utilizes the tools that she is comfortable with. Therefore, to an external observer of her classroom practice, she often comes across as a confident technology user.

In general, Dalal espouses a teacher-orchestrated style of technology use whereby she is at the center of interaction mediating between the different elements of her environment. Display and visualization characterize her technology use as reflected in the kinds of computer-based tools she employs.

As for the relationship between teacher cognition, practice, and context, Dalal identifies a number of factors that impact her ICT adoption. She emphasizes an active institutional role for teacher technology use and development; a role that is directly and indirectly related to other factors such as time, teacher collaboration and ICT learning. Lack of time for technology use and development emerges as the most critical barrier for adoption, which is attributed to preoccupation with professional responsibilities and overload. On the other hand, colleagues play a central role in her ICT implementation that may actually outweigh that of formal training. They constitute a source of learning that is immediate and contextualized. Dalal is specific in articulating her computer-based learning needs, which should be structured, situated and make a difference. It is this type of learning in addition to support from colleagues that assist Dalal in overcoming her fears and raising her confidence in

educational technologies. This, however, is achieved within the context of an active and supportive institutional role.

CHAPTER 6: HEBA'S COGNITIONS AND TECHNOLOGY USE

6.1 A Visit to Heba's Class

It is ten minutes before the beginning of Heba's Arabic media class. While I fix the camcorder on the tripod, she describes her upcoming lesson to me. The class will mainly be reviewing the vocabulary from the past media themes in preparation for an exam they will take in the following session. However, Heba says she intends to break away from paper-based revision exercises and try something new. We discuss her lesson plan and exchange some ideas. At this point, four students sit to one side of the classroom. The seats opposite are, for the moment, empty. She turns on her computer, and as it is starting up, Veronica inquires about the exam. Heba comes closer to her, explains the structure of the test, and assures her that there is no need to worry. Heba goes back to the teacher's computer and Tadahiro comes in. She greets him and asks if he feels better today. He says yes, and takes a seat opposite Veronica.

Heba holds a number of photocopied pictures in her hand, and talks about the coming exercise. She looks attentively at all the students and slowly explains that they will each write a news script around the photos. She asks them to use verbs and nouns they have studied. Heba spreads the pictures on the table, and invites her learners to draw closer and choose the ones they like. She asks them to work in pairs and with the help of their media textbooks, write down ideas. She reminds them that she is there to assist them with the task. Heba adds that at the end, they will read out their news scripts as if they were real news anchors, and concludes that the stories they write do not have to be real. The four students work in two groups. Tadahiro is by himself on the other side, so Heba pulls up a chair and says she will work with him until Alex or Takumi arrive. She sits next to him, asks him to choose a picture, and he starts working on his story. The other students are busy working together and, every now and then, ask her a question to which she responds from her location next to Tadahiro.

After a while she leaves Tadahiro and starts to move around, quietly passing behind each pair of students and checking if things are ok. Takumi comes in, and sits next to Tadahiro who briefs him on the exercise. While circulating, Heba explains to the class that they will handle their final Movie Maker project in this same way. Basically, they will use a piece of digital video material and add their audio formats to develop a news story. At this point, Claire comes in and joins Harry and Veronica. Opposite them, Tadahiro and Takumi are also working together. Heba moves around, stops by each group of students, follows their discussions or looks at their work. Sometimes she answers questions, provides comments, or points out something in their writing. She is constantly smiley and supportive. Heba returns to the Japanese pair, and asks them about their story. She tells them that she has been trying to find pictures of the Japanese prime minister and that the one in their hands is the former prime minister. Heba is surprised and the three of them laugh. Heba then suggests that they write their piece about his resignation. She moves on, stops by other groups and has similar mini-teaching sessions or short casual conversations.

After some time, Heba comes to Silva and asks if she is ready. She says yes. Heba explains that her picture will be displayed on the smart board and that she will be the anchor. Heba turns on the document camera and adjusts its focus. The students are still working together with their pictures. As she circulates, Heba asks if they are ready. Alex comes quietly in. She greets him, gives him a quick summary of the activity, and hands him pictures to choose from.

Heba asks her students to write their names next to their pictures, and holding a pair of scissors in her hand, she explains that she will pass around and cut the pictures off to be placed under the document camera. Heba moves around to help with final bits and pieces. The classroom is buzzing with activity. She asks if they are ready. Veronica shouts: "No", and laughs.

Silva's picture is displayed on the smart board. She sits in front of it and Heba announces that they will start. She switches off the lights, pauses, smiles and says she would like some introductory music. Bella and Veronica make the sound effect and in a serious voice, Silva starts with "assalamu alaikum". They laugh. After reading out her piece of news, Heba changes the picture in the background and Bella goes to the board... and so on. After every piece of news Heba gives a positive remark and introduces the following piece with words such as: "and now we move to...".

Heba then says they will move to a different kind of news briefing, and they watch Al-Jazeera on the smart board. She pauses after the first news story and checks comprehension. Heba walks between the video station and the white board and encourages her students verbally using words like "beautiful" and "excellent", and non-verbally by smiling, nodding, establishing close eye contact, or just a 'thumbs up'. They watch the news again, and then move to another piece of news, and so on.

Heba is on the move, checking understanding and inviting answers. She proceeds from general information to more specific details. Suddenly, the picture on the smart board disappears, but the voice is still on. Heba walks back to the video, rewinds, but there is still no picture. She presses a certain button on the teachers' console but in vain. Not knowing what to do, Heba helplessly throws her arms in the air, announces: "We will have to rely on listening", and moves on. She writes words on the board and asks for synonyms and collocations. Heba says they will continue with the news, and adds "I don't know what happened to the video". They listen to the following piece. She tries the projector button, rewinds the video, while at the same time manages the on-going activity. The projector works and she proceeds in the same way with the following news segments.

At the end, Heba asks them if they have any questions. She advises them to start on the Movie Maker project, and reminds them that after they return from the break, they will have only three weeks until the end of the semester. She explains that the exam is going to be similar to the way they developed their pieces this morning. "The clip will be in front of you, think of verbs, think of nouns, and formulate the sentences... Then practice, reading out loud... reading... reading... and then in the final round do the recording". The class is silent. Heba pauses, looks at them and with a broad smile she asks: "What's the matter with you? Why do you look distressed?". The students smile back. Veronica flips through the pages of her media textbook searching for a word. She raises her head and in broken Arabic says: "We were victims", and laughs. Heba laughs... "Who are the victims? Come on...", she adds. The others smile. Heba asks them to think about the project over the break. "We can help each other with any technical aspects", she explains, and adds that the computer lab also provides assistance with technical issues. Alex asks if it is possible to record his voice without developing the movie, for Movie Maker is difficult for him to use. Heba says he can, but comments that this is a beautiful opportunity to learn it.

Heba announces that they will stop at this point, and reminds them that the exam will take place in the following class.

(Video recorded session, 14.04.2008)

6.2 Teacher Cognition and Early Experiences as a Learner

Since childhood, learning by observation and doing seems to have been Heba's preferred way of acquiring languages. In her early schooling years, she used to have a language teacher whom she liked to model.

When I was very young, I had an English language teacher... and I remember I used to go home and imitate her way of teaching. I grew up and this habit grew with me (Interview, 13.02.2008/**H1**).

Heba used to repeat to her nanny, who was illiterate, what she had learned at school. Her mother thought this was a practical way of reviewing her lessons, and therefore, encouraged her behavior by initially designating a section on the wall for her scribbles, and later getting her a blackboard. Heba explains that though the vocabulary and structures that she learned at school were very simple, the nanny actually learned from this experience and started reading and writing basic words.

Heba had a relatively positive experience as an Arabic language learner. She was good at the language and did not dislike grammar as many of her peers did. She remembers that when her teacher used to say: "Please stand up and read", it was understood that she was the one this command was meant for, since she was the only one who did the reading out loud in that class.

Heba grew up with the image that it is the teacher who speaks and the student who listens. Over the years, this image was reinforced as she was always commended for being "quiet and obedient". Hence, she believed that the best student was the quietest. Although the quality of English language teaching at her school was

deteriorating, she continued to favor her English language teacher over her Arabic language one. The former used to wear a T-shirt and a pair of jeans, and made them acquire the language through singing and playing. The Arabic language teacher, however, used to wear a suit and was always distant. Because she was tall, she used to sit at the back of the class so the distance between the Arabic language teacher and herself was literal. In fact, he only came closer at exams or during dictation.

6.3 Teacher Cognition and Teacher Education

Throughout her schooling, Heba never had a teacher who did not hold a central role in class. However, her understanding of the role of the teacher changed drastically when she started her MA courses in the ALI TAFL program. For example, she was surprised to find that, as far as possible, teacher talk should be minimal, and that the less the teacher spoke, the better.

All these concepts I learned from the methods courses. These things were new to me... to know that, as a teacher, my role should be more of a side one (Interview, 25.02.2008/H2).

The teaching methods module, in particular, had a profound impact on Heba's thinking. The course was open to students from both the TAFL and the TEFL programs and exposed her to new teaching experiences. In addition, the way the tutor ran the class reflected what he was teaching in terms of giving responsibility to the learners and respecting their individual contributions. The new pedagogical principles were, therefore, exemplified in practice. This marked the beginning of a transformation in Heba's cognitions, which may later have encouraged her to place the technology in her students' hands, and assign tasks that promote learner autonomy.

In addition to presenting her with theories and approaches to teaching, the methods course introduced her to technology. Heba remembers that one day in 1992, the tutor of the course came in with a computer mouse in his hand, and asked the students if they knew what it was. The first thing that came to her mind was that it looked like a razor. When she heard her classmates say it was a mouse, she did not understand, and felt very upset deep inside. From that day, she decided to learn how to use a

computer. Later, the same tutor told them they all had to have email accounts. Most of the students already had ones, except for Heba and a few others. She used to turn in assignments typewritten, only to receive them back with a small note indicating that her work "*has to be more professional*". The tutor then showed her some benefits of using the computer.

He wanted to push me in this direction. In 1993, I bought my first computer, big and heavy, and started working on it. In 1996, I typed my dissertation myself and handed it in. This was the beginning" (Interview, 25.02.2008/**H3**).

Later, as part of her coursework, Heba started sitting in on classes. Though the sessions she observed were just a few, she found the experience very useful especially since it added a practical dimension to her theoretical learning.

"The thing that benefited me the most was going into classes, observing others, and taking notes" (Interview, 25.02.2008/**H4**).

Considering Heba's earlier narration about modeling her school teacher, we may conclude that observing others has a significant influence on shaping her cognitions and practice.

6.4 Teacher Cognition and Technology Practice

In this section, I shed light on Heba's awareness of herself as a technology user within her specific Arabic language teaching context. Upon examining her data, a number of salient themes stand out.

- Determination
- Insecurity vs. Resourcefulness
- Experimentation
- Responsibility

6.4.1 Determination

Heba's data reveals evidence of her determination for technology integration and development. She believes that ICT is here to stay, and has thus become an integral element of Arabic language instruction. According to her, if educators wish to progress in their field, this is the way ahead.

There is no way ahead in teaching the Arabic language except moving in this direction... that we use technology in our teaching (Technological Reflections, 17.03.2008/H5).

To Heba, adoption is irrevocable as she can no longer imagine herself teaching without technology.

There is no other way. It's a path that we have travelled, and a return is very difficult. I would feel something was missing (Technological Reflections, 17.03.2008/ **H6**).

Having taught listening and speaking, in particular, for many years, Heba recognizes the remarkable role of technology in enriching Arabic language teaching. A wide array of authentic material is now available at teachers' and learners' fingertips, since they are just a few clicks away from endless possibilities.

The areas where ICT has been most useful are those of speaking and listening - or watching and listening... The field has seen a renaissance and not just an addition of new educational facilities (Technological Reflections, 17.03.2008/ **H7**).

Heba affirms that with the introduction of technology into the teaching environment, she has the option of choosing from a large pool of material depending on the theme studied, and the level of her learners. Additionally, satellite channels have changed the landscape of teaching listening with the wealth and diversity of authentic material they offer. Examples include documentaries, talk shows, news bulletins, reports, and more.

The largest sources of raw material are the satellite channels (Interview, 26.02.2008/ H8). In addition to providing "a very very wide range of listening material", Heba describes satellite channels as "very rich" (Materials Development Interview, 26.02.2008/H9) in elements of Arabic culture, which stimulates discussions in her classes. She believes that such channels have exposed learners to the reality of the Arabic language and culture, as students today have access to a host of Arabic language varieties that were not available to them in the past. The rich world of the Arabic language, as it really is, is now open to them.

With the advent of satellite channels, colloquial varieties have become a very powerful thing. A very clear thing... They [learners] see the language as it is (Interview, 26.02.2008/H10).

Observing Heba's practice, we notice that she is constantly searching for ways to make use of the affordances provided by ICT for more effective Arabic language teaching. When she finds a helpful medium, she uses it, until she comes across a more useful one.

Every [now and then], I discover that there is something better than what I do. For example, I used to give them [learners] the homework in the form of audio, MP3. Then I found that 'hang on! When I digitize a TV program and give the homework in the form of video as well as audio, this is more interesting. So, I always want to improve whatever I present to them... When I find a better thing, I want to do that better thing. So, I find myself in need of new equipment or in need of something else (Technological Reflections, 17.03.2008/H11).

In her teaching, we see her encourage learner initiative, and assign tasks that motivate students to break away from textbooks, think, and innovate, to achieve certain learning goals. We see examples of this in her media class when she asks them to develop imaginary news scripts with the help of the vocabulary that they have learned, or when she provides them with silent clips, and encourages them to produce their own pieces of news using Windows Movie Maker.

6.4.2 Insecurity vs. Resourcefulness

An explicit polarity in Heba's data is that although she comes across as a committed ICT user, she also talks about her insecurities. We notice that she is aware of the

sources of these feelings, and tries to find ways to overcome them. As a determined user of ICT, it is not surprising to see that she is heavily dependent on ICT in her teaching. Much of her material is now computer-based, and some of her classes, such as advanced colloquial Egyptian, are entirely dependent on the use of digital media. Technical failures are, therefore, a major source of tension, stress and, anxiety.

I have reached a stage where I am so dependent on this material... that if anything happens to it, there would possibly be a large portion of the class where I wouldn't know what to do (Interview, 25.02.2008/H12).

In a different context she affirms:

When this happens, it's a problem; that we [teachers] are so dependent on something, and suddenly we can't use it (Technological Reflections, 17.03.2008/ H13).

Like the majority of teachers in her context, Heba encounters challenges associated with technology use, but she is in a constant quest for means of overcoming perceived difficulties. Evidence of her resourcefulness appears across her data. For example, she used to store her material, particularly the large multi-media files, on an ALI server. When it collapsed, a considerable portion of her digital media was lost, an experience she described as *"a tragedy"*. She thought of getting an external hard disk, started saving her work on DVDs, and moved around her classes with a USB. When her USB caught a virus, and her office computer got infected, the latter had to be reformatted, and again, she lost some of her work. At that point, she thought of using WebCT (now Blackboard) to keep her work on, and started actively learning more about it. At the same time, she continued searching for secure ways to backup her material. As a determined and resourceful user of digital tools, it is not surprising that she also considers technology failures as opportunities for learning and development.

I always feel that there is something that I haven't learned, and that I would like to learn. They [technical problems] make me feel that I still haven't learned enough. There is still more I need to learn (Interview, 07.11.2007/ H14). In fact, Heba recognizes progress in her reaction to technical problems. For example, during a recall session, we were watching a clip in which the video image from an Al-Jazeera news bulletin suddenly disappeared from the smart board. Recalling the event, Heba commented:

I have to admit that I did not develop the [physical] reaction that I used to get up until last semester... when I am in a situation like this one here. I have to admit this did not happen to me (Recall, 16.04.2008/H15).

In a different context, referring to her previous anxieties, she mentioned:

They could happen before... Now, I got used to this... and we [Heba and her students] would talk about, oh yeah, that's technology, and I don't know what. But no, before, I would be shaken, I would sweat... (Interview, 07.11.2007/H16).

Evidence from Heba's data reveal how she handles such insecurities, tries to meet the challenges that she faces in the process of adoption, and is flexible enough to adapt her teaching for the most efficient use of technological resources.

While using digital media in learning and teaching, Heba recognizes the diverse needs and backgrounds of her learners. She is attentive to differences in their learning styles, and alters her teaching accordingly. Her experience with her all-Japanese class is an example. Initially, they reminded her of herself when she was at school, 'quiet and compliant'. Over the course of the semester, she noticed that the Japanese students learned better when they viewed the printed text.

There is a huge emphasis on the written word. I think this is a different learning style. The way they learned was not at all dependent on listening. At the beginning of the semester, we started with listening but they really had problems with it. Maybe due to the nature of the language, in addition to the way they have learned. They need to see the word, and [use] the digital dictionary (Recall, 19.05.2008/H17).

Initially, having no experience of teaching all-Japanese classes, Heba was not sure how to employ digital media to meet their needs. Remembering how frustrated she was, she explains:
"When I first started with them, I really wanted to cry" (Interview, 14.05.2008/ H18).

Considering their specific learning needs, Heba added a marked visual element to her teaching. She started writing more on the board, in addition to transcribing the texts of the audio pieces. She also tailored a special activity for this group which she called 'Listen and Follow', where they listened and at the same used a pen to follow every word on the page making sure that they had heard it. Such activity was not used in her other classes, but specifically customized to suit this group's preferred learning style. Toward the end of the semester, they made remarkable progress.

This class is the one where I have seen the most progress... and have been touched by the progress that they have made. I still remember the first day... and the first week when we started watching the news... Honestly... I am proud of them (Recall, 16.04.2008/H19).

Heba is not only a resourceful teacher herself, but also encourages her learners to be so. She invites them to try to find ways to meet the CALL challenges they may face. For example, when some of them had problems working on certain assignments using Apple Macintosh, she encouraged them to spend some time searching for solutions to their problems. Later, they came back describing the experience as very useful.

6.4.3 Experimentation

Heba's determination and resourcefulness are manifested in her continuous attempts to experiment with different tools. Trying things out is her way of combating fears, and progressing forward. When asked if she had the courage to experiment with different media, she responded:

Yes, I like to experiment with things, of course... and see if they will work out (Recall, 20.02.2008/**H20**).

In another setting she affirmed:

I might possess a bit of courage that allows me to experiment with new things, or things I have not used before. This applies to technology as well (Interview, 28.05.2008/H21).

Like most of her colleagues, when she was told that classrooms at the ALI were to be refurbished and turned into *smart classrooms*, she felt anxious. However, she slowly discovered that teaching in such a new environment required some courage and adventure, and that it was all a matter of frequent experimentation and practice.

It's a matter of somebody being a bit adventurous. Somebody sitting in front of a machine, a computer for example, for a long time, playing with it, trying this and trying that (Technological Reflections, 17.03.2008/H22).

When asked specifically about her own practice and whether being courageous has supported her ICT adoption, she responded:

Yes. I developed many activities for the first time. Well, I thought I would experiment. Some things were successful, others failed. Many things involved [the use of] technology (Interview, 28.05.2008/ H23).

Observing Heba's practice, we notice that over the data collection period, she has introduced tools, materials, and activities to her classes for the first time. For example, she was video recorded as she was using Skype for the first time to conduct oral proficiency placement interviews with overseas learners of Arabic. Heba also introduced new Arabic media websites, and satellite channels to her students. Further, she introduced the news anchor activity to her media classes (featured in the earlier description of her class), where students were expected to develop their own scripts based on specific pictures, and present them to the class with corresponding images displayed on the smart board in the background. One of the objectives of the activity was to prepare them for their independent Windows Movie Maker projects.

6.4.4 Responsibility

Heba's determination, resourcefulness, and drive for experimentation are closely related to her sense of responsibility. Throughout her journey of ICT implementation and development, we see her take initiative without holding high expectations of other parties, including her own institution. Yes, she likes to be given opportunities for ICT professional growth, but she also recognizes the major role to be played by the teachers themselves. She believes that teachers should take responsibility for their own learning, and is, therefore, not in favor of top-down institutional arrangements for ICT teacher collaboration.

If everyone is really involved, we will definitely talk to each other. When I know that there are several teachers interested in this and are learning it... In other words, I do not see a specific role for the department here (Technological Reflections, 17.03.2008/H24).

In addition, Heba's data reveals ample evidence of how she also gives students responsibility for their own learning. In fact, one of the distinctive attributes of Heba's teaching is placing the technology in the learners' hands. Her teacher presence in relation to the tool and the students is characterized by this transfer of ownership. When asked about the learning styles that she encourages, she mentioned:

That they [learners] become independent, as much as possible. That they bear the weight of their own learning. They can come and ask some questions, and we can try to work on them together... but essentially, they have to sit by themselves, with the thing that they are reading, listen by themselves. In my opinion, this is the most useful thing (Interview, 01.07.2009/**H25**).

On another occassion, Heba asserts the importance of assisting learners in becoming independent.

I think they have to understand that they shoulder the bigger burden. In other words, they bear the weight of their learning. I will give them things that will help them, but in essence, the work is theirs, and if they make progress, then it is they who progress not I (Interview, 01.07.2008/**H26**).

Throughout Heba's data, we notice that she is willing to relinquish control, and see her learners make some decisions. For example, Heba always had the dream of giving her students access to the audio and video material that she was using in her colloquial Egyptian classes, in addition to developing materials that they could work with on their own. As she started using more technological resources in her teaching, such ideas were no longer impossible. With a small group of teachers, she designed a computer-based colloquial Egyptian course on DVD, which every student could use and keep.

Each student will take a [DVD] exactly like this one I work from. It has... [everything] on it. Of course, this wouldn't have been possible without this type of technology (Interview, 07.11.2007/H27).

Heba not only gives students access to the material that she develops, but also engages them in activities that allow them to become immediate producers of computer-based work. For example, we see her assign a final media project based on Windows Movie Maker, and ask students to use their cameras and camcorders to record their experiences in her Egyptian colloquial sessions.

Well, if it doesn't have a linguistic impact, it will have a psychological one... The sense that they come up with a product. When it is developed so that they record [their voices] to accompany the pictures, and it is presented as a final project, this has a most beautiful effect on [their confidence]. They graduate from the course with a product in their hands, and present that product to all the students in their class... (Technological Reflections, 17.03.2008/H28).

Heba's support for learner autonomy means that learning extends beyond classroom boundaries, and the transition between the classroom and the outside world becomes seamless. We also notice that because she teaches Arabic within the target culture, she tries to harness the opportunities presented by her cultural context. She believes that providing students with chances to interact with people as they prepare their projects is important for their language development, and that studying in Egypt facilitates such interaction as she generally considers Egyptians to be approachable.

Placing the technology in the learners' hands and giving them responsibility for their own learning is a reflection of Heba's established cognitions about the role of the teacher in relation to that of the learners. Although she encourages learner independence, she does not believe that technology nullifies the role of the teacher, whose presence remains essential to management of the teaching process. It's not true that technology cancels out the role of the teacher. I think that many things in the classroom possibly wouldn't function without my presence, even if technology is utilized. Yes, now, I feel that without ICT, the quality of my teaching would decrease, but I still have a role in the class. I still have a role in the teaching process (Technological Reflections, 17.03.2008/H29).

According to Heba, a teacher's role is essentially to facilitate learning, give students responsibility for their own progress, and help them become autonomous.

I like it this way. I came to understand that my role should be reduced as much as possible and that he [the student] should be doing the work, for after some time neither I nor any other teacher will be with him. So, he should learn how to go away and research. He should know how to ask others and this will be the thing that I have taught him (Interview, 13.02.2008/H30).

In fact, she defines an effective teacher in terms of his or her awareness of the active role of the learners in the educational process. Her perception of the qualities of a good teacher may be encapsulated in the following statement:

He has to know how to engage the students, [and] let them do the work, do the questioning, and do the researching... (Interview, 01.07.2008/H31).

Heba's conceptualization of the role of the teacher is reflected in her practice. So, we see her students use the electronic resources they are familiar with, or which she has directed them to. We notice that she advocates task-based learning where students gather information, engage with others, and present a final product using available technologies. In such activities, Heba's role is mainly to set the scene, facilitate learning, monitor progress and provide assistance when needed. The following exemplifies her understanding of her role in relation to that of her learners:

This week I asked each of the students to present a song, [to consider] how they will deliver it in class, and how they will talk about it. I asked them to ask people about it, to practice speaking... possibly ask their neighbors, and ask students down in the Fountain Area [at AUC]... ask professors... who likes it...who does not... things like that.. One of the girls told me she wanted to work on a children's song. "What children's songs are there?" [she asked]. I told her: "Search on the Internet and

see". Anyway, she continued to search and search, and then told me: "There is something called 'Mama zamanha gayya' [Mum will soon be back]... can I work on something like that?" I responded: "That would be lovely. Look around, search, and you come back with the information". She said, "but will you help me with writing the vocabulary, and so on". "Yes", I responded (Interview, 13.07.2009/H32).

Examining Heba's role in this specific example, we notice that she identifies the task, but gives the students freedom to choose their songs, to consider modes of delivery, and to experiment with different tools. She asks them to engage with people, but again leaves selecting the individuals to the learners. When her student told her she wanted to work on a children's song, she did not suggest one for her, but encouraged her to search, and directed her along the way. She then approved of the song that the learner had chosen, and agreed to support her when the latter, herself, requested some assistance. Observing the presentation of this children's song in class, we notice that the space given to the learner was manifested physically. While she was sitting at the front addressing her colleagues and managing the equipment, Heba was at other end of the class taking notes and monitoring interaction.

Further observation reveals that her cognitions about her role in relation to that of her learners, reflects constant interaction and collaboration between herself and them. She often shares with her students what she discovers of relevant technology, and points out its educational value to them. The following is an example from one of her media sessions that I observed:

Heba informs them that the BBC has launched a new Arabic TV station. She also tells them about the podcast service on the Internet, and how it is a beautiful opportunity to practice listening as well as an excellent chance for more reading. The students seem impressed (Field notes, 12.03.2008/H33).

Her learners, in turn, update her with technology-based information. They may suggest useful software or give her tips on technical matters. They also introduce her to online newspapers and radio stations, in addition to the educational potential of some Web 2.0 applications, such as You Tube. I too often benefit from their experiences. I get to know websites that I didn't know before. [For example,] I got to know that there are American online magazines which are never printed. You only get access to them through the Internet (Technological Reflections, 17.03.2008/H34).

On a separate occasion, Heba mentioned:

Today, I just learned that there is a website through which I can send large files to the students. I learn many things from them (Interview, 25.02.2008/**H35**).

Given Heba's relationship with her learners, it is not surprising that they also come to her assistance in case of technical breakdowns, as documented in her observation data.

...Heba then asks them to switch on their computers and go to the video section. She can't see the website on her screen. One student helps her, but she can only get the thing on the smart board... (Field notes, 11.05.2008/**H36**).

Earlier, I discussed how Heba feels that her reactions to technical failures have gradually decreased in intensity. Her perception of her role in relation to that of her learners may be a significant factor. It seems that to her, learners are not 'an audience' watching, and therefore, judging her performance, but rather partners, who are as active in the educational process as she is. Considering the nature of Heba's interaction with her learners, we understand why they no longer constitute a pressure on her to make use of the facilities in the smart classrooms.

In the beginning, I felt that I had to use them [smart classrooms]. Yes. But after that, No. No big deal. A day might pass without us using anything [in there] (Recall, 20.02.2008/H37).

Heba may no longer feel obliged to use technology with her learners, yet she continues to perceive them as a source of motivation mainly because of their generally high levels of computer competence. Specifically, students influence her adoption of new ideas through the technological advancement that they represent. Her constant interaction with them, gives her insights into the kinds of tools to be used, and those to put aside. For example, Heba stopped using cassette tapes after noticing that none of her learners actually owns a cassette player.

It might be the influence of the learners. The influence of [digital] advancement. They tell me [referring to cassette players]: "Oh, my dad used to have one" and things like that. This used to hurt (laugh). Toward the end, there was a generation [of learners] that really didn't know cassette players. They don't have one (Interview, 28.05.2008/H38).

It should be noted, however, that although Heba's teaching is characterized by transfer of ownership and giving learners responsibility for their own learning, evidence of shared responsibility remains marginal. From talking to Heba and observing her classes, we notice that she is still in the early stages of developing a refined understanding of how ICT may facilitate learner collaboration.

Student collaboration. This is one of the things that I have started doing, that I divide them up. In the past I didn't do such things... They can be divided into groups, where they search together, and work together (Interview, 13.02.2008/**H39**).

6.5 Teacher Cognition, Practice, and Context

This section elucidates the impact of Heba's environment on shaping her cognitions about technology integration, and sheds light on the role of particular contextual factors in causing dissonance between cognitions and practice. The following central themes are discussed.

- Institutional Philosophy and Policy
- Time
- Technical Support
- Teacher Collaboration

6.5.1 Institutional Philosophy and Policy

In spite of her conviction that Arabic language teachers should take responsibility for their own learning, and her vocal opposition to top-down arrangements for teacher collaboration for ICT development, Heba identifies a degree of institutional support as necessary for adoption. She confirms that her workplace plays a significant role in fostering her ICT development by providing a context for both learning and practice. The ALI is a center of ubiquitous computing and networking, where both teachers and students have access to a wide array of technological tools, and every language teacher is entitled to a personal laptop.

Of course, without this institute, I don't know if I would have had the opportunity to learn these things (Interview, 25.02.2008/ H40).

Reflecting on her workplace, Heba thinks that in theory, the program promotes technology integration, but in practice, there are obstacles.

I feel that the Institute is willing to pay greater attention to the issue of technology. There might still be some problems in practice. But the orientation is toward using more ICT (Technological Reflections, 17.03.2008/**H41**).

Heba is not aware of a clear technology implementation plan for the Institute and is not sure if there is good communication between the CALL Unit, the administration, and the teachers when it comes to technology-related matters. In fact, she finds herself somewhat distant from the Unit, and resorts to them for technical assistance only. When asked whether the current structure of the ALI, in terms of its internal organization and scheduling system, helps her develop with respect to ICT use, she responded:

With difficulty, with immense effort on my part, with giving a lot of time on my part at the expense of other things I could do at home (Technological Reflections, 17.03.2008/H42).

In a different context when she was asked whether she had ideas for computer-based Arabic language material, she mentioned:

Yes. If I can concentrate on this, if it were my only task, I will possibly come up with things... ideas. But to do this [ICT materials development] on top of that [her regular teaching]... For example, I am working on the colloquial [DVD] material, on top of

that [teaching]. I am tired, tired, tired. I cannot tell you how tired... (Interview, 07.11.2007/**H43**).

Given the contextual constraints encountered by Heba, we understand that her continued ICT development is very much a function of considerable ability and great determination.

6.5.2 Time

A further aspect which cannot be separated from the area of institutional culture is time. On several occasions, Heba has identified time as the main obstacle to her ICT development. As such, it is also a primary source of incongruence between her cognitions and practice.

The most obstructive factor is time (Interview, 13.07.2008/H44).

Heba needs time to observe other teachers use ICT, or even to travel for more exposure; she needs time for exploration and experimentation; and she needs time for preparation and materials development.

If only I could get partial time release to go and attend classes, listen, attend foreign things and **see** new methods or even travel. Currently, this is not possible for us (Interview, 13.07.2008/**H45**).

Her usage of the verb '*see*' in an indication of the weight she places on observation as a method of learning. Further, in relation to a WebCT (now Blackboard) account that she has set up, she mentions:

They [AUC] actually opened an account for me, and I started uploading things onto it. However, I don't have time to update it. I stopped. I don't exactly know why, but until now I haven't had enough time to sit down and delve into the program (Member Checking Interview, 02.04.2008/**H46**).

Similarly, upon completing her questionnaire, she added the following note at the end:

I need time to be able to develop my computer skills, and to be able to practice everything I learn (ICT Questionnaire, March 2007/H47).

6.5.3 Technical Support

Lack of technical support poses a challenge to Heba's uptake of technology, and is a recurring theme in her data. We have already seen how frequent technical breakdowns and lack of adequate assistance account for her feelings of insecurity. Although she tries to manage such feelings in different ways, the challenge remains, especially as she becomes increasingly dependent on these tools in her teaching.

Heba also needs technical assistance as she develops her computer-based teaching material. In the past, she was willing to work on both the pedagogical and the technical aspects of her projects, but after a demanding experience in developing digital material for her Egyptian colloquial classes, she came to the conclusion that a qualified and cooperative technical team is much needed to help her translate ideas into practice. Given the time that she spends taking courses on detailed technical matters, she affirms:

I prefer to focus all my attention on the pedagogical (Interview, 13.07.2008/H48).

6.5.4 Teacher Collaboration

Throughout her professional journey, Heba's colleagues have played a central role in shaping her cognitions about ICT, and in supporting her learning and practice. She describes their influence as both psychological and pedagogical.

In terms of shaping her early cognitions about technology, Heba remembers the pivotal role played by Waheed (see section 1.2) in constructing her cognitions about the role of ICT in teaching Arabic as a foreign language. During the early years of her career, Waheed, the then head of the CALL Unit, encouraged her to use computers, showed her how to operate them, included her in his ICT materials development team, and directed her to the various training sessions around the university.

Thanks to Waheed, I liked computers more, and worked with them more. He included me in his projects... and showed me everything I needed to enable me to work with a computer... (Interview, 25.02.2008/ **H49**).

Waheed also helped her overcome fears, and she passes on the advice he offered her to fellow teachers facing similar challenges. In fact, Heba's resourcefulness, adventurousness, and passion for experimentation, might all have originated from Waheed's constant encouragement during her early encounters with technology.

This is one of the areas where Waheed always gave me support. I used to have fears. Honestly, I am much better now. He used to encourage me a lot [by saying]: "We make it. It does not make us... We operate it. It does not operate us". With time, the fears I had of the machines disappeared (Interview, 25.02.2008/**H50**).

With the passing of years, the fact that she still quotes him verbatim is emblematic of the profound impact of these early experiences on her cognitions and practice.

At present, Heba is currently surrounded by small group of technology-using teachers who have a significant impact on her professional life, and whose support seems to compensate for the relative absence of the language program in this area. Heba believes that it is *"an excellent thing" (Interview, 17.03.2008/ H51)* that teachers in the language program exchange ICT ideas, share new experiences, and come to each other's assistance.

We share. Whoever learns something new, mentions it or shows it to the others (Interview, 25.02.2008/H52).

Specifically, Heba's colleagues are her prime source of learning and development, as well as her first resort when encountering difficulties.

As for learning and development, teacher cooperation is manifested in areas like exchange of sources (e.g. new websites, TV channels), methods and techniques (e.g. recording directly from the Internet), and ideas for activities (e.g. asking students to individually select pieces of news from certain websites, skim through them within a specific time, and tell the class about them).

Within her own context, Heba tries out what she observes of new ideas, modifies them, and shares them with colleagues. As an example of how new ideas are disseminated into the system, she mentions a video presentation activity that she introduced in her colloquial Egyptian classes, where students used their cameras or camcorders to record their experiences, and later present them in class.

The idea was at the very back of my mind. What brought it forth and made me actually **see** it with my eyes was... [a] workshop. After that, I modified it. In the following semester, we [Heba and her students] added it as a project in the colloquial class, and included it within the curriculum. It further developed and later I heard that the same idea was used in other classes (Technological Reflections, 17.03.2008/**H53**).

Again, we note the use of the verb '*see*' indicating Heba's preference for observation and modeling as methods for ICT learning.

6.6 Summary of Teacher Cognition and Technology

This section summarizes the salient themes in Heba's profile. In the context of the research questions and the theoretical orientation of this study, these themes are addressed in relation to her early experiences as a learner, teacher education, classroom practice, and work environment.

Since childhood, Heba has favored learning through observation, modeling, and practice. This has remained with her until the present day, as she voices a need for time to observe technology use outside her teaching context, and to learn about ICT through experimentation. During her early schooling years, Heba grew up with prevailing notions of transmissionist teachers, though as a foreign language learner she remembers favoring an active and engaging teacher who maintained a degree of closeness with her learners. With and without the use of digital media, these are among the distinctive characteristics of her teaching in the present.

The TAFL postgraduate program, and particularly the teaching methods course, had a transforming influence on Heba's pedagogical beliefs, as the roles of both the teacher and the learner were reconstructed. The change happened through new theoretical understandings, exposure to other MA students, and the practice of the tutor himself. Again, observation of others was key to her learning. The course also introduced her to learning technologies, and marked the beginning of her journey of ICT implementation. Heba believes that ICT plays a major role in enriching Arabic language teaching and learning, especially in the area of listening and speaking. Unsurprisingly, her technology use is characterized by a remarkable sense of determination. However, technical breakdowns create a perpetual state of insecurity, especially as she has become increasingly dependent on digital media in her teaching. As a resourceful teacher she is constantly searching for ways to rise up to these challenges and to proceed despite the difficulties. Presenting herself as a 'learning teacher' before her students may contribute to lessening the detrimental effect of technical failures. Determination and resourcefulness are reflected in her continuous experimentation with technology, which is her way of combating fears and advancing in ICT. Responsibility is also a characteristic feature of Heba's technology use. Though she expects institutional support in certain areas, she recognizes the responsibility of the teachers for their own development, and is, therefore, not in favour of top-down arrangements for teacher collaboration.

Heba's cognitions about ICT use are reflected in her teaching as we see her advocate a learning style whereby students are responsible for their own learning. She also encourages them to experiment with different digital tools, and to try to overcome technical barriers that they may encounter.

Within her context, Heba enjoys access to a wide range of technological resources which she perceives as indispensable for teaching and development. In her attempt to leverage digital resources for meaningful learning, she is confronted by a number of barriers. These are mainly associated with institutional philosophy and policy, scarcity of time, and lack of technical support. As a source of psychological and pedagogical assistance, colleagues play a key role in shaping her cognitions about technology and supporting her learning and development. We may, therefore, conclude that her main sources of ICT learning are all informal: her own experimentation, her learners, and her colleagues.

CHAPTER 7: LAILA'S COGNITIONS AND TECHNOLOGY USE

7.1 A Visit to Laila's Class

It's a little after 12:30. The students have just come back from their lunch break ready for the colloquial Egyptian class. They sit in two parallel lines facing one another. Laila sits at one end of the class with the teacher's computer in front of her and the document camera adjacent to it. She places her things next to the computer: a digital desk clock, the student attendance register, a stack of photocopies, on top of which is a small sheet of paper in compact Arabic handwriting, probably her lesson plan. At the other end of the class, and right across the teacher's computer station, we see a large smart board.

Laila starts the class by asking the students if they have any new stories or interesting anecdotes to share. The class listens attentively as Martin explains how taxi drivers in Cairo never understand his Arabic pronunciation. He says maybe it is because of his language or the sounds from the cars. Laila repeats what he says introducing the word 'noise'. "Noise?", he asks. "Yes, lots of sounds", she explains. Nora, obviously of some Arabic origin, asks what the phrase 'moved in' is in Arabic. Laila gives the various translations and highlights the ones most frequently used. Nora explains that she has not moved in yet, as there is no Internet in the apartment. She adds that she will call the landlord on the following day. Laila smiles, nods and repeats the words of the student with minor corrections. Nora looks at Laila, asks for the translation of the word 'demand' in Arabic, and lists the things that she has demanded from the landlord. Laila says she is strong, as she has demanded so many things, and they laugh. Laila asks if the rent is high and Nora says it is 4000 Egyptian Pounds for three rooms. Laila turns to the class and asks if this is a reasonable price, and they agree that it is. Nora continues with her list of demands and says she will have the apartment cleaned today. Laila asks if there are any insects like cockroaches there. But the student says no. David asks what a cockroach is, and Nora gives him the translation in English. Laila says "Congratulations", and explains that the phrase is used when someone has new things, whether they are apartments, cars or clothes etc.

Laila says they will return to Martin's problem with the taxi drivers, and why they don't understand his pronunciation. They discuss problems of pronunciation, and Martin repeats some words to Laila. She says they sound fine, though the 'r' is a bit American. She pronounces the words again and he repeats. Peter gives examples of other Arabic words that Americans pronounce wrongly, while Laura says that she had the same problem two years ago. Laila asks "and now?" Laura smiles and says she uses much simpler alternatives. Laila and the whole class laugh. Laila asks if they have other stories. Emma says she will be going to Luxor next week before she returns to the US, because her mother, who is a teacher, wants some photos to show to her students.

Laila then suggests that the class go out for lunch together and, at the same time, have the class session outside. She asks what day is suitable, and negotiates different options. David asks if there is a special occasion, and Laila says no, but that they will sit together and talk, all in Arabic. They also discuss where to have lunch and whether they should take a taxi to save time. Laila says they will talk further in the following week.

Laila tells the class they will move on to the presentations. The computer is on now, the lights turned off and the students' attention is focused on the screen. She moves to sit next to Peter, leaving her place free for Emma. While the latter uploads her presentation on the teacher's computer, Laila asks where she has travelled, and she says she has been to Greece. Emma presents her PowerPoint on the smart board. She talks about the slides, and gives brief descriptions of the places she has been to. While Emma delivers her presentation, Laila intervenes unobtrusively, from time to time, to repeat words or phrases correctly, provide the Arabic translations of a couple of English words, comment on a picture, or ask questions to confirm certain information. The student talks about a certain theatre, and Laila says there is a similar, but smaller, one in Alexandria and asks if anyone has seen it. In the end, they all give Emma a round of applause. Laila asks about the food and Nora and Emma discuss the differences between Turkish and Greek food.

They proceed, and Laila says they need to finish the game 'What is my job?' which they had started in the previous session. She reminds them that everyone will think of

a job, and that the rest of the class has to figure out what it is. She tells them that the first objective of this exercise is to use 'bi-' with the present tense, and the second is to have fun. Laila has a blank Word document on the board now. Nora thinks of a job and the rest of the class starts asking her questions using the present tense. If necessary, Laila repeats the questions with corrections. She also joins in to ask a question or two. Laila types the new words and they are displayed on the smart board. David volunteers but says he does not know what his job is called in Arabic. Laila says he can say it in English afterwards, and they will all figure out what it is in Arabic. The class starts questioning him, and Martin guesses that he is a driver of an aeroplane. Laila provides the word 'pilot' in Arabic and types it so they can see it. The game goes on. She encourages students to ask and sometimes takes part. It's Peter's turn now. He thinks of a job, but after the first couple of questions, Nora seems to know the answer. Laila suggests to her that they ask more questions, and later gives her the chance to provide the answer. Toward the end Martin tells Laila it is her turn to think of a job, and David tells her not to choose the job of a teacher. Laila thinks of a job and the class starts asking her about it. After some time, Laura arrives at the right answer, nurse. Martin asks Laila if she can type the word and she does.

Next, Laila says they will have a general overview of the usage of the present tense, and puts up a PowerPoint presentation. She moves through the slides, and talks about the characteristics of the present tense in Arabic using animated words. The verb is presented within a rectangular textbox and the prefixes in hexagrams. As she clicks, examples of verbs and the prefixes then move from the boxes to the center of the screen indicating their association. Hereafter, full sentences enter slowly from the bottom of the screen, and the tense sweeps in at the end in a different color. Later, she presents slides with more elaboration on prefixes where each prefix is connected to relevant examples using arrows. Laila also points out similarities between the present tenses in Arabic and English. One student asks a vocabulary question in the middle of the presentation. She provides the answer and proceeds. Laila says they will practice using these structures later. She tells them what they will be doing in the following class. Before she dismisses the class, Peter asks her a question about the difference between two similar words. She says it is a beautiful one, and provides the answer giving some examples. In the end, she thanks them, marking the end of this class period. It's 2:00 now, as indicated by Laila's desk clock.

(Video recorded session, 04.01.2008)

7.2 Teacher Cognition and Early Experiences as a Learner

Laila's early Arabic language experiences date back to her pre-school years when her father used to teach her at home. This gave her a good head start when she went to school. However, over the course of her school years, she lost interest in learning Arabic, and consequently her level went down to 'average'. According to Laila, the traditional Arabic language instruction provided in Egyptian schools suffers many limitations. For example, grammar teaching focuses on common and rare structures alike, introduces archaisms, and is not functional in terms of pedagogical orientation. This leads to lack of motivation on the part of the learner, which in turn affects his/ her level of achievement.

Laila's negative schooling experience exerts a strong influence on the way she teaches now. As an Arabic language teacher she does not want her students to go through the same process.

I think we mentioned this before, but negative experiences as a learner... Arabic language curricula in schools, teacher-student interaction... has led to the opposite [wanting to offer enjoyable learning opportunities] (Interview, 26.05.08/L1).

In contrast to the way she was taught, Laila tries to raise student motivation and foster an enjoyable atmosphere of language learning. When teaching grammar, she avoids uncommon vocabulary and less frequent structures, and draws direct associations between grammar and writing. Introducing technology into her teaching is a reflection of her attempts to bring the language closer to learners, and to present it in the most effective way.

In general, I try to detach grammar from the rigidity associated with it, and make it appeal to the learners... I make them feel that it has a value and that they can use it ... Grammatical rules are introduced in a simple manner. If possible, the sentences

would include a bit of culture or humor. [I use] very basic vocabulary, so we don't get lost in vocabulary at a time when we want to focus on grammar. I introduce the rule using PowerPoint. The learners then produce similar structures, and we gradually move on from there, so that, in the end, students use the grammatical rule, or more than one rule, in their writing... (Interview, 24.01.08/L2).

In a different context, the same cognitions were reaffirmed.

As for PowerPoint and similar things, I really don't want grammar to be boring, but to be visual, and to enter their minds and stay there. I thought of using these tools, for I really want the students to learn and retain what they have learned (Interview, 26.05.08/L3)

Laila notes that many teachers - even specialized ones - avoid teaching grammar. Due to shortcomings in Arabic language curricula, psychological barriers are placed between the teacher and the subject matter. Hence, teachers have to be careful not to pass their negative attitudes and beliefs on to their own students afterwards. Recalling her own Arabic language learning process, Laila is pleased when she succeeds in giving her students an experience that is different from her own.

7.3 Teacher Cognition and Teacher Education

Laila joined the TAFL program in the ALI without any teaching experience. The theoretical background she was provided with, coupled with a short apprenticeship experience gave her the foundation upon which she built her professional career as an Arabic language teacher.

The first influence on my pedagogical beliefs was the theoretical [foundation] represented in the different TAFL courses, for I had no experience when I started... As a teacher trainee, I used to take the students to the listening lab twice a week, and that was the beginning (Interview, 26.05.08/L4).

Naturally, TAFL work at that time did not include any elements of ICT, for the only examples of technology available then were reel-to-reel tapes, manual typewriters, and one listening lab. However, her TAFL training provided her with the conceptual tools and understandings of effective second/ foreign language teaching, which has since guided her quest for professional development.

Reading and attending conferences are fresh sources that stimulate my thinking. Sometimes, I go online and download a certain article. I read it, it adds to my knowledge, and gives me food for thought. Like doctors, teachers need to work constantly on developing themselves (Interview, 26.05.08/L5).

7.4 Teacher Cognition and Technology Practice

The following will address Laila's cognitions in relation to adoption of innovations, within her specific ecology. Upon examining her data, a number of notable themes emerge. These are

- Determination
- Insecurity vs. Resourcefulness
- Teacher Orchestration
- Identity, Representation, and Image

7.4.1 Determination

One of the salient themes in Laila's data is 'clock hands never move backwards'. The sentence first appeared in her *Technological Reflections* to indicate determination for continuous ICT development despite any obstacles.

Regardless of any technology-related frustrations that take place due to many factors, I don't think I can do without its tools now, after getting this far, and experiencing their benefits and the pleasure of using them. Clock hands never move backwards and, God willing, neither will my journey (Technological Reflections, 18.01.2008/L6).

At different junctures of Laila's journey with technology, we notice a strong desire to harness opportunities put forth by available tools. From the early days of the reel-toreel tapes and carbon copies to the present era of PowerPoint and You Tube, she has made the effort to learn about the affordances of these technologies for the betterment of her teaching. Her commitment to self-development is reflected in the words she uses to describe her attitude toward using digital resources.

Occasionally, I may have some fears, but I always try to curb [them] and to conquer new areas of ICT (Technological Reflections, 18.01.2008/L7).

In the context of a major technical difficulty she encountered, she remembers:

I started again from scratch, armed with memory, experience and hope (Technological Reflections, 18.01.2008/L8).

And when asked about her ambitions, she affirms that "*there is no limit*" (*Interview*, 24.01.2008/L9)

Laila explains that when Arabic language classrooms were refurbished to include the latest technologies, a joke circulated among the teachers: "Smart classrooms and stupid teachers". It was a funny statement but had a profound impact on her self-development. Somehow, she wanted to dispel that image, despite the minimal ICT training that the teachers had received prior to the introduction of the smart classrooms.

Laila affirms that she is in a constant state of learning and discovery, and that it gives her a sense of achievement every time she successfully integrates a technological tool to improve her teaching:

I enjoy it very much every time I learn something new. I enjoy adding knowledge to my experiences, and I also enjoy the feeling of achievement, and that I have reached a higher stage on the endless ladder of knowledge (Technological Reflections, 18.01.2008/L10).

One of the main reasons for Laila's determination to use ICT despite possible challenges is its perceived positive impact on learning, particularly in terms of raising student motivation.

I believe technology plays a major role in fostering the learning process and motivating students. Presenting the material in an attractive, smooth, and novel way plays a pivotal role in acquisition, and as we learned in psychology: "the more senses we engage in the learning process, the more effective it becomes". Therefore, I believe that introducing ICT into the learning process means increased use of the senses, and thus better learning (Technological Reflections, 18.01.2008/L11).

Referring to the value of ICT to Arabic language teaching in particular, she affirms that digital resources have "added life to classrooms" (Interviews, 26.05.2008/L12); and hence enriched learner experience. Through images, sound, and motion there is less reliance on paper-based material, and classroom dynamics have changed. Technology has brought Arab culture closer to learners and played a remarkable role in improving the teaching of media lessons. Both teachers and learners now have free access to the most up-to-date information, in addition to a whole pool of authentic material.

In media classes, technology is useful in presenting live material... In the past, I used to cut from newspapers, paste, and photocopy. Now, I get it directly from websites (Interview, 05.11.2007/L13).

According to Laila, ICT has also facilitated teaching the derivational system of the Arabic language, collocations, connectors, and all grammatical rules where there are changes to be emphasized (e.g., additions or omissions). She mostly uses PowerPoint animation to bring such language characteristics closer to her learners and help them grasp the rules. The following sketches her use of this tool to explain the derivational system, a central morphological feature of the language.

When a rule is visualized and motion is attached to it, it is better retained. I used to present the derivational system in the traditional way using worksheets or on the board, and I tried using colored chalk. However, when I present it using PowerPoint, first I save time and effort... and [second] they [the students] understand much faster (Interview, 26.05.2008/L14).

Comparing earlier groups of students, whose learning did not feature a technology element, with those who are exposed to it now, she believes there is a difference in the level of motivation to learn.

Students are more enthusiastic about the subject matter. "We will watch a movie" [they say referring to her PowerPoint presentations]. We switch off the lights. I feel

happy when I see grammar becoming something attractive...[It] has always been something boring and monotonous... So, when it becomes a source of enthusiasm to students that is really nice. And enthusiasm brings about motives for learning and remembering (Interview, 24.01.2008/L15).

Learners' positive reactions to Laila's computer-based material encourage her to proceed in this direction. The more she makes use of digital resources, the higher her learners' motivation becomes, and the cycle continues.

7.4.2 Insecurity vs. Resourcefulness

Although technology opens up new vistas for better teaching, Laila does not feel she can totally rely on it. Frequent technical breakdowns have created a state of constant insecurity, which necessitates keeping alternative lesson plans in reserve.

One is always afraid lest things get lost... There is a feeling of constant insecurity (Interview, 06.01.2008/L16).

Laila identifies such breakdowns as a source of fear and anxiety, but at the same time affirms that she has reached a stage of no-return. Digital resources have simply come to stay. Integrating technology into teaching has become the standard that she strives to keep, and settling for less causes her to feel displeased with herself, unsatisfied with her performance, and that she is being unfair to her students. The following situation reflects these feelings:

I knew the classroom computer did not have the new version of Office, so I saved [my PowerPoint presentation] in the older version. Well, the lesson was about dropping the 'n' in noun-adjective phrases... The PowerPoint worked but there was no movement... The sentence appeared but the 'n' did not disappear... I closed the presentation and found a piece of chalk... It felt like going five or more years back in time... Just holding that piece of chalk made me feel I had returned to the stone age... Just writing with it on the board felt very heavy. I had already surpassed this stage... So, I started writing the way I used to long ago, before my dreams, before my development. I crossed out the 'n' and drew an arrow, something I used to do with pleasure, but [now] I had found a better option and got used to it.. I was frustrated and upset (Interview, 01.07.2008/L17) In this example, it is interesting to note that she needed the animation aspect of PowerPoint, and not just a straight presentation. The example also depicts her feelings when she was unable to make use of these affordances. Although technical breakdowns shake Laila's confidence in technology, they do not deter her from using the tools, which may be further evidence of her determination. In fact, as she says, sometimes technology is both 'the sickness and the cure'. In other words, quite often, when a technical failure takes place, she finds alternatives by using other aspects of ICT. For example, in her Arabic media class, if she has a problem accessing video material on the server, she might change the plan, and ask her learners to switch on their computers and log on to the al-Jazeera website instead. Reflecting on this, she asserts:

Technology is both the problem and the solution (Interview, 14.05.2008/L18).

7.4.3 Teacher Orchestration

Laila espouses a teacher-orchestrated approach to teaching Arabic. She is at the heart of activity, directing learning, and moderating interaction. Technology is used within this framework, either by Laila or one of her students, mainly to display information, and both visualization and animation play a role in sustaining motivation and enhancing understanding. Laila believes that with or without technology, the teacher's principal role remains the same, the director, or the conductor, of learning. In fact, one of the recurring themes in her data is her perception of the role of the teacher. According to her theory of learning, teachers direct learning by setting learners onto the right path, and leaving them move forward. She believes that students carry the burden of responsibility for their own learning, and that the teachers facilitate the process.

The role of the learner is almost the central one... I guide, get [the learning process] moving, and withdraw (Interview, 29.05.2008/L19).

Laila's cognitions about her role as a teacher are manifested in her classroom practice. For example, in her grammar classes, she presents the rule using PowerPoint, runs some mechanical exercises, then less-controlled ones, and finally associates grammar with writing. In her media classes, she goes through a rigorous process of repeated listening to familiarize her students with the language of Arabic media. After that, she asks them to turn on their computers, read a fresh piece of news each, and present it to the class. She teaches them how to guess meaning from context, and make use of their knowledge of Arabic syntax and morphology to understand new vocabulary. Laila explains that she teaches them these strategies because in real life they will have to handle Arabic media independently, without a teacher or a dictionary. In her colloquial classes, she introduces a topic and encourages students to talk to one another. If they become silent or bored, she intervenes, opens up new issues, and brings straying conversations back to the point.

Laila believes that using ICT in teaching allows the teacher to give students more autonomy, and does not in any way reduce the role of the teacher as a guide, and a director of the educational process.

When I ask the students to go online, choose articles and present them, they become the center of the class, not me. I make sure that I keep it that way. [I tell them] "Turn on the computers, have a look and ... tell each other", not "tell me". Technology alters the role of the teacher slightly, but does not decrease its importance. The teacher is always present and always directing, but he allows them [the students] to rely on themselves (Interview, 29.05.2008/L20).

According to Laila, an unsuccessful class is one where the students are not active players in the learning process. Sometimes the students are ill-prepared, unmotivated or sleepy, and she finds herself doing most of the talking. In her opinion, this is not effective teaching.

A teacher should be doing less talking than the students. The day I find myself talking more than the students, I tell myself: "This is an unsuccessful class" (Interview, 05.11.2007/L21).

Laila does not use just one specific method in her teaching, but adopts different approaches. However, she prefers to start off with one small element, and slowly add to it until the bigger picture is complete.

My general principle is step-by-step or starting with the brick. Well, it's a matter of approaches to teaching, and there is no right or wrong method. For example there is

the holistic approach, were we begin with the general and then start breaking things into pieces, the Gestalt. I learned through the theory of the brick, and I think it is better. I start with the smallest thing and... build on it until we make our house... I direct and lay the foundations, and the students carry the greatest responsibility (Interview, 26.05.2008/L22).

From observing Laila's teaching, we notice several examples of how technology is used in light of her 'theory of the brick'. For instance, in the media class, after watching the video recorded news on the smart board, she asks the students general questions. They listen again, and she asks more specific questions, and so on until the whole news item is covered. Further, her statement '*I learned through the theory of the brick, and I think it is better*' is an indication of the influence of early experiences in shaping teacher cognition about teaching and learning.

I ask them questions that are not prepared in advance, for its fresh news. "Who are these people?" They think about part of the answer. It is not important that they give a complete response. They add to each other's. It's a way of elicit[ing] information... One bit after the other... One word after the other... I see this like the pieces of a jigsaw puzzle... The biggest part comes later when we place these pieces next to each other (Recall, 15.05.2008/L23).

The 'theory of the brick' is also evident in Laila's teaching of grammar, in both her Modern Standard Arabic and colloquial classes. For example, following her PowerPoint presentation of grammatical rules, learners work on mechanical drills, using simple vocabulary with focus on the specific structure that they have been introduced to. They then gradually move to semi-controlled exercises, until they use that particular rule, or more than one rule, in their oral or written work. Laila also prefers teaching grammar within the context of reading and writing so that it is *"meaningful and not a number of isolated islands" (Interview, 24.01.2008/L24)*.

Laila's orchestrated style is guided by clear objectives. She believes that effective teachers direct learning within a defined framework of educational aims, which are in turn informed by factors such as the subject matter, level of the class, and student needs. Like any aspect of teaching, ICT implementation should take place within a

carefully designed structure informed by specific teaching objectives. This is reflected in Laila's coherent lesson plans and organized activities.

I have objectives and means with which to achieve these objectives. According to that, I draw a plan for the class and design diverse activities. Each time is different from the next. In my mind, there has to be an objective that I aim to realize in the end, but separating objectives from activities is a catastrophe (Interview, 29.05.2008/L25).

Once learning objectives are identified, the teacher considers the most efficient methods with which to achieve them, and ICT is considered in this light. What technologies to use, when to use them, and for what purpose, are questions that teachers need to have clear answers to before any practical use of ICT takes place. Laila constantly subjects her adoption of ICT to self-review and reflection. She notes critical incidences, moments of success, and points of failure. Day to day student reactions affect her course planning and decision-making. Therefore, despite being guided by a coherent structure, her lessons are in constant evolution and the way she integrates ICT into the curriculum is subject to change from one day to the next. This is particularly evident in the time she spends modifying her PowerPoint presentations to meet the learners' needs.

Sensitivity to students' needs is one of the main factors that Laila takes into account when planning her lessons. Sometimes there are points of weakness here or there, vocabulary that needs reinforcement, or specific areas in the homework that require closer attention.

If the learners' level is low, I can't ask them to go and check the blog of so and so and read about people's opinion on the extension of martial law in Egypt, [for example]. That's incapacitating. The same applies to listening, "Go to al-Jazeera and come back with...". This is discouraging (Interview, 29.05.2008/L26).

In fact, Laila highlights the importance of considering students' educational needs when deciding whether to use any technology in the first place.

If, at any point in time, I don't feel that technology will be of help to the students, I teach in a normal, traditional way (Interview, 26.03.2008/L27)

Laila also likes to communicate the objectives of her lessons to her learners.

Since they are all adults, they have the right to know what we are doing. I tell them: "We are currently working on reinforcing the nominal sentence and the present tense, and this is a semi-controlled activity". After that every learner writes about people he knows in his life or carries out parallel activities (Interview, 24.01.2008/ L28).

With her course objectives clear in her mind, Laila alters and adjusts her teaching in accordance with what serves those goals. She, therefore, perceives her students' learning outcomes and feedback as important indicators on her journey of ICT integration.

I cannot describe my happiness when I see that the students are enthusiastic about viewing a grammatical rule that I had prepared in PowerPoint, when I listen to their feedback about what they see, and at the end of the term when I find their positive feedback on the student evaluation forms (Technological Reflections, 18.01.2008/ **L29**).

7.4.4 Identity, Representation, and Image

Laila views TASOL professionals as ambassadors of their culture, and examples of the educated Arab.

We represent the image of the cultured, civilized Arab individuals, and this image has to be clear in... my appearance, my speech, my actions. For example, if I am at a party [with students and prayer time arrives], I don't mind telling them: "Excuse me, I am going to pray". I don't feel shy. I present myself as I am. Not everyone has this awareness (Interview, 29.05.2008/L30).

The issue of identity and cultural representation is central in Laila's data. It is closely linked to the attitudes of some of her learners on the one hand, and her use of technology on the other.

She highlights a perception shared by other teachers in the ALI, which is that students who come to the Arab world to learn Arabic are sometimes loaded with negative attitudes toward the region and its people. Their pre-conceived ideas are occasionally reflected in their words and behaviour, and sometimes constitute an obstacle to learning, especially when they do not view their teachers as competent professionals or credible facilitators of the educational process.

You feel it sometimes in their manner, the evaluations, and [from] your long experience. They believe we are better in the language only. But even in teaching methods... [they think] they are better... Sometimes there is rejection and criticism of your methods, your own methods that you are specialized in (Interview, 06.01.2008/L31).

Laila gives the example of a student she had in the past in one of her beginners' classes. He used to ask her questions like: "What are we doing now? What's the objective of the exercise? What are we trying to do?", which reflected a certain attitude toward her as a teacher.

She believes that because successful integration of ICT can improve teaching, language teachers should harness the benefits provided by such educational tools. Utilizing them becomes particularly important in learning environments where the majority of students already use them in their daily lives. Using technology becomes a way of integrating students' preferred means of communication into their language learning, and in the context of Arabic language teaching specifically it is also a way of making a positive cultural statement and dispelling misconceptions.

There is no doubt that technology is the language of [our] time, and constitutes one of the most important aspects that distinguish an advanced nation from a backward one. The teacher - like any other human being - is part of this world, and has to catch up with the technological advancements as much as he can, in order to improve his teaching performance, and so as not to appear less experienced and informed than his students who - mostly - come from advanced countries (Technological Reflections, 18.01.2008/L32).

We may therefore conclude that, according to Laila, improving teaching performance and presenting a positive image of one's culture are key motivating factors for technology adoption. This might explain why she feels distressed and embarrassed when technical problems occur. In addition to spoiling her lesson plans and wasting her time, such glitches tarnish her image as an Arab teacher and citizen.

I don't think that this is the right way [of handling technical problems]... that in front of the students I still have to call someone to come and, I don't know, see to this or that for me. I feel very embarrassed and a lot of time is wasted. The students start chatting with each other... Actually, we don't look good (Interview, 16.03.2008/L33)

Her use of '*we*' is an indication of this perception of a communal identity; professional, cultural, or both.

On the other hand, a close association is observed between Laila's sense of achievement and successful realization of educational goals, especially where technology is used. She explains that generally, teachers always feel that younger learners are ahead of them in terms of ICT, even in its simplest aspects like typing speed, for example. She adds that given the negative attitude that some students arrive with, when she succeeds in implementing her lesson plans it gives her a 'psychological edge', and a sense of achievement. However, it should be noted that Laila is against ostentatious use of technology to achieve this goal.

Of course, technology gives me some kind of psychological edge, as I present the material in a way that reaches the minds and the hearts through the eyes. But this is not the only [way]. In other words, you can run a whole class without ICT and it is still successful. Technology is not the sole source of this psychological edge, but one of the factors, without unnecessary enforcement (Interview, 29.05.2008/L34).

In fact, we may conclude that she perceives using technology for the sole purpose of impressing others as a weakness or perhaps a sign of low-self esteem.

I want to clarify that I don't suffer at all from the ostentatious use of technology or introducing it when there is no place for it, but I call for making use of the tools of our time whenever their benefits and positive outcomes are evident (Technological Reflections, 18.01.2008/L35).

To Laila, using ICT in teaching is indispensable. She wonders, therefore, why there are still teachers in the language program who do not use any digital resources in

their teaching. Though she realizes feelings of fear and anxiety may be associated with using ICT, she does not always find such feelings justifiable.

I hear from some of my colleagues, in fact a few of them, words that indicate fear and panic of computer applications. They don't mean complicated or highly specific ones, but all kinds of technology, even the very simple ones like the document camera in the smart classrooms... I believe this feeling is strange and unjustifiable. In my opinion, it is attributed to some kind of mental and psychological laziness, that prefers to avoid things rather than trying to understand and learn them (Technological Reflections, 18.01.2008/L36).

This vocal criticism of avoiding digital media in teaching Arabic might be explained in light of Laila's commitment to self-development and determination for professional growth. However, it could also be associated with her pride in her Arab heritage, and her desire to see Arabic language teachers reflect the best in their culture, and ICT, as we have seen, is a way of achieving this.

In addition to using ICT to make a cultural statement, Laila believes that technology is important for a teacher's professional image in general. The new generation of technology-versed learners constitute *"a positive pressure" (Interview, 31.01.2008/L37)* on her to adopt innovations and continue to progress in this direction.

I never forget the day when one of my students said: "What are the computers doing in the classrooms? They are useless". His words caused me to feel very embarrassed and made me think of what these machines could provide for the students. Perhaps, this is one of the motives that encouraged me to think of more ways of using the technology we have in our classrooms (Technological Reflections, 18.01.2008/L38).

However, the actual turning point took place some years ago when Laila was assigned a listening class to teach.

I used to teach using audio tapes. [At the beginning of the semester] I told the students, as I always did for the past twenty years: "Please bring in four empty audio-tapes each, so I can record the homework for you". They responded: "We don't have tape recorders". I asked: "Why not?" [They told me] "... No one uses these things..." I asked: "You don't use them?" They said: "Never.. Our generation

does not use tapes "(laugh). I wondered what to do. I was puzzled. I talked to Heba, and she told me her students said the same to her... but [then] I learned to use Audacity. It is a program that can be installed on the computer, and we [started using it] it for recording. It gives the option of exporting files as MP3, which makes them quite small. The files are [now] sent to the student either by email or they bring their memory sticks and we give them a copy (Interview, 06.12.2007/L39)

Her concern about her image before her learners, whether for cultural or professional purposes, is reflected in several ways, such as:

Preferring to test things out away from her students. For example, in the context of learning to use WebCT (now Blackboard), she says:

I will try... first, just by myself, before telling the students about it (Interview, 31.01.2008/L40).

- The frequent association between her feelings of embarrassment and in-class technical failures.
- Her choice of vocabulary to refer to the learners in the context of her ICT use, such as "audience" or "public".

We also notice an indirect link between Laila's professional status and the younger graduates from the TAFL program, whom she refers to as 'the emerging generation'. She recognizes clear differences between herself and them; so, whereas she has much longer experience of teaching, they are more confident and competent technology users by virtue of the 'natural' integration of ICT into their daily lives. Additionally, the TASOL teacher training they currently undergo has a technology element within it, which may provide them with the opportunity to transfer their day-to-day technological competencies into their professional lives.

The new ones, they all use technology much more than we do... To the extent that one of them has a website, from which... [there are] links to many things. The alphabet... I don't know what. This link, and that link. They are more advanced, or most of them are much more advanced than us in these things (Interview, 31.01.2008/**L41**).

As an ambitious teacher and given her eminent status within the ALI, Laila perceives 'the emerging generation' not as a threat but as a motivating factor for integrating technology into Arabic language teaching. She explains that observing one of the younger teachers in her classroom spurred her motivation for learning, and increased her determination to improve her computer skills.

7.5 Teacher Cognition, Practice, and Context

This section examines Laila's cognitions within her local context. It explicates the main influences on her cognitions and underlines how certain factors can account for the incongruence between cognition and practice. It is notable from Laila's data that she herself is aware of the possible role of her context in producing this dissonance. For example, she expresses her wish to see her learners become more autonomous, but realizes that she neither has the skills nor the time to develop material and activities that would enable her to achieve this goal. Another observation is that much of what she believes to be important to her ICT integration is actually what she herself provides to her learners. For example, she says that when she learns about new technologies, she needs ample opportunity to practice using them. When we look at her teaching we see her give language learners a lot of time to practice, before moving on to something else. This reflects the close association between pedagogical beliefs and classroom practice.

In light of this close relationship between cognitions, practice, and context, a number of salient themes arise. These are:

- Institutional Philosophy and Policy
- Learning Opportunities
- Time
- Technical Support
- Teacher Collaboration

7.5.1 Institutional Philosophy and Policy

Laila believes that the ALI supports teachers' professional development in different ways. For example, it encourages the teachers to present at conferences, and invites distinguished visiting professors (DVPs) every year to deliver workshops or training sessions in areas of direct relevance to the teaching staff's professional needs. However, when it comes to technology, the language program has yet to foster an atmosphere that is conducive to ICT integration. Despite some efforts, Laila does not think that technology adoption is high on the ALI's agenda, nor does she know of a clear plan for integration within the Institute. For example, she states:

Due to lack of sound planning in positioning equipment in the classrooms, it is difficult to use most of it with ease, if at all (Technological Reflections, 18.01.2008/L42).

Also, she does not think there is good communication between the program, the CALL Unit, and the teachers when it comes to ICT matters. According to her, much technology was introduced into the ALI without the teachers being provided with the necessary training to be able to use it.

Consequently, they may feel the pressure of working within highly equipped classrooms, the pressure from technologically-versed learners, and the pressure from the younger generation of teachers who are apprenticed to them.

7.5.2 Learning Opportunities

Although Laila is motivated to learn more about the use of ICT in language teaching, and to attend relevant training, she does not think her workplace is supportive in this respect. For example, she does not have the time to go to sessions, and when she does, she is often unsatisfied with the quality of training she receives.

They should have a clear plan of introducing us to new and simple things in the field... There are things I have learned while others are still unknown to me. So, this training has to be more structured... and it should be clear... one, two, three... What this thing can do, and how it can help me as a teacher... there are many things...

many programs. We need this. Even on Wednesday, during Assembly Hour, something like that could be done (Interview, 16.03.2008/**L43**).

Her beliefs about the significance of structured learning are reflected in her perception of efficient training, but they are also reflected in the way she runs her classes, as illustrated previously (L22; L23; L24).

7.5.3 Time

Over and again, lack of time appears as the prime obstacle to Laila's adoption of technology. She needs time mainly for training, as well as practice before actually using what she has learned in her classrooms.

Constant occupation with teaching responsibilities and everything related to them, such as preparing for classes and developing materials, in addition to [working on] papers for conferences, all this does not allow for much time to realize all that I aspire to learn in the area of ICT (Technological Reflections, 18.01.2008/L44).

The need for time was asserted at the end of her questionnaire when she wrote:

I believe the ICT Unit in our department should allocate some time (e.g. Wednesdays 11:00 – 12:00) for training and familiarizing the ALI teachers with ICT materials and skills (Questionnaire, May 2008/L45).

Laila argues that training in and of itself is useless if the teachers are not given the chance to practice what they have learned.

I wish I had the time... I wish... There are so many things that I really want to learn. For example, I learned this 'Hotpotatoes' [software], and it is gone. I don't remember anything about it, because after I learned it, I never practiced it... So, it totally disappeared. So, it is not only education... Education, training and practice... until I remember it (Interview, 31.01.2008/**L46**).

She has taken WebCT (now Blackboard) training courses twice, but still does not use it due to lack of time for practice.

That which I practice and use, I remember. That which I don't use, is forgotten (Interview, 16.03.2008/L47).

Cognitions about the importance of practice for better learning are reflected in Laila's teaching. Through her 'theory of the brick', she gradually takes her learners through different activities until they master what she has taught them. As such, she gives them ample opportunity to practice what they have learned. In the same way, she believes that for ICT training to be successful, teachers have to be given a chance to practice what they have learned.

As indicated in Laila's data, lack of time is also a direct reason for a shortage of TASOL computer-based material. She thinks there is a need for more work to be done in this area, hopes to see a bigger repository for Arabic language teachers to choose from, and looks forward to being able to refer her students to websites or CDs, and leave them to learn on their own. She realizes that it is very hard for her to develop such content herself, mainly due to lack of time. Consequently, she is left with the options of relying on ready-made material, or getting a 'tailor' to develop it for her, though neither is readily available.

We may therefore conclude that, generally, Laila needs time for training, exploration, experimentation, and materials development. In fact, lack of time could deter her from further advancement in technology use.

Sometimes I fear that by developing something myself, I waste a very long time, and therefore, it's better to do without it (Interview, 16.03.2008/L48).

7.5.4 Technical Support

Frequent technical breakdowns are among the main contextual factors that affect Laila's attitudes toward using ICT in teaching. In light of her wish to represent the best of her culture and given her concern for her professional image, we understand the profound impact of technical failures on shaping her cognitions about ICT and framing her subsequent practice. They generate feelings of embarrassment, and place her under immense stress, particularly if such difficulties take place during a test, at the beginning of the semester (before she gets to know her students), or in the presence of a TAFL teacher-candidate observing her session. In fact, Laila describes a successful teaching session as one where teaching progresses smoothly without any technical problems.
This anxiety is always there... Every day, I am dependent on something technologybased, and afraid that on that particular day it will not work for some reason (Interview, 06.01.2008/**L49**).

Although technical problems shake her confidence and provoke constant anxiety, she can no longer envisage her teaching without the use of these technological tools. The result is that she continues to incorporate ICT into her lessons, but is in constant dread of such tools letting her down.

This, of course, annoys me, but I have already reached a stage where I cannot revert. In other words, I will not ask for [the old] Lab 3 again, nor carry the cassette player with me to class or record on audio tapes. I have reached a stage where I am convinced of the path I follow... So, there is no reversion, but there is anxiety (Interview, 18.11.2007/L50).

7.5.5 Teacher Collaboration

One of the main factors that contribute to Laila's technology development is teacher collaboration. Its impact on her learning far surpasses that of any other sources of ICT education, including formal training. Laila has close personal connections with a number of teachers in the language program, especially 'the old guard', or the earlier generation of teachers. She prefers to exchange ideas with teachers of a similar age group and also of, more or less, similar computer competence. This personal rapport is manifested professionally in their ICT collaboration.

There is a beautiful spirit and great closeness on a personal level. This is reflected professionally as well. (Interview, 29.05.2008/L51)

In fact, Laila's colleagues were the ones who sparked her interest in using ICT in teaching, as observing their work gave her the inspiration to travel the same path.

Just seeing these things instigated the feeling that this dream [using ICT in teaching] could come true (Interview, 24.01.2008/L52)

At present, Laila and some of her colleagues exchange ideas, experiment with new technological tools, and think of solutions to problems.

[Teacher collaboration has] a major influence, as I told you. I learn a lot. For example, ... I wanted to send a file to the students, and failed. So, again through talking... Shahira told me that Heba has a Gmail account that is large [in capacity], and I don't know what. So, I opened a Gmail so I could send things from it... and so on. In other words, it [co-operation] helps in many things. It facilitates many things. Now, I know that Heba is trying to record directly to the laptop... and Kamal is installing something for her, or has tried several software packages or so... So, I am waiting to see what he will do, and after that I'll record as she will do. Well, I don't have to go through all the stages she went through (Interview, 06.03.2008/L53).

Laila hopes to see more teacher collaboration within the language program. She is aware of the very busy schedules that they all have, and therefore, suggests designating a specific time once a week, or even once a month, where all the teachers could assemble and discuss different educational ideas, especially those related to integrating technology into TASOL. Her ambitions for ICT collaboration extend beyond the physical boundaries of her environment to include Arabic language professionals worldwide, as educators need to work together to provide more training opportunities, and establish forums for the exchange of ideas.

We need more [opportunities for] ICT teacher training and sharing experiences at the level of all Arabic language professionals, like 'Arabic-L' (an international online forum for TASOL teachers) (Interview 29.05.2008/L54).

7.6 Summary of Teacher Cognition and Technology

This section summarizes the main themes emerging from Laila's description. In light of the research questions and the conceptual framework that have informed this investigation, these themes are addressed in relation to her early experiences as a learner, her teacher education, her classroom practice, and her work context.

In her pre-school years, Laila was introduced to Arabic language learning by her father. These experiences gave her a remarkable head start when she attended school later on. However, the traditional educational system she was subjected to caused her to dislike learning Arabic as it focused on rare structures, introduced archaisms, and was detached from contexts of use. Negative schooling experiences have had a

profound impact on the way she teaches now. This is reflected in her efforts to foster enjoyable and meaningful learning, and her use of PowerPoint animation in teaching Arabic grammar is emblematic of these efforts.

Although the TAFL postgraduate program did not include any elements of technology (as we know it today), the theoretical understandings gained during her course of study guided her subsequent professional development.

Laila believes that the use of digital media has transformed the teaching of Arabic and 'added life to classrooms'. Her data reveal a firm determination to leverage digital media for the advancement of teaching the language in spite of any challenges that she may encounter in the process. Examples of these challenges are perpetual technical failures. They instigate feelings of insecurity and necessitate backup lessons plans, but do not deter her from utilizing technological resources for better language learning outcomes. As a resourceful teacher she tries to overcome these feelings and find ways around breakdowns, sometimes through using other forms of digital media available to her.

Laila exhibits a teacher-orchestrated style of teaching. She is at the center of action directing student learning and mediating between the various elements in her environment. Informed by defined objectives, her teaching is guided by structure and organization, clearly observable to a visitor to her classroom. Related to her 'teacher' role are issues of identity, representation, and image. In her opinion, TASOL teachers are ambassadors of their cultures, who through effective use of ICT, may dispel cultural misconceptions that some learners arrive with. In addition to her cultural image, Laila is also conscious of her professional image, especially in the presence of young, competent technology users in her work environment: her learners and 'the emerging generation' of Arabic language teachers.

Laila's context plays a central role in shaping her cognitions and practice. She appreciates the support that her workplace gives her for overall professional development, but thinks there is room for improvement with respect to technology integration, particularly in terms of planning and communication. Among the contextual barriers that she identifies are lack of time, lack of structured and meaningful ICT training, and lack of adequate technical support. Nonetheless, Laila's colleagues are an essential factor for adoption of technology and progress, as well as a significant source of learning and support.

PART III: UNDERSTANDING TEACHER COGNITION AND TECHNOLOGY

Comprising the two final chapters, Part III draws on the within-case analysis described in Part II, and guides the reader to an understanding of teacher cognition in relation to individual ICT use.

Chapter 8 focuses on the cross-case analysis and the discussion of the salient themes. It sets out what we can learn about the relationship between teacher cognition and ICT use by viewing the three profiles in conjunction. In this respect, the chapter details the key findings in this study thereby providing answers to the research questions that have guided this investigation. Following on from there, Chapter 9 presents the main conclusions derived from these findings. It also emphasizes conceptual, methodological, and professional contributions, suggests areas with potential for further research, and addresses some reflective thoughts.

CHAPTER 8: CROSS-CASE ANALYSIS AND DISCUSSION

8.1 Introduction

The focus of Part II Articulating Teacher Cognition and Technology was to present three accounts of teacher cognition in relation to individual technology practices. The within-case analysis allowed salient themes to emerge and led to an in-depth understanding of each participant's pedagogical beliefs in relation to her use of ICT. Since the value of each case profile lies in its uniqueness, an important consideration in this chapter is that teacher particularity is not eclipsed by the cross-case analysis but instead further illuminated by bringing the three case reports together. By examining the three case profiles in this manner the chapter offers comprehensive answers to the overarching research question and four sub-questions that have guided this investigation throughout its various stages, namely:

What is the relationship between teacher cognition and the use of technology in teaching Arabic to speakers of other languages?

- What is the relationship between teacher cognition and teachers' early experiences as learners?
- What is the relationship between teacher cognition and teacher education?
- What is the relationship between teacher cognition and classroom practice?
- What is the relationship between teacher cognition, classroom practice, and context?

8.2 Teacher Cognition and Early Experiences as Learners

A considerable volume of literature recognizes the imprint left by early learning experiences on teacher cognition (Borg, 2006, 2009; Ertmer & Ottenbreit-Leftwich, 2010; Farrell, 2009; Graves, 2009; Johnson, 1994; Lortie, 1975; Pajares, 1992; Richards & Lockhart, 1996; Windschitl, 2002). 'Apprenticeship of observation', reflected in the thousands of hours spent in classrooms, contributes to shaping perceptions of what constitutes good and bad practice.

Recognizing the many years of professional practice completed by the teachers in this study, and therefore the time elapsed since they themselves were pupils in a school, we can expect their case profiles to provide no evidence of the use of technology in their early years of schooling. Nonetheless, there are accounts of the impact which positive and negative preconceptions formed earlier in life, during apprenticeship of observation, has on shaping teacher practice, including the use of digital resources.

According to their case reports, although the depictions vary, the three teachers studied within a traditional Egyptian educational system. Dalal and Laila in particular, identify negative aspects of their schooling experience such as focus on obscure grammatical rules, archaism, rote memory, and protracted reading out loud sessions. These activities were counterproductive, and eventually caused them to dislike learning the language. Drawing on their negative schooling experiences, both teachers decided to give their learners a different experience, and utilize ICT to this end (D3; L1; L2; L3). Laila, for example, uses PowerPoint animation to explain grammatical rules in a simple and entertaining manner, before associating them with functional writing tasks, while Dalal uses the document camera to display visual elements (in the form of drawings, pictures, and grids) on the smart board in her teaching of new vocabulary.

In contrast with Dalal and Laila, Heba fared relatively well within a traditional educational system and was good at Arabic. However, she recalls preferring her engaging English language teacher to her distant Arabic language one. The possible impact of apprenticeship of observation might explain her adoption of a 'learning by doing' style, and preference for maintaining close contact with students. Asking them to work on Windows Movie Maker projects, and providing guidance throughout the process is a reflection of this theory of learning. We further note that during Heba's early schooling, one way she learned her lessons was through imitating her teacher (H1). Later, she describes 'learning by modeling' as one of her favored approaches to ICT development (H53), and expresses a need for time to observe the technology practice of language teachers in different educational contexts (H45).

In the three case studies, there are also accounts of the early role of parents and social networks in impacting teacher cognition about learning and teaching later on. For example, Dalal advocates a communicative approach to language teaching especially because this was how she herself enjoyed learning English from her neighbors in the United States (D1). Furthermore, her mother was an Arabic language teacher herself, which may have contributed to shaping Dalal's beliefs about teaching and learning (D4). We have also seen how Laila's father and Heba's mother played a supportive role in directing their language learning in childhood.

We may, therefore, conclude that even in the absence of technology, apprenticeship of observation within formal language learning settings plays a major role in shaping teacher cognition and subsequent classroom practice, but teachers' pedagogical beliefs may also be constructed outside the school context through the influence of parents or social networks.

8.3 Teacher Cognition and Teacher Education

Earlier research has taken different approaches as to the relationship between teacher cognition and teacher education. For example, some studies have shown that cognitions formed early in life can outweigh the effect of teacher education in shaping classroom practice (Belland, 2009; Johnson, 1994; Lortie, 1975; Nespor, 1987; Pajares, 1992; Phipps & Borg, 2007). On the other hand, there is evidence that teacher education plays a pivotal role in mediating teacher beliefs (Ertmer & Ottenbreit-Leftwich, 2010; Freeman, 1991, 1993; Slaouti & Motteram, 2006).

This study supports the latter view as revealed by the three cross-case analyses. Dalal, Heba, and Laila have the common experience of joining the TAFL teacher education program in the ALI, and attest to the importance of these years in transforming their earlier conceptions of teaching and learning Arabic that were furnished during their early schooling. The three participants are aware of the reconstructive processes that took place during their formal teacher education years (D5; D6; H2; L4), and drawing on their narratives we may attribute the change in their beliefs to two main factors:

b) Presenting Teaching Models: A number of the TAFL modules had a modeling impact. For example, Heba reported that the instructor of the teaching methods courses himself gave participants responsibility for their own learning and appreciated their individual contributions to the course. Similarly, Dalal stated that the Arabic grammar module was taught in an inductive manner that stimulated thinking and sustained student interest (D5). As such, the course presented a practical example of effective Arabic grammar teaching.

c) Observing Teaching in Context: One of the practicum requirements was sitting in Arabic language classrooms. Besides providing Dalal, Heba, and Laila with additional modeling experiences, it allowed them to observe, and sometimes take part in, teaching Arabic in authentic settings (H4; L4).

Like their experiences of schooling, the teacher training undertaken by the three teachers did not include an independent CALL module, or integrate technology as we know it today in their courses. Both Laila and Dalal joined the TAFL program before Heba, and report the absence of technology in their teacher education. In Heba's case, however, the teaching methods course introduced her to the basics of computers and the Internet.

Despite the absence of an ICT element in their learning, we understand that the TAFL program provided the three participants with conceptual tools and pedagogical insights, which had a profound impact on their subsequent practice. For example, it introduced them to new understandings of the role of the teacher (H2), and inductive methods of teaching grammar (D5; D6). When the teachers were later faced with a situation where technology could potentially be used, they approached it with these cognitions, some of which may have been informed by their teacher education experience. For example, we notice that Heba employs ICT to support ambitions for learner autonomy (H27; H28), and Dalal uses PowerPoint to show detailed changes in grammatical prefixes and suffixes (D33). Therefore, even if they are void of concrete elements of ICT, teacher education experiences can act as filters for subsequent technology use.

8.4 Teacher Cognition and Classroom Practice

The three case studies reveal a close relationship between teacher cognition and technology practice, reflected in the emergence of the following themes from the analysis.

<u>Dalal</u>	<u>Heba</u>	<u>Laila</u>
• An Uphill Struggle	 Determination 	 Determination
for Integration		
 Perfectionism, Imag 	e, Insecurity vs.	 Insecurity vs.
and Fear of Failure	Resourcefulness	Resourcefulness
 Deliberate Steps 	 Experimentation 	 Identity,
toward Integration		Representation, and
		Image
• Teacher	 Responsibility 	 Teacher
Orchestration		Orchestration

Examined in context, these salient themes were further collated under three broader themes, which offered deeper insights into similarities and differences between the teachers' individual orientations toward ICT use. As will be illustrated below, the three themes are closely related, and as a group provide a broader understanding of the unique nature of each teacher's cognitive system in relation to her practice of technology.

- Cognitions about Teaching and Learning (TL) Shape Technology Practice
- Cognitions about the Professional Self (PS) Shape Technology Practice
- Cognitions about TL and about PS Shape Reactions to Perceived Challenges

8.4.1 Cognitions about Teaching and Learning (TL) Shape Technology Practice

A closer look at the relationship between cognition and practice reveals that all three teachers use ICT to support established cognitions about teaching and learning. As such, this study corroborates those international papers which document the direct impact of teacher cognition on individual technology practices (e.g., Demetriadis et al., 2003; Gobbo & Girardi, 2001; Lam, 2000; Niederhauser & Stoddart, 2001; Veen, 1993; Zhong & Shen, 2002).

Heba's case study reveals firm cognitions about students taking responsibility for their own learning (H25; H26), and we see her place the technology in their hands by sharing her digital material with them (H27), and assigning them computer-based projects (H28). She also holds cognitions about the importance of the teacher possessing the requisite "bit of courage" to experiment with various technological tools (H21), and in her teaching, she explores different media and brings in new activities (H23).

Similarly, close examination of Laila's data reveals a unique set of pedagogical beliefs about teaching and learning, which are in turn, reflected in her practice. For example, through her teacher-orchestrated style, she directs student learning by setting them off on the right path and then leaving them to move forward (L19). She also uses digital media (e.g. video) in the framework of her "theory of the brick" (L22; L23). Referring to her own ICT learning she states: "that which I practice and use, I remember. That which I don't use, is forgotten" (L47), and observing her teaching style we notice that she gives students ample opportunity to practice what they have learned. Furthermore, Laila believes that "the more senses we engage in the learning process, the more effective it becomes" (L11). She explains that introducing ICT into language classrooms implies the use of more senses on the part of learners, and therefore, more effective learning. Laila's use of PowerPoint animation in teaching Arabic grammar is a manifestation of these cognitions (L14), and the highly organized lessons in which these slides are presented reflect her theory of the brick, and, more broadly, her detailed attention to structure and organization.

Dalal's cognitions about teaching and learning also influence the way in which she employs digital media in teaching Arabic. Like Laila, she adopts a teacherorchestrated style whereby she is at the center of interaction mediating between the different elements of her environment. She believes that visualization contributes to raising student motivation, and therefore, enhances learning (D32). Upon examining her practice, we note that she employs digital resources mostly for presentation purposes. Hence, her frequently-used digital tools are the document camera, the smart board, video DVD, and PowerPoint. Her use of these media is characterized by a definite visual element in the form of images, grids, and colors (D33).

Although each of the three participants adopts a distinctive pedagogical orientation, which is reflected in her path toward the adoption of technology, areas of similarity may be identified. For example, comparing Dalal and Laila's pedagogical orientations, we notice that both teachers adopt an orchestrated approach to language instruction and are of the belief that, with or without the use of digital media, the teacher's role is to direct students in their process of language learning. Technological resources are employed within a structured framework, by the teacher herself or one of her students, to display information and both visualization and animation play a part in sustaining group motivation and fostering classroom interaction.

8.4.2 Cognitions about the Professional Self (PS) Shape Technology Practice

According to their case studies, teachers' perceptions of themselves as Arabic language professionals impact their technology use. It should also be noted that these cognitions are closely associated with cognitions about teaching and learning, as discussed above.

For example, an examination of Dalal's profile demonstrates that beliefs about her professional self are reflected in her use of educational technologies. She fears that things may go wrong and that she would appear incapable of handling technical matters in front of her learners (D17; D19). This is related to her sense of perfectionism, and her conviction that the smooth progression of lessons is vital to the effective use of class time (D18). Her fears are also associated with cognitions about the importance of a positive professional image in maintaining learner trust, something she identifies as essential to any educational process (D20; D21; D23). These cognitions may explain why Dalal avoids those tools that she is not totally familiar with (D25), and why she is deliberate in her approach to integration. This also explains why, to an external observer, she always comes across as confident technology user.

In terms of her perception of herself as a professional, Laila shares Dalal's conviction that maintaining a positive professional image is a significant aspect of being a teacher. This is especially the case when faced with the newly qualified teachers who already use digital media in their daily lives (L41), and her technologically-versed language learners (L38; L39), whom she identified as a "positive pressure" for learning and development (L37). In light of these perceptions, we also understand why, in relation to ICT integration, she sometimes refers to her learners as the "audience" or the "public", implying some kind of assessment of her performance. What's more, Laila's cognitions about maintaining a positive teacher image have a further dimension as she perceives Arab teachers to be representatives of their culture (L30). In classrooms where some learners may hold negative stereotypes about the language and its culture, effective integration of digital resources becomes essential as they convey a cultural message to these learners (L34). This understanding of her role as a teacher might also explain why her forays into ICT mostly take place outside language classrooms (L40). When comparing Laila to Dalal we may conclude that whereas Laila uses ICT to support her image, Dalal avoids it in order to protect hers. It should be noted, however, that Laila is against ostentatious use of ICT for the sole purpose of making an impression (L34; L35).

Like Dalal and Laila, Heba's cognitions about herself as a teacher also shape her practice. She perceives her role as key to the educational process, and has the tendency to cooperate with learners on technology-related matters. Through daily interaction she shares new 'discoveries' with them (H33), and does not mind informing them of certain limitations in her ICT competence or accepting their assistance in case of technical failures (H36). She identifies her students as a source of learning about technology (H34; H35), and in that sense, they may be considered 'partners' in her process of integration, rather than an 'audience' observing her performance. This particular understanding of the relationship between the teacher and her learners might also explain why the theme of teacher image did not appear in Heba's data.

8.4.3 Cognitions about TL and about PS Shape Reactions to Perceived Challenges

The three case studies demonstrate shared cognitions about the importance of ICT for language teaching and learning generally. For example, Dalal states that "all teaching nowadays is dependent upon technology" (D13), while Heba affirms that "there is no other way ahead for teaching the Arabic Language" (H5), and Laila confirms that "technology is the language of [our] time" (L32). The three participants also hold specific cognitions about the role of educational technologies in enhancing the quality of Arabic language teaching and learning. By way of illustration, Laila confirms that ICT has "added life to classrooms" (L12), while Dalal states that it has "enriched Arabic teaching immensely" (D8). Referring to listening and speaking in particular, Heba contends that "the field has seen a renaissance" (H7). Digital resources have brought the realities of Arabic closer to classrooms as instructors and students have access to volumes of authentic material, ancient and modern. In this sense, technology plays a principal role in conveying the richness of Arabic language and culture to its learners. The teachers maintain that digital tools are especially wellsuited to teaching a number of the particularities of the Arabic language, such as the derivational system, and that image, sound, and motion play a significant role in this respect.

However, in the three case profiles the integration of educational technologies is depicted as a challenging process. This is reflected in Laila's and Heba's main theme of *Determination*, and Dalal's reference to *An Uphill Struggle for Integration*, which both imply a degree of effort to achieve a desired goal.

In their process of ICT integration, the teachers experience a number of day-to-day challenges to their practice, the most direct of which are feelings of insecurity generated mainly by the technical failures they encounter. The teachers' reactions vary largely depending on their cognitions about teaching and learning, in addition to their cognitions about themselves as Arabic language professionals. Therefore, reactions to perceived challenges, and particularly feelings of insecurity, characterize individual ICT use.

With her growing dependence on ICT in teaching, Heba describes technical breakdowns as a major challenge and her main source of insecurity (H12; H13). However, she is constantly searching for ways to overcome perceived difficulties, and her resourcefulness is evident in her case report. She also reports that the physical symptoms she had been suffering, associated with times of immense stress, are no longer as intense (H15). It is, therefore, not surprising that Heba often interprets these failures as indicators of a need for more learning and development (H14), and that she describes her integration process as a path of no return (H6).

For Laila, the use of ICT is associated with "a feeling of constant insecurity" (L16), as "anxiety is always there" (L49). Repeated technical failures spoil her carefullyplanned class, and damage her image as an Arab teacher and a competent professional. These failures, therefore, cause her a great deal of distress and embarrassment, often reflected in the stress-related physical symptoms she experiences. It is not surprising that she defines a successful class as one that proceeds in accordance with her plans and without any technical disruptions. Nevertheless, like Heba, Laila has reported that breakdowns and perpetual feelings of insecurity do not deter her from using ICT. She endeavors to find ways to overcome these problems and achieve her pedagogical objectives. Resourcefulness is evident in her profile. For example, sometimes when failures occur, she finds alternative methods by employing other aspects of ICT and in this sense "technology is both the problem and the solution" (L18). In light of her efforts to deal with challenges to ICT use, and particularly her feelings of insecurity, Laila likens her journey of integration to clock hands that never move backwards (L6). She is determined to use ICT despite the difficulties. In that sense, "there is no reversion, but there is anxiety" (L50).

As for Dalal, frequent technical breakdowns disrupt her carefully-planned lessons, and waste class time. They affect her professional image, and although she may ask her learners to resolve technical problems on her behalf, she feels "very embarrassed" (D17). These factors decrease her confidence in technology and may cause her to "avoid it altogether" (D18; D25). Her cognitions about teaching and learning and about herself as a professional shape her reactions to perceived challenges. These cognitions may also explain why she prefers to use those instructional resources with which she is fully confident, and refrain from working

with others until she is fully acquainted with them. Dalal is aware that progressing in her use of ICT is imperative, and expresses her wish to do so. However, she feels blocked, and asks "when and how?"(D16).

With respect to the relationship between teacher cognition and technology practice, the case studies demonstrate three different but internally coherent belief systems. We notice that the cognitions about teaching and learning are related to the teachers' perceptions of themselves, and both of these factors mediate reactions to perceived challenges to integration.

8.5 Teacher Cognition, Practice, and Context

In each of the case studies, the influence of the work context on teacher cognition and ICT use is evident, as is its role in creating incongruence between these elements. On the other hand, the case studies also demonstrate that the weight assigned by practitioners to contextual factors is influenced by their individual belief systems.

The themes listed below arose in discussion of the relationship between teacher cognition, practice, and context. Despite being highly interrelated, they will be addressed independently to allow for a careful cross-examination of the teachers' cognitions in relation to each contextual factor.

<u>Dalal</u>		<u>Heba</u>		<u>Laila</u>	
•	Institutional	•	Institutional	•	Institutional
	Philosophy and		Philosophy and		Philosophy and
	Policy		Policy		Policy
•	Time	•	Time	•	Time
•	Teacher	•	Teacher	•	Teacher
	Collaboration		Collaboration		Collaboration
•	Learning	•	Technical Support	•	Learning
	Opportunities				Opportunities

Technical Support

8.5.1 Institutional Philosophy and Policy

The ALI can be considered a teaching environment of ubiquitous computing and networking. Within smart classrooms, language teachers have access to educational tools such as PCs, smart boards, document cameras, satellite TV, and digital audio and video. There is a computer station for every student, and teachers are each entitled to a laptop, in addition to their desktop computers. All classrooms are Wi-Fi supported, and the Institute has its own server. The ALI also hosts its own CALL Unit, which is responsible for providing training and support to the teachers. Such an environment provides opportunities for the three teachers to use technology in their lessons, and to develop computer-based material. Thus, generally speaking, they do not experience problems of availability of resources nor access, which are central factors for integration (Cox et al., 2003; Pelgrum, 2001).

Despite their role in facilitating teaching, availability of, and access to, resources per se are not sufficient conditions for adoption. The teachers believe that the general orientation in their workplace is in favor of ICT use, but in reality there is little evidence of careful planning or a "definite procedure" (D36) for ICT integration. Furthermore, although the program endorses the use of digital media for better learning, there seems to be very little change in areas like time-tabling or professional responsibilities to allow for effective adoption. This means that integration is possible but "with difficulty, with immense effort" (H42). Communication between the teachers, the CALL Unit, and the administration is another area which requires attention to ensure more useful employment of digital resources.

Although all three teachers have expressed the need for a more active institutional role, upon examining their case profiles, we notice differences in how each one perceives that role. For example, although Heba identifies a number of barriers to ICT use and voices a need for institutional support, she advocates a space for autonomous teacher effort. She is not in favor of top-down arrangements for teacher collaboration, and asserts that motivated teachers will seek to get together for their own ICT development when they themselves feel the need to do so (H24). Dalal, on the other hand, is of the opinion that institutions are responsible for establishing a

system to help their staff enhance their computer competence (D36). These institutions, therefore, bear the heavier burden, especially in light of obstructive contextual factors that may hinder teachers from taking the initiative (D39). Like Dalal, Laila supports institutional arrangements for facilitation of teacher collaboration around ICT-related matters (L45), but at the same time believes that teachers play a significant, active role in their own development. She wonders why some teachers still refrain from using any kind of technology, describing such an attitude as "strange and unjustifiable" (L36). The teachers' stated positions as to the role of their institution in their ICT development mirror their respective learning theories and illuminate aspects of their cognitions.

8.5.2 Time

An inseparable element of institutional culture, and one of the most frequently recurring themes in the three case profiles, is lack of time. Described as "the most obstructive" (H44), and "the most critical factor" (D41), it emerges as the main barrier to ICT adoption. The teachers wish (D41; H45; L46) they had time to work on what they believe is important for their professional development in ICT. For example, Heba states that she needs time to observe others within her context and beyond (H45), to experiment with the tools she is introduced to (H46), and to practice what she has learned (H47). Comparing this to her early experience as a learner (H1) and to her teacher training (H4) we understand that modeling, experimentation and practice have been her preferred methods of learning. Relating these to her cognitions about teaching and learning (discussed above), we notice that they are also her preferred methods of teaching.

Laila explains that she needs time for training (L45). She also needs time to go over what she has learned (L46), and to develop instructional material (L48). Again, this mirrors her cognitions about teaching and learning. We have seen how her students are presented with certain material, and are given ample opportunity to practice, before they reproduce what they have learned through functional language activities.

In her account, Dalal states that she needs time for learning, practice, design of activities (D42), experimentation, materials development (D43), and collaboration

with colleagues (D44). Broadly speaking, she needs time for ICT development and use.

One of the implications of lack of time is that teachers do not get the opportunity to experiment with technological tools. Hence, they are likely to experience failures in the process of adoption, which in turn, generate feelings of disappointment. When such feelings reoccur, they may lead to a build-up of negative attitudes toward technology (K. Al Ekhnawy, Head of the CALL Unit, Interview, 13.02.2008). Ertmer (2005) stipulates that because earlier beliefs tend to frame consecutive ones, teachers whose initial encounters with innovations are characterized by negative experiences, will tend to develop certain cognitions about technology use that are hard to change even in the presence of counter evidence. New understandings about ICT are then filtered though these negative cognitions leading to further avoidance.

8.5.3 Technical Support

In section 8.4.3, I addressed the role of teacher cognition in shaping reactions to perceived challenges in the integration process. The need for technical support is related to this theme, and is one of the areas where differences in teacher cognition are amplified. For example, unlike Laila and Heba, *Technical Support* does not appear as an independent concern in Dalal's profile, which might seem surprising in light of the presence of themes such as *An Uphill Struggle for Integration*, and *Perfectionism, Image, and Fear of Failure*. A closer examination of her pedagogical beliefs in relation to ICT use may provide an explanation. Her fear of failure and her concern about her professional image cause her to avoid using tools that she is not fully familiar with. Consequently, the likelihood that technical failures might occur is relatively minimal, and if they do, they will probably be within the bounds of her computer competence.

At variance with Dalal's report, technical support is a principal theme in Laila's profile. This is again related to her cognitions. Breakdowns disrupt her carefullyplanned lessons, tarnish her image, and cause her stress and embarrassment. However, she attempts to find ways around these difficulties and is determined to integrate ICT in her teaching. Technical support is, therefore, central to this process. The need for technical support also emerges as a salient theme in Heba's data. As she is increasingly dependent upon digital media, breakdowns create constant feelings of insecurity, which she tries to manage. However, her discussion of technical support is not confined to failure of application or equipment. Reflecting on her past experience in developing computer-based course material, Heba underscores the importance of technical assistance in this respect. As it is demanding to work on both the technical and the pedagogical aspects of educational production, she identifies a need for a qualified team to attend to the technical while she focuses on the pedagogical (H48).

We may, therefore, conclude that although the three teachers work within the same environment, and have access to the same digital resources, the weight that they assign to technical support is related to their individual cognitions and their ICT practice.

8.5.4 Learning Opportunities

Like *Technical Support, Learning Opportunities* does not feature as a central theme in all three case studies. Compared to Dalal and Laila's profiles, formal sources of learning are not given much attention in Heba's report. Possible explanations are her cognitions about teachers' responsibility for their own development, and her tendency to learn from her own experimentation, colleagues, and learners. Nevertheless, as mentioned earlier, she has expressed a need for opportunities to observe the ICT practice of others and to experiment with new digital tools.

Laila's account reveals an explicit need for formal training in ICT. In her opinion, for this learning to be effective it "should have a clear plan", and be "structured" and "clear" (L43). We notice that Laila's cognitions about the importance of structure and organization for effective language learning (manifested in her teaching) are emphasized here in relation to her own ICT learning.

Like Laila, Dalal expresses a need for "structured" training (D50) that follows certain "procedures" (D51). It is the responsibility of the institution to organize such sessions for its teachers and to require the teachers to attend (D51; D52). Besides being structured, computer-based training should be directly related to the teachers'

pedagogical needs (D56), and demonstrably make a difference to their teaching (D60). Dalal is not, therefore, in favor of general-purpose ICT training (D63). Her cognitions about effective technology learning are often reflected in her own classroom practice, as she teaches in "a systematic way" (D54), attends to her learners' immediate needs (D58; D59), and suggests alternative study strategies that can make a difference to their learning (D64). Dalal's emphasis on training teachers in technology might indicate an awareness of the crucial role this plays in raising competence, building confidence, and overcoming fears. The literature suggests a direct relationship between formal learning and teacher ICT confidence (Jones, 2004), and underscores the significance of context-embedded ICT training (Egbert, Paulus, & Nakamichi, 2002; Vrasidas & McIsaac, 2001).

8.5.5 Teacher Collaboration

Across the three case studies, colleagues are highlighted as a principal factor in shaping teacher cognition and facilitating adoption and development. The teachers have described collaboration as "very important" (D46), "an excellent thing" (H51), and "a major influence" (L53). Peer relationships are a source of psychological and pedagogical support, and seem to be the teachers' way around contextual barriers such as lack of time, training, or technical support. We understand that there are a handful of teachers who are technology competent in the ALI, who explore new avenues (H52), pass on novel ideas (H53), exchange educational material (D46), and share experiences of overcoming challenges (D46; D47; H50; L53). In this context, teacher collaboration is a prime source of motivation, confidence, learning and support. The impact of colleagues is particularly important in learning about technology, as evidenced in Dalal's affirmation "I always turn to them when I want to learn something" (D47), Laila's statement "I learn a lot" (L53), and Heba's comment "whoever learns something new, mentions it or shows it to the others" (H52). Informal training is seen to be more effective than the formal kind as it is immediate, context-based, relevant, and very much built on modeling experiences of technology use.

The three accounts reveal close communication between a small group of technology users, within which employment of digital media is not only shaped by the teachers' own cognitions but by that of their colleagues as well. Practitioners seem to be socialized by others within a particular ecology, invested with notions of learning and teaching with technology. A clear example is the remarkable influence Waheed had in shaping Heba's early cognitions about ICT use through involving her in computer-based projects (H49), and helping her overcome her fears (H50).

This study validates a growing body of literature that perceives teacher cognition as socio-cultural in nature (e.g., Johnson, 2006; Johnson, 2009; Windschitl & Sahl, 2002), and corroborates research that suggests that an individual's knowledge is constructed through that of the communities of practice in which he or she takes part (Johnson, 2006, 2009; Lave & Wenger, 1991). Findings in this study advance the argument that "teacher learning and instructional innovation thrive in environments where there are others who are experimenting with technology" (Windschitl & Sahl, 2002, p. 168).

Investigation of the relationship between teacher cognition, practice and context reveals a number of factors that mediate ICT adoption: institutional philosophy and policy, time, technical support, learning opportunities, and teacher collaboration. This study bears out the view that while it is important to identify the role of contextual factors in informing cognitions and practice, such factors should be analyzed within the particular 'ecologies' in which they interact (Zhao & Frank, 2003). Viewing the relationship between cognition, practice, and context through the ecological lens helps us understand individual ICT integration as an evolutionary process (Zhao, Pugh, Sheldon, & Byers, 2002).

We notice that although the three teachers work within the same environment and are subject to similar contextual factors, their interactions with these factors vary depending on the individual gravity they assign to them. This, in turn, is related to the teachers' cognitions about teaching and learning, and about themselves as Arabic language professionals. It is also related to their feelings of insecurity, and their cognitions about the integration process.

This study confirms the role of teacher cognition in determining the weight that teachers assign to the different contextual factors. In this respect, the research sheds light on early findings in the field. For example, Ertmer (1999) reports that despite

the prediction that teachers of higher digital competence might encounter fewer challenges than their peers, a more concrete difference between the teachers lies in the relative significance they give to first-order barriers. For example, teachers might perceive the same first-order barrier (e.g. lack of technical support) as annoying, problematic, or blocking. Ertmer concludes that this might explain why practitioners teaching within the same educational context under similar circumstances might be at different levels of technology adoption.

8.6 Summary of Key Findings

The following outlines the key findings that have arisen from the cross-case analysis.

- In all three accounts there is evidence that the teachers' cognitions were shaped by early schooling experiences, and influenced by interactions with parents and social networks. Despite the absence of elements of technology, conceptions of teaching and learning formed during schooling are manifested in the approaches they take to ICT implementation.
- The teachers share the experience of joining the TAFL program in the ALI. Although their accounts range from minimal to no use of digital media in practicum, these years provided them with new pedagogical understandings that were later reflected in their use of technology.
- The case studies point to a close relationship between the three teachers' cognitions about ICT and their classroom practice, as we notice the remarkable influence which beliefs about teaching and learning, and beliefs about the self have in shaping their use of digital media. These cognitions also mediate reactions to perceived challenges in the process of ICT integration, and may explain individual differences between the three participants in terms of technology use.
- The cross-case analysis contains extended accounts of the role of context in shaping the teachers' cognitions and technology practice. It is also notable that although the three participants work within the same environment, their pedagogical beliefs account for differences in the weight they each assign to contextual factors for adoption.

CHAPTER 9: CONCLUSIONS AND CONTRIBUTIONS

9.1 Conclusions

The aim of this research was to investigate the relationship between teacher cognition and individual technology practice within a TASOL context. Drawing on the theoretical framework and the research questions that have guided the inquiry, this relationship was explored in light of the teachers' early experiences as learners, teacher education, classroom practice, and work context. The following presents the main conclusions to be drawn from this investigation, and thus, the answers to the research questions.

9.1.1 Teacher Cognition and Early Experiences as Learners

Teacher cognition is shaped by early schooling experiences, and mediated by interactions with parents and social networks. Apprenticeship of observation represented by the thousands of hours that pupils spend in classrooms, provide mental images of teaching and learning, and informs teacher practice afterwards. Of course, practitioners with many years of professional experience will not have met elements of technology as we know it today during their own years of schooling. Nevertheless, experiences of positive and negative learning do impact the way they use technology. For example, admiration of a school teacher's active 'learning by doing' style can be seen in activities designed to engage learners through Windows Movie Maker projects. Similarly, distaste for rigid methods of teaching grammar inspires the creation of animated PowerPoint presentations for this purpose.

9.1.2 Teacher Cognition and Teacher Education

Teacher education programs can play a key role in transforming preconceptions about teaching and learning shaped during apprenticeship of observation. Although these programs may not introduce candidates to educational technologies, the theoretical and practical understandings developed during practicum impact classroom practice, and act as filters for potential use of ICT. For example, images of transmissionist teachers and passive learners accepted and reinforced during schooling years, may change through teacher education experiences to an approach that encourages students to take responsibility for their own learning and motivates them to become producers of digital media rather than mere consumers of it.

9.1.3 Teacher Cognition and Classroom Practice

Teachers' pedagogical beliefs about themselves and about teaching and learning mediate practice, and may account for variation among teachers in this respect. For example, cognitions about the value of learner autonomy, the importance of a teacher's professional image, or the role of structure and organization in language teaching, are translated into different types of technology implementation within the same professional environment.

Furthermore, teachers may hold shared beliefs about the remarkable value of ICT to Arabic language instruction. However, their cognitions about themselves and about teaching and learning may shape their reactions to perceived challenges in the integration process. For example, while some teachers may recognize feelings of insecurity, withstand the pressure, and carry on, others may experience the same emotions but feel helpless when confronted with these barriers, and become blocked. This may explain variations among teachers in their level of ICT integration.

9.1.4 Teacher Cognition, Practice, and Context

Contextual factors not only play a pivotal role in supporting teacher cognition and ICT use, but also in creating dissonance between them. For example, teachers might have the motivation to develop their ICT skills but are unable to do so due to lack of time. Other central contextual factors emerging in this study include institutional philosophy and policy, teacher collaboration, learning opportunities, and technical support. While lack of time is identified as the most significant barrier to adoption, peer collaboration is recognized as the most effective enabler for ICT integration. Findings suggest that teachers' ICT use is not only mediated by their own pedagogical beliefs, but by those of their colleagues as well.

Teacher cognition also determines the weight that practitioners assign to different contextual factors. For example, some may recognize the role of their institution in their ICT development, but at the same time prefer to be given space to make their own decisions about innovation. Others may be of the opinion that the institution they work for carries the majority of the burden of responsibility for teacher development in ICT, especially when their numerous professional responsibilities and the obstructive impact of other factors for adoption are brought into consideration. This may also explain why teachers working under the same conditions may exhibit different technology practices.

9.2 Contributions

This section discusses the main contributions of this research; conceptual, methodological, and professional. It further identifies new research potential and addresses some reflective thoughts.

9.2.1 Conceptual Contributions

In this study, Figure 2.1 *Elements and processes in language teacher cognition* (Borg, 2006, p. 283) was chosen as a starting point from which to explore the relationship between teacher cognition and individual ICT use. Due to the emergent nature of qualitative inquiry, as the study progressed, I began to have gradual realizations of where technology is to be situated within the teacher cognition picture. I also developed a sharper view of the relationship between the different elements, and the terms to be used to refer to them. Figure 9.1 encapsulates these realizations and views, and presents a framework that can be used by future researchers who may consider travelling down the same path.



Figure 9.1 Elements and processes in language teacher cognition (Borg, 2006, p. 283) - Refined

This diagram refines the original (Figure 2.1) in four specific ways:

- It considers ICT as an overarching issue for investigation alongside all the others (e.g., teacher, learner, material) as underlying and interwoven elements.
- It changes the title of the 'schooling' box to 'early experiences as a learner', to offer a more accurate representation of the wider impact of parents and early social networks on shaping teacher cognition, and replaces the term 'professional coursework' with 'teacher education' for a more precise description of this element within the context of this study.
- It connects 'early experiences as a learner' with 'teacher education' *through* the 'language teacher cognition' box rather than *around* it, to provide a clearer reflection of the relationship between early cognitions and teacher education.
- It positions 'contextual factors' around *both* 'language teacher cognition' and 'practice' rather than just 'practice'. As cognitions are investigated in context, they are represented *within* rather than *outside* the box of 'contextual factors'.

A theoretical implication of this work which offers scope for continuing research is the understanding of teachers' pedagogical beliefs as internally coherent systems. Although it is beyond the specific scope of this research, findings suggest that cognitions exist in constellations in which they explain, and are explained by, one another. For example, in this study we notice a close relationship between cognitions about teacher responsibility for their own ICT development, perceptions of oneself as a 'learning teacher', and beliefs concerning the important but limited role of the institution. Similarly, cognitions about the significance of professional image are related to beliefs in favor of minimal in-class experimentation, and beliefs about the role of formal learning in ICT. Additional research is necessary to delve into these individual cognitive systems to gain a deeper understanding of the relationships, processes, and interactions therein. As educational technologies are constantly changing, such understanding may help predict teachers' future innovation decisions. This study examined the relationship between teacher cognition and individual technology practice within the context of TASOL. Interactions between beliefs and other factors such as fear, time, technical support, and teacher collaboration were examined in light of the specific purpose of this study. As the integration of ICT into TASOL contexts is relatively under-researched, additional studies are needed to elucidate factors for adoption of technology within these emerging 'ecologies'.

9.2.2 Methodological Contributions

This research places special emphasis on the role of affect in fieldwork methodology in the specific case of researchers examining their own workplace. In this study, the importance of relationships may be explained in light of the following interrelated elements of my fieldwork:



Figure 9.2 The role of relationships in fieldwork methodology

A detailed description of the matrix unfolds as follows:

Unlike outsider researchers who gain participant trust over the course of their fieldwork, for insiders, established trust is the foundation upon which they build their entire project. When trust is reinforced it is likely to result in an atmosphere of collaboration especially if the informants feel that their participation in the research will make a difference to their current situation. This collaboration between the inquirer and the informants is a pathway to generating candid accounts (Creswell &

Miller, 2000). Understanding the nature of the project, the participants may also provide additional sources of information that will help the researcher triangulate data types and produce rich descriptions corroborated by the informants themselves. Trust, collaboration, and corroboration are then likely to result in the production of rigorous academic accounts. The final report will have a bearing on the level of trust maintained when the researcher returns to his/ her work site. More importantly, inquirers must be careful not to contaminate the field for potential insider researchers who may, sooner or later, wish to undertake similar studies within the same environment, and who will inevitably need a basis of trust on which to construct their research.

As this study was conducted in the Arab world, issues arose in relation to the suitability of measures of ethical codes, set mainly in Europe and North America, to studies undertaken in other cultural contexts. Such codes may not always be appropriate to research communities where relationships are grounded in a particular social ethos. The question of "cultural locatedness of contemporary ethical codes" (Bridges, 2009, p. 5) is an important one to address, especially given the rising number of international researchers studying for their degrees in western countries, while undertaking fieldwork in their local communities, and the exponential potential of cyberspace which allows more learners to connect to institutions of higher education worldwide, from their home countries.

A key methodological implication in this work concerns its bilingual nature. This language element provided a wide range of opportunities such as drawing on literature in both English and Arabic. However, it also had its challenges such as handling the subtleties of translation, or being confined to certain qualitative analysis software. Furthermore, detailed methodological decisions such as whether to code and then translate or translate and then code are typical in this kind of research, but scarcely explored. The affordances and complexities of conducting research bilingually is, therefore, an area that merits further attention. Again, such investigation is of major significance considering the growing numbers of international researchers carrying out research in universities worldwide.

9.2.3 Professional Contributions

A number of professional contributions emanate from this study. These are mainly related to institutional initiatives for technology integration, in-service professional development, and pre-service teacher education.

9.2.3.1 Institutional Initiatives for Technology Integration

Institutions embarking on installation of educational technologies need to recognize the crucial role the human element plays in the success of the integration process. Teachers' hold established beliefs about teaching and learning, and about themselves, which act as filters through which their innovation decisions are made, and inform their subsequent ICT use. This may explain why even in teaching environments of ubiquitous computing, many teachers may still choose not to use digital resources in their teaching. The discourse within institutions, which is often top-down, has to take account of differences between teachers' pedagogical orientations, and their implications for adoption. Furthermore, variation in ICT use has to be taken into account as institutions draw up plans and implement policies for integration. This includes standardized whole-scale ICT training, for example, which often overlooks the uniqueness of the teachers' cognitions through which their training experiences are internalized.

Understanding the human element which underpins technology adoption also implies a recognition of the social dimension. As teacher cognition about ICT use is sociocultural in nature (e.g., Johnson, 2006, 2009; Windschitl & Sahl, 2002), as well as socially distributed among members within certain contexts (Putnam & Borko, 2000), it is essential to recognize and understand the influential role of teachers' pedagogical beliefs in informing their own use of technology, and that of their colleagues. Attention should, therefore, be given to existing and emerging communities of practice for ICT use in language programs.

9.2.3.2 In-service Professional Development

This study underlines the importance of reflective practice for continued teacher development in ICT, or "the critical exploration of 'what is' in order to reflect on 'what might be'" (Burns, 1992, p. 64). By examining their thought processes and focusing on their own professional experiences, teachers gain deeper insights into their practice, and are better able to identify areas for improvement rather than having them imposed on them (Clark & Lampert, 1986; Meijer, Verloop, & Beijaard, 1999). Notions of 'best practice', therefore, need to be replaced with an understanding of effective teaching as the "individually determined best-next-step for each teacher" (Edge & Richards, 1998, p. 571). Consequently, the most suitable type of ICT integration is that which results from an individual teacher's constant examination of their own practice within their specific context; hence, "appropriate methodology is always in a state of becoming", that is to say, "emergent methodology" (Edge, 1996, p. 19). This acknowledges the significance of daily classroom teaching, supports teacher agency, and encourages practitioners to take responsibility for their own professional growth.

Such implications are of particular relevance to teaching contexts in which technology integration remains a personal endeavour. Participants in this study reported that taking part added value to their daily classroom practice, enabled them to investigate their cognitions, and helped them reflect upon their ICT use. This process of critical examination invited them to notice the unusual hidden within the usual, brought them into closer contact with their professional selves, and motivated them to identify their own developmental needs. Here, one of the participants traces this process of self-exploration in her own words.

The study gave me a better feel of the value of what I do [...]. The stimulated recalls made me think more. Well, I teach as I have always done, one class after the other, one month after the other, one semester after the other. Sometimes I stop to reflect, sometimes I don't. The recalls made me take a good look at myself and see exactly what I was doing... In other words, they placed me in front of a mirror... They made me connect to [my practice], and think about it. This, in turn, helps in reinforcing positive aspects of teaching and eliminating negatives. As I said, it's a mirror (Laila - Interview, 01.07.2008).

This process of 'unpacking' cognitions and examining one's teaching then resulted in identifying new directions for professional development.

One of the positive aspects of this study is that I felt the need to develop, to learn more about technology... It gave me a positive push forward (Laila - Interview, 01.07.2008).

Another teacher noted that articulating pedagogical beliefs was especially significant in raising her awareness of the relationship between her stated beliefs and actual classroom practice.

This study has affected me positively, for every time I tell you something, I check with myself to see if I actually do it, or just say it to you. I try to be more honest with myself (Dalal - Interview, 24.06.2008).

Paying consistent and careful attention to her use of digital media then led her to identify potential areas for professional change.

The most significant consequence of this study is that I realized that I need to increase my knowledge of technology, or rather my use of ICT. I need to do something about it (Dalal - Interview, 24.06.2008).

The three pedagogical orientations presented in this research have helped the participants place more value upon their own everyday classroom teaching, connect with themselves as teachers, and identify areas for improvement. In relation to the role of teacher cognition research in fostering in-service teacher professional development, we may, therefore, conclude that:

Ultimately, the practical aim of research on teacher beliefs and classroom practice must be to empower teachers themselves. This comes about by enabling teachers to become more aware of who they are as teachers, what they do and why, thereby allowing them to establish their own professional development agenda. (Garton, 2008, p. 85)

Teachers should be supported in finding ways to investigate their practice and improve it. For example, Huberman (1992, p. 131) argues that introducing small changes to one's practice or "tinkering" with various aspects of one's teaching is necessary for long-term professional satisfaction. Similarly, learning through personal experience has been identified as essential to ICT integration (Mueller, et

al., 2008), and described as "the most powerful strategy" in raising teacher confidence in technology (Mueller, et al., 2008, p. 261).

In this study, the three participants have each taken small experimental steps in using digital resources in Arabic language teaching, and invited the camcorder into their classrooms to record these new experiences. Building on these initial attempts, practitioners can then conduct larger-scale and more systematic investigation of their own classroom practice (Garton, 2008), such as action research (Burns, 2005, 2009; Edge, 2001). We may, therefore, identify a close connection between teacher cognition research and practitioner research.

Another association to be emphasized is that between teacher cognition research, practitioner research, and in-service teacher education. According to Johnson (2006), "located L2 teacher education begins by recognizing why L2 teachers do what they do within the social, historical, and cultural contexts within which they work" (p. 246). The role of teacher education is, therefore, to assist teachers in articulating their pedagogical beliefs and give meaning to their classroom practice (Burns, 1992; Garton, 2009). At the same time, "practitioner knowledge can enrich the knowledge base of L2 teacher education precisely because it is generated in and emerges out of teachers' lived experiences", it illuminates relationships between cognition and practice, and it addresses context-embedded issues encountered in day-to-day practice (Johnson, 2009, p. 23).

In light of this interconnectedness between teacher cognition, practitioner knowledge, and teacher education, we conclude that:

We do not look to research on teacher thinking for prescriptions of how teachers ought to think or how novices ought to be trained. Rather, the knowledge from research on teacher thinking that we believe holds the most potential worth for teacher educators and teachers is knowledge about the mental lives of teachers directly derivable from descriptions of the way teaching is. (Clark & Lampert, 1986, p. 30)

This study does not intend to provide a fixed formula for technology integration, nor present standardized methods for teacher education in ICT. Rather, it aims to

recognize the significance of individual articulation of cognitions and careful examination of technology use in helping practitioners understand their practice and improve it. The research supports ICT use, teacher education, and classroom research which are derived from practitioners' own lived experiences, and which help them enrich these experiences. The objective of this study is, therefore, the empowerment of the language teacher.

9.2.3.3 Pre-service Teacher Education

This research has further implications for TASOL pre-service teacher education programs.

First, as pedagogical beliefs constitute a filter through which learners internalize practicum experiences, teacher educators need to realize that the former do not embark on their studies as blank slates, but rather carry with them deep-rooted preconceptions of learning and teaching that have been furnished with over many years of schooling. Prospective teachers need to be encouraged to 'unpack' these experiences, and become more conscious of their individual belief systems. Furthermore, given the present state of digital technologies in pre-university education within a large Arab state such as Egypt where "most teachers lack the basic computer skills necessary for applying new pedagogical strategies" (Arab Republic of Egypt Ministry of Education, National strategic plan for pre-university education reform, 2007/2008 - 2011/2012, p. 186), we may conclude that the majority of student-teachers have not experienced learning with ICT during apprenticeship of observation, and as a consequence, do not come to teacher education programs with pedagogical beliefs in which educational technology is incorporated.

Second, the status of technology within the TASOL teacher education program referred to in this research, echoes that of many teacher education contexts throughout the world in which technology is either absent or merely offered as a stand-alone course (Belland, 2009). Consequently, it does not become integrated in the learners' overall educational experience. If we wish to train pre-service teachers so that they might implement technology in their teaching naturally, we need to give them the opportunity to use it naturally in their learning.

Third, since learners may be apprenticed to in-service teachers who might not use any technology in teaching, the former are less likely to observe ICT integration in authentic Arabic language teaching settings. Further, in-service teachers' individual perceptions of what constitutes good practice are likely to be passed on to their apprentices, which may have the effect of slowing down adoption processes within particular teacher education programs. Computer-based facilities such as DVDs, the Internet, and videoconferencing can be employed in teacher education classrooms to suggest potential uses of ICT.

Fourth, Arabic language teacher educators face the challenge of preparing studentteachers for digital environments without having experienced such settings themselves. Research is, therefore, needed to explicate a) means of preparing educators for such critical roles, and b) the relationship between educators' cognitions, student-teachers' cognitions, and ICT integration in Arabic language teaching.

9.3 Potential for Further Research

The following defines the limits of this study and suggests new areas for research.

- In accordance with the case study approach adopted in this research, the number of participants was limited to three. This was to allow for the indepth investigation required to yield rich descriptions of the teachers' cognitive processes. There is clearly scope for continuing research in this area in order to reveal a wider variation of teacher pedagogical beliefs around technology use.
- Given the specific purpose of this study, the design chosen for it, and the sampling process, it was not possible to explore the likely role played by factors such as age, gender, teaching experience, and ICT competence on the data elicited from the teachers. Through the use of a mixed methods approach, such correlations can be explored in future studies on teacher cognition and technology use. Also, in line with some of the research that was conducted on the relationship between teacher cognition and ICT use (e.g., Hennessy, et al., 2005), it would be interesting to undertake interdisciplinary
research between teachers of TASOL and TESOL for example, to examine the extent to which the subject matter accounts for differences in language teachers' cognitions about the use of digital media.

- Context plays a prime role in research on teacher cognition. This study was conducted within a specific work environment in which a number of factors interacted. Replicating the study within other professional TASOL settings will offer broader insights into the issue in question.
- A research area which deserves further attention is the role of longitudinal studies in examining teacher cognition in relation to ICT practice. Considering the practicalities of managing this kind of project and making sense of the data that emerged, the time available for fieldwork was limited to nine months. Studies of a longer range will allow for a deeper examination of the evolving relationship between cognition and practice, and more likely yield deeper understandings of the cognitive transformations that occur as a result of certain technology use, in addition to changes in ICT implementation influenced by particular beliefs.
- Since the purpose of this study was the examination of teacher cognition in relation to individual technology practice, the focus was primarily on practitioners. Additional research is needed to elucidate the relationship between different beliefs about ICT and learning outcomes, especially as the relationship between teacher cognition and student learning still receives scant attention (Borg, 2006).
- An issue that merits further research is the relationship between teacher cognition and emotions. Although Chapter 4 focused on this area in terms of the impact of field relations on the research process, and despite the emphasis on the affective in the context of technology implementation (particularly feelings of fear, embarrassment, insecurity, enjoyment, achievement), the relationship between teacher cognition and emotions remains under-explored (Borg, 2006; Zembylas, 2005). This is also true in relation to ICT integration.

Additional research is also needed to elucidate shared cognitions among teachers working within the same environment (Borg, 2006). Although the scope of this research has been individual teachers' cognitions about ICT, shared cognitions have been referred to, for example in the context of pedagogical beliefs about the relationship between technology and the Arabic language. However, exploring shared cognitions among a larger number of technology-using teachers within a specific TASOL ecology will definitely add new dimensions to the role of context in framing teacher cognition and practice, and also enrich our understanding of this complex area of investigation.

9.4 Final Reflections

These final lines shall be dedicated to sharing a few reflections on the impact carrying out this research has had on me as a teacher and researcher.

First, according to Borg (2001), "teachers who read accounts of other professional lives may benefit from added understandings of their own work which reading about someone else's can bring" (p. 157). Indeed, conducting this research has contributed to raising my awareness of my own cognitions as a teacher. Throughout the process, as I was learning about the participants' pedagogical theories and ICT practice, I became more aware of my own cognitions and approaches to technology. Questions directed to the teachers evoked memories of teaching situations, and observation of technology implementation generated thoughts about my own classroom activities. In the end, as I was drafting the three case profiles, I almost added a fourth, my own.

Second, conducting this research has been a valuable learning experience, and a gradual process of growth in the field of teacher cognition and ICT. A number of parallels may be drawn between the evolution of my researcher development and this true story by Holliday (2002):

A young Egyptian woman was living in the capital for the first time. She had never been to a restaurant before. In order to work out how to do this she first watched customers coming and going from across the street. As she gained confidence she went and stood just inside the door of the restaurant, which was sufficiently large and crowded for her not to be noticed. Here she watched and listened to how customers sat down and ordered. Eventually, she learned enough to sit down and order herself - to try out the hypotheses she had formulated as a result of her observations. (p. 11)

Finally, this study has emphasized how important it is to maintain close relationships with one's participants in order to develop rigorous accounts. However, relationshipbased research is not only about the close ties we have within our communities and the way they inform our fieldwork, but it is also about the relationship we have with ourselves. Establishing an inner voice and engaging in a dialogue with the self is a source of personal enrichment and professional growth. It gives the researcher the reflective space needed throughout the research journey. Adding this introspective hyphen to one's lived experiences is essential for collecting ideas, sorting emotions, evaluating situations, gauging relationships, revising objectives, and planning ahead. Research that is suitably 'hyphenated' in this way will be better understood and learned from.

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APPENDICES

	Dalal	Heba	Laila
Baseline Questionnaire	1	1	1
Interviews			
Backgrounds interviews	48.8 min	67.5 min	92 min
Non-ICT beliefs interview	125.1 min (= 2 hours)	132.9 min (=2.2 hours	206 min (= 3.4 hours)
Mini and follow-up interviews	53.7 min	123.3 min (2 hours)	220 min (= 3.6 hours)
Materials development interview	45.8 min	51 min	85 min (= 1.4 hours)
Member checking accounts/ interviews	36 min	41.2 min	43.2 min
Total	309.4 min (= 5.1 hours)	415.9 min (= 6.9 hours)	646.2 min (= 10.7 hours)
Stimulated Recall	(3 sessions) 128.3 min (= 2.1 hours)	(3 sessions) 141.3 min (= 2.3 hours)	(3 sessions) 329.2 min (= 2.7 hours)
Classroom Observation			
Sessions recorded as field notes	(20 sessions) 24 hours	(20 sessions) 24.8 hours	(19 sessions) 27 hours
Video recorded sessions	510.9 min (=8.5 hours)	535 min (= 8.9 hours)	329.2 min (= 5.4 hours)
Total	32.5 hours	33.7 hours	32.4 hours
Technological Reflections	1 audio recorded (129.4 min = 2.1 hours) + notebook	1 audio recorded (41.9 min)	1 electronic form

Appendix 1: Overview of Data Collected

ALI Language Teaching And Technology Questionnaire

Dear Colleagues,

Thank you very much for taking the time to complete this questionnaire. Its aim is twofold:

First, I hope that it will stimulate your reflection on ICT as a tool for teaching in the ALI. Your responses will provide us with some information about our ICT experience. Establishing a realistic baseline to start from and understanding the ICT context we work in are essential for a successful training. The ultimate purpose is not to make all teachers use ICT but to provide you with some ideas and skills that will later enable you to make your own intelligent decisions about when to use and when not to use ICT.

Second, it is hoped that through this questionnaire a general picture of the current state of ICT use in the ALI will emerge, which might later serve as a foundation for further research in the department. The questionnaire is designed so that it can be used again in the near future for comparative purposes. Therefore, please make sure to answer all the questions and to add any comments if necessary.

Your responses will be held strictly confidential and will not be released to any one without your prior consent. Neither will they be used for any assessment purposes whether inside or outside the ALI. Of course, the overall results will be available in the ALI, but your individual responses will not. The two main reasons for asking for your names are: First, to enable me to contact you if I need further information, especially since I plan to situate the practical part of my research in the ALI. Second, if you wish to take the questionnaire again after a year or so, we can easily retrieve your former answers and note any interesting changes. However, if you prefer to remain unidentified, please feel free to be so.

Once you have finished answering your questions, they will be collated in the multi-media unit. The overall results will be sent to Diane and myself and the hard copies will be kept with me for research considerations.

Thank you again.

Mariam Attia

ALI Language Teaching And Technology Questionnaire

Name (for possible future contact):			
Years of experience in teaching Arabic:			
I usually teach the following courses:			
I usually teach the following levels:			
Please select:	Full-time	Part-time	TAFL Fellow

ICT for Personal Use

1) Please circle the most appropriate answer:

1 – Strongly Agree 2– Agree 3 – Neutral 4 – Disagree 5 – Strongly disagree

Technology plays an important role in my personal life (outside work) , e.g. shopping online, digital cameras or diaries, 'Skype' to communicate with friends	1	2	3	4	5
I am familiar with computer security and copyright issues	1	2	ო	4	5
I am familiar with Health and Safety issues relating to the computing environment	1	2	3	4	5
I am satisfied with my general skills as a computer user	1	2	3	4	5

ICT Access

2) Please mark (\checkmark) next to the most appropriate answer:

	yes	no
I have a computer at home		
I have access to the Internet at home		
I have a computer at work		
I have access to the Internet at work		

I have access to technical support at work	
I have my own WebCT course(s)	

General ICT Use

3) Please consider each of the following applications/equipments and mark (\checkmark) next to the most appropriate answer:

	I am not aware of this applicatio n/ equipment	I am aware of it but have no experienc e in using it	I use it but still need more practice/ training	I am confident using it
Word processor				
PowerPoint				
Excel				
Arabic Software (e.g. ready-made educational material on CD Rom)				

WWW resources (e.g		
www.aljazeera.net)		
Email		
Synchronous communication ie		
'real-time communication' such as		
Chat or Skype		
BLOGS		
Collaborative online writing		
environments such as 'Wikis'		
Shared online spaces (e.g.		
MySpace, Flickr, YouTube)		
WebCT		
Discussion forums (e.g the		
discussion board within WebCT)		

Tape recorder (the portable ones		
in the ALI office)		
Tape recorder (the ones installed		
in the smart classrooms)		
Video (VHS)		
Video (DVD)		
Satellite facilities (in the smart		
classrooms)		
Document camera		

Smart board		
Video conferencing		

Digital camera		
Digital video camera		
Digital voice recorder/ MP3		
Other ()		

ICT & Taught Subjects (Part I)

4) Please consider the following taught subjects and only circle the ones that you normally teach:

I teach:	The	Vocabulary	Grommon	Deedine	\4/siting
	Alphabet	building	Grammar	Redding	writing

Now, consider the following list of applications/equipments. Please mark (\checkmark) when using these applications/equipments in your teaching:

	The Alphabet	Vocabulary building	Grammar	Reading	Writing
Word processor					
PowerPoint					
Excel					
Arabic Software (e.g. ready- made educational material on CD Rom)					

The WWW resources		
Email		
Synchronous communication ie		
'real-time communication' such		
as Chat or Skype		
BLOGS		
Collaborative online writing		
environments such as 'Wikis'		
Shared online spaces (e.g.		
MySpace, Flickr, YouTube)		
WebCT		
Discussion forums (e.g the		
discussion board within		
WebCT)		

Tape recorder (the portable			
ones in the ALI office)			
Tape recorder (the ones			
installed in the smart			
classrooms)			

Video (VHS)			
Video (DVD)			
Satellite facilities (in the smart classrooms)			
Document camera			
Smart board			
Video conferencing			

Digital camera			
Digital video camera			
Digital voice recorder/ MP3			
Other ()			

ICT & Taught Subjects (Part II)

5) Please consider the following taught subjects and only circle the ones that you normally teach:

I teach:	Listening	Speaking	Madia	Translation	Colloquial
	(Fusha)	(Fusha)	Media	Translation	conoquiai

Now, consider the following list of applications/equipments. Please mark (\checkmark) when using these applications/equipments in your teaching:

	Listening (Fusha)	Speaking (Fusha)	Media	Translation	Colloquial
Word processor					
PowerPoint					
Excel					
Arabic Software (e.g. ready- made educational material on CD Rom)					

The WWW resources			
Email			
Synchronous communication			
ie 'real-time communication'			
such as Chat or Skype			
BLOGS			
Collaborative online writing			
environments such as 'Wikis'			
Shared online spaces (e.g.			
MySpace, Flickr, YouTube)			
WebCT			
Discussion forums (e.g the			
discussion board within			
WebCT)			

Tape recorder (the portable			
ones in the ALI office)			
Tape recorder (the ones			
installed in the smart			
classrooms)			
Video (VHS)			
Video (DVD)			
Satellite facilities (in the			
smart classrooms)			
Document camera			
Smart board			
Video conferencing			

Digital camera			
Digital video camera			
Digital voice recorder/ MP3			
Other ()			

ICT & Language Levels

6) Please consider the following language levels and only circle the ones that you normally teach:

I teach:	Elementary	High	Intermediate	High	Advanced/
		Elementary		Intermediate	CASA

Now, consider the following list of applications/equipments. Please mark (\checkmark) when using these applications/equipments in your teaching:

	Elementary	High Elementary	Intermediate	High Intermediate	Advanced/ CASA
Word processor		•			
PowerPoint					
Excel					
Arabic Software (e.g. ready-made educational material on CD Rom)					

The WWW resources			
(e.g www.aljazeera.net)			
Email			
Synchronous communication ie 'real- time communication' such			
as Chat or Skype			
BLOGS			
Collaborative online			
writing environments			
such as 'Wikis'			
Shared online spaces			

(e.g. MySpace, Flickr, YouTube)			
WebCT			
Discussion forums (e.g the discussion board within WebCT)			
Tape recorder (the			

Tape recorder (the			
portable ones in the ALI			
office)			
Tape recorder (the ones			
installed in the smart			
classrooms)			
Video (VHS)			
Video (DVD)			
Satellite facilities (in			
the smart classrooms)			
Document camera			
Smart board			
Video conferencing			
Digital camera			
Digital video camera			
Digital voice recorder/			
MP3			
Other (
)			

The Smart Classroom

7) Please circle the most appropriate answer:

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

I am confident using the teacher's console (with the buttons on the	1	2	2	4	5
teacher's desk) in our smart classrooms	•	1	5	-)
I am confident using the data projector (fixed in the ceiling)	1	2	3	4	5
It is very important to me to teach in a smart classroom	1	2	3	4	5
In general, I find the equipments in the smart classrooms user-friendly	1	2	3	4	5
In general, I make sure to book computer-based equipment when I	1	0	υ	>	Б
teach in a traditional classroom	T	2	3	Ŧ	5
In general, I like the physical layout of our smart classrooms	1	2	3	4	5

8) Please mark yes or no:

	yes	no
I know how to monitor my students' computers through my screen		
I know how to display my screen on the students' computers		
I know how to design tasks around the students' computers in the		
classroom		

I know how to design tasks that involve student collaboration around	
computers	

ICT Training

9) Please mark yes or no:

	yes	no
I taught myself to use ICT		
I learned about using ICT from friends and colleagues		
I learned about using ICT through formal training		
I learned about using ICT in teaching Arabic in the TAFL MA program		
I have attended the ICT sessions offered by ACS		
I have attended the ICT sessions offered by CLT		
I have taken ICT training outside the university		

10) Please circle the most appropriate answer:

1 – Strongly Agree 2– Agree 3 – Neutral 4 – Disagree 5 – Strongly disagree

I am motivated to take ICT training	1	2	3	4	5
I have time for ICT training during the semester	1	2	3	4	5
The training I had was directly related to Arabic (e.g. used examples from the language)	1	2	3	4	5
The department provides incentives for ICT training	1	2	3	4	5
I have future plans for ICT professional development	1	2	3	4	5
In general, I am satisfied with the level of ICT training I have received so far	1	2	3	4	5

ICT for Professional Use

11) Please mark (\checkmark) next to the most appropriate answer:

	Always	Frequently	Sometimes	Rarely	Never
I prepare the worksheets for my					
classes on the computer myself					
I ask another person (e.g. the secretary) to type them for me					
I develop my own computer-based material					
I give my students computer-based					

homework			
I use the ICT material available in			
the ALI (e.g. in the multi-media unit)			
I need advice on using ICT in my			
classes			
I need technical support in using ICT			
I make use of the multi-media unit in			
the ALI			
I look for Arabic ICT material			
available in the market			

12) Please mark yes or no:

	yes	no
I have ideas about how I can use ICT with my classes		
I am a member of an online electronic list (e.g. Arabic-L)		
I have given a presentation, locally or internationally, on the use of ICT in		
Arabic language teaching		

13) Please circle the most appropriate answer:

1 – Strongly Agree 2 – Agree 3 – Neutral 4 – Disagree 5 – Strongly disagree

I can see the relevance of ICT in teaching Arabic as a language	1	2	3	4	5
I think the language itself constitutes a barrier to ICT integration	1	2	3	4	5
I can see the relevance of ICT in teaching elements of the Arabic culture	1	2	3	4	5
I think ICT provides the teacher with a diversity of Arabic material	1	2	3	4	5
I think ICT provides the teacher with access to Arabic authentic material	1	2	3	4	5
I think ICT helps the teacher extend activities beyond the classroom	1	2	3	4	5
I think ICT motivates students to learn Arabic	1	2	3	4	5
I think ICT encourages Arabic learners to become more independent	1	2	3	4	5
I think ICT reduces eye contact and personal communication	1	2	3	4	5

ICT & the Arabic Language Teacher

14) Please circle the most appropriate answer:

1 – Strongly Agree 2– Agree 3 – Neutral 4 – Disagree 5 – Strongly disagree

I don't feel the need to integrate ICT in my teaching	1	2	3	4	5
Professionally speaking, I have more important things to think about than ICT integration	1	2	3	4	5
I feel confident using ICT in my teaching	1	2	3	4	5
I am aware of when to use ICT and when not to use it in my teaching	1	2	3	4	5
I see myself fully integrating ICT in my teaching in five years time	1	2	3	4	5
I think using ICT is time consuming	1	2	3	4	5
I think integrating ICT is costly	1	2	3	4	5
I think ICT is not reliable (things may go wrong)	1	2	3	4	5
I think using ICT is important for my image in front of my students	1	2	3	4	5

15) Please circle the most appropriate answer:

1 - Strongly Agree	2- Agree	3 - Neutral	4 – Disagree	5 -
Strongly disagree	NA- Not Applic	able		

I think using ICT has improved the quality of my teaching	1	2	3	4	5	NA
I feel my teaching style has changed since I started using	1	2	3	4	5	NA
ICT						
I feel my role as a teacher has changed since I started	1	2	3	4	5	NA
using ICT						
Overall, my experience using ICT has been a positive one	1	2	3	4	5	NA

ALI Culture & ICT

16) Please circle the most appropriate answer:

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

I am familiar with the ICT material available in the ALI	1	2	3	4	5
The ALI up-dates me with new ICT material when it is available	1	2	3	4	5
I am familiar with the services provided by the multi- media unit	1	2	3	4	5
My Head of Department is supportive of the use of ICT in teaching		2	3	4	5
My colleagues are supportive of the use of ICT in teaching	1	2	3	4	5
I think ICT can foster collegiality in the department	1	2	3	4	5

I think ICT can help Arabic language teachers worldwide exchange experiences	1	2	3	4	5
In terms of priorities, I think the department has more important things to work on than ICT		2	3	4	5
I feel pressured by my work environment to use ICT when I am not ready to do so	1	2	3	4	5
I think the department is pressured by the university to use ICT	1	2	3	4	5
In general, I think the department has a clear plan for ICT integration	1	2	3	4	5
There is good communication between the multi-media unit, the department and the teachers when it comes to ICT matters	1	2	3	4	5
In general, I think the department provides the teachers with a suitable environment for ICT professional development	1	2	3	4	5

17) If you have any further comments, please add them here (or on the back):

Thank you very much for your cooperation

Acknowledgements:

Thank you to Diane Slaouti and Amanda Barton, from the University of Manchester, for allowing me to use the questionnaire that they had earlier developed for their study: Slaouti, D. and Barton, A. (2007 in press). Opportunities for practice and development: newly qualified teachers and the use of ICT in teaching foreign languages in English secondary school contexts. *Journal of In-service Education*, 3(4)

Appendix 3: Interview Schedule - Teacher Background

These initial interviews were conducted with the teachers, particularly in relation to their early learning experiences and teacher education in TASOL. The following constitutes the broad areas covered. Further probes were tailored in accordance with each participant's narration.

a) Early Learning Experiences

Following Borg (2006), the initial questions were about *Schooling* only. However, as the three teachers referred to the impact of parents and social networks in early years, I later decided to expand this area of research from *Schooling* to *Early Experiences as Learners*.

I will not call it an 'interview', but rather	لن أسميها مقابلة. إنما هو نوع من النقاش أو		
a discussion or [an open space]; stories	atur a É. e atur 28 e 8 - 21 1 ar 7 e 2 e 291		
about your background. Let's start with	الفصفصة حكايات حول حلفيتك وببدأ بتجربتك		
your early schooling. Could you please	المدرسية منذ الصغر.		
tell me a little about your experience of	at the state of th		
learning languages in general, and the	هن من الممدن ال تحدي في قليلا عن تجربه تعمت		
Arabic language in particular?	للغات بصفة عامة واللغة العربية بصفة خاصة؟		
In light of your personal experience, was	في ضوء تجربتك الشخصية، هل كان تدريس اللغة		
teaching Arabic different to teaching			
other languages? In what way?	العربية مختلفاً عن غيرها؟ كيف؟		
Do you think that your schooling	ها، محدث أن انتحريتك المدرسية تأثيراً على		
experience has an impact on your present	ہن ویجت ان سیریٹ استرسید تایز ، طی		
experience has an impact on your present	تدريسك حالياً؟ كيف؟		
teaching? In what way?			

b) TAFL Teacher Education and Early Teaching Experiences

Why did you choose the teaching	لماذا اخترت مهنة التدريس؟
profession?	
Has the TAFL program had an impact on	هل كان لبرنامج الــــ TAFL تأثير عليك كمدرسة؟
you as a teacher? How?	
	کیف؟
Are there things that you wish you had	هل هناك أشياء تتمنين لو أنك كنت قد تعلمتها في
learned in TAFL?	е ТАТТ 1
Do you remember your first teaching	هل تذكرين يومك الأول في التدريس؟
day?	
What are some of things you used to do	ما هي بعض الأشياء التي كنت تقومين بها سابقاً
in the past but no longer do?	Plain matile
What are things you did not do in the past	ما هي بعض الأشياء التي لم نكوني تقومين بها
but have started doing now?	سابقاً وأصبحت تفعلينها؟
	•••••••••••••••••••••••••••••••••••••••
What used to affect you the most as a	ما هو أشد ما كان يؤثر فيك كمدرسة مبتدئة؟
novice teacher?	
What is your advice to a novice teacher?	هل من بعض النصائح لمدرسة مبتدئة؟
What are the most important stages in	ما هي أهم مراحل تطورك المهني؟
your professional development?	
Your technological development. How	مراحل تطورك التكنولوجي. كيف تتابعت؟
did it start?	
Do you remember your first computer?	هل تتذكرين أول كمبيوتر امتلكته؟
When did your relationship with the	متى بدأت علاقتك بالانترنت؟
Internet start?	
Did you receive any training on using the	هل تلقيت تدريباً على استخدام الكمبيوتر؟ هل كان
computer? Was it useful?	рі [#] . •
	مفيدا؟

What are your sources of information on	ما مصادر معلوماتك التكنولوجية؟
technology?	
What are your ambitions in relation to	ما هي طموحاتك التكنولوجية؟
technology?	
What are your professional ambitions,	ما هي طموحاتك المهنية عامةً؟
generally?	
Appendix 4: Interview Schedule - Materials Development

In the process of eliciting teacher cognition about ICT use, the three participants were invited to showcase computer-based material of their design. Reflecting various aspects of using educational technologies in teaching Arabic, their presentations were as follows:

- Dalal discussed the use of PowerPoint in teaching reading (Arabic prose)
- Heba discussed the use of video material in teaching listening and speaking
- Laila discussed the use of PowerPoint in teaching grammar

The questions below guided our conversations, and the sessions were video recorded to capture both teacher production and our discussion.

Why was this medium suitable for	لماذا كان هذا الوسيط مناسباً لتدريس اللغة
teaching Arabic?	eï
	العريبة:
How did you think about it? What was	كيف فكرت في ذلك؟ ما مصدر الإلهام؟
your source of inspiration?	
How did you teach it in class?	كيف تدرسينه في الفصل؟
How did you teach it without computer	كيف كنت تدرسينه دون استخدام تقنية الحاسوب؟
technology?	
What did you aim to achieve?	ما الذي كنت تودين تحقيقه؟
What difference did it make to you and to	ما الفرق الذي أحدثته لك وللمتعلمين؟
the learners?	
Where does it fall within the entire	أين يقع الحاسوب من الدرس ككل؟
lesson?	
What did you use before? And what	ماذا كنت تفعلين قبله؟ وماذا ستفعلين في حالة عدم
would you do in the absence of a	
computer?	وجود الحاسوب؟
What would you do if it does not work?	ماذا ستفعلين لو لم يعمل؟

Do years of (teaching) experience play a	هل تلعب سنوات الخبرة دورًا مهمًا؟
role?	
Has the new strategy contributed to	هل ساهمت الاستراتيجية الجديدة في تغيير طريقة
changing your way of thinking?	
	تفكيرك؟
Has the new strategy contributed to	هل ساهمت الاستراتيجية الجديدة في تغيير طريقتك
changing your way of teaching?	o
	في التدريس؟
Has the new strategy contributed to	هل ساهمت الإستراتيجية الجديدة في تغيير علاقتك
changing your relationship with the	
learners?	بالمتعلمين؟
What is the role of the learners?	ما هو دور المتعامين؟
Did your collectives along a role?	
Did your colleagues play a role?	هل كان للزميلات دور؟
What were some of the supportive	ما هي بعض العوامل المشجعة أو الداعمة؟
factors?	
What were some of the challenges/	ما هي بعض التحديات/ العوامل المعيقة؟
obstacles?	
Do you use other technological resources	هل تستخدمين وسائل تقنية أخرى في تدريس
in teaching Arabic?	
	العربية؟
Do you use this medium in teaching other	هل تستخدمين هذا الوسيط في تدريس مواد أخرى؟
subjects?	

Appendix 5: Interview Schedule - Teacher Non-ICT Beliefs

In addition to technology-related cognitions, teachers' non-ICT beliefs were probed. Questions were largely borrowed from Richards & Lockhart (1996, pp. 29-49), and in light of Borg's (2006) diagram they were either refined or supplemented with additional ones (Sections extracted from Richards & Lockhart (1996) are marked in bold for clear identification).

Sources of teachers' beliefs (pp. 30 - 32)

The authors identify the following as the main sources of teachers' beliefs:

- 1) Their own experience as language learners
- 2) Experience of what works best
- **3)** Established practice
- 4) Personality factors
- 5) Educationally based or research-based principles
- 6) Principles derived from an approach or method

What do you think is/are the main source(s) of your beliefs?

Beliefs about ... [Arabic] (pp. 32-33)

Do you think... [Arabic] is more difficult to learn than other languages? If there are any difficult aspects about the language, what do you think they are? What attitudes do your learners associate with... [Arabic]? Do you think... [Arabic] has any qualities that make it different from other languages?

Beliefs about learning (p. 34)

How do you define learning?

What are the best ways to learn a language?

What kinds of learning styles and strategies do you encourage in learners? What kinds of learning styles and strategies do you discourage in learners?

Beliefs about the learners

Tell me about Arabic language learners in the ALI?

What kinds of students do best in your classes? (p. 34) What roles are students expected to assume in your classroom? (p. 34) How would you define your relationship with your learners?

<u>Beliefs about teaching</u> (pp. 36-37)
How would you define effective teaching?
What teaching methods do you try to implement in your classroom?
What teaching resources do you make use of?
What is your approach to classroom management?
What is the most rewarding aspect of teaching for you? (p.41)

Beliefs about the teacher

How would you define an effective teacher? How do you see your role in the classroom? Do you think there is a certain view of the role of the teacher in the Arab culture?

<u>Beliefs about learning activities and teaching material</u> What are your criteria for selecting activities and material? What are some of the enabling and hindering factors in this respect?

Beliefs about colleagues

Tell me about the role of colleagues in your professional life?

<u>Beliefs about the program and the curriculum</u> (p. 39) What do you think are the most important elements in an effective language teaching program? How do you decide what you will teach? To what extent is your teaching based on your students' needs? What is your attitude toward assessment in a language program? What changes would you like to see in your program?

Beliefs about ... [Arabic] Language Teaching as a Profession (p. 41)

How would you characterize ... [Arabic] language teaching... as a profession? What changes do you think are necessary in the [Arabic] language teaching profession?

What kinds of professional development activities best support [Arabic] teaching?

Appendix 6: Interview Schedule - Impact of Study on Participants

At the end of fieldwork, the three teachers were invited to reflect on their participation in this study. Both positive and negative comments were encouraged.

What impact has this study had on you,	كيف أثرت عليك الدراسة سلباً وإيجاباً؟
positively and negatively?	
Has your participation in this study	هل غيرت مشاركتك في الدراسة من رؤيتك لنفسك
changed anything about the way you	e."
perceive yourself as a teacher?	حمدرسته؟
Has your participation in the study	هل غيرت مشاركتك في الدراسة من استخدامك
affected your use of ICT in teaching	o 7 N
Arabic?	للتكنولوجيا في تدريس العربية؟
In terms of methods of data collection	من ناحية أدوات البحث (كالــــ questionnaire,
(e.g., questionnaire, interviews,	interviews stimulated recalls and
stimulated recalls, and recording	interviews, stimulated recails, and
teaching sessions), has any of that left an	recording teaching sessions)، هل اتر اي
impact, positively or negatively?	منها عليك سلباً أو إيجاباً؟
Finally, are there any additional	في الختام هل لديك أي تعليق تودين إضافته؟
comments you wish to add?	

Appendix 7: Technological Reflections

خواطر تكنولوجية (Technological Reflections)

مساحة مفتوحة للبوح ببعض الأفكار والأراء والقناعات والتحيزات حول استخدام – أو عدم استخدام – التكنولوجيا في تدريس اللغة العربية⁴:

(.. An open space for the free expression of thoughts, opinions, beliefs, and biases about using - or not using - technology in teaching Arabic*):

النكنولوجيا و المدرس (Technology and the Teacher)

التكنولوجيا و (عملية) التدريس (Technology and the Teaching Process)

التكنولوجيا والطلاب (Technology and the Students)

⁴ ستحاط جميع الآراء بالسرية التامة ولن تستعمل إلا لأغراض بحثية. (Opinions will remain strictly confidential, and only used for research purposed) التكنولوجيا و (عملية) التعلّم (Technology and the Learning Process)

التكنولوجيا و المادة التعليمية (Technology and the Educational Material)

التكنولوجيا والأنشطة اللغوية (Technology and Language Activities)

التكنولوجيا واللغة العربية (تحديداً) (Technology and the Arabic Language, in Specific)

التكنولوجيا والتقييم/ الاختبارات (Technology and Assessment/ Tests)

التكنولوجيا والزملاء (Technology and Colleagues)

(Technology and the ALI: Administration - Policy - Scheduling - Classes) التكنولوجيا والمعهد

(الإدارة – سياسة المعهد – نظام الجداول – الفصول)

التكنولوجيا ووحدة الكمبيوتر (Technology and the CALL Unit)

التكنولوجيا.. و أنا (Technology and Myself)

التكنولوجيا.. وأي شيء آخر (Technology and Anything Else)

مع الشكر،

مريم عطية (With thanks, Mariam Attia)

Appendix 8: Interview Schedule - Dr. Zeinab Taha, ALI Director

Why the use of technology (in the ALI)?	لماذا الاتجاه نحو استخدام التكنولوجيا (في القسم)؟
What are the stages of ICT development	ما هي مراحل تطور استخدام التكنولوجيا في
in the Institute?	المعهد؟
	•
What is the policy of the Institute in	ما هي سياسة المعهد بالنسبة لاستخدام
relation to ICT use?	
	التكنولوجيا؟
Is there a technology plan for the Institute	هل هناك خطة تكنولوجية للمعهد ككل؟
as a whole?	
The importance of ICT in her opinion -	أهمية تكنولوجيا الإتصالات والمعلومات حسب رأيك
What difference does it make?	
	– ما الفرق الذي تحدثه؟
What is the role of the teacher in the	ما دور المدرس مع وجود هذه الأدوات؟
presence of these tools?	
What is the attitude of the teachers	ما موقف المدرسين تجاه استخدام التكنولوجيا؟
toward using technology?	
What are some of the prevailing beliefs/	ما هي بعض القناعات السائدة في المعهد؟
convictions in the Institute?	
How do the teachers in the Institute use	كيف يستعمل المدرسون تكنولوجيا الإتصالات
ICT? Why?	
	والمعلومات في المعهد؟ ولمادا؟
Is ICT used in certain levels/ with certain	هل تستخدم تكنولوجيا الإتصالات والمعلومات في
skills rather than others?	
	مستويات/ مهارات دون اخرى؟
Are certain media/ equipment used rather	هل هناك استخدام لوسائط/ أجهزة دون أخرى؟
than others?	
What should we do to support ICT use in	ماذا علينا فعله لدعم استخدام تكنولوجيا الإتصالات
the Institute?	
	والمعلومات في المعهد؟

How can we explain teacher reluctance	كيف نفسر عزوف المدرسين عن استخدام
despite technological resources,	
encouragement and training?	التكنولوجيا رغم توفر الوسائل والتشجيع
	والتدريب؟
What is the role of the Institute in raising	ما دور المعهد في رفع كفاءة المعلمين في
teacher competence in ICT?	
	تكنولوجيا الإتصالات والمعلومات؟
What are the biggest achievements? How	ما هي أكبر الانجازات؟ كيف يمكننا المضي قدمًا؟
can we proceed?	
What are some of the challenges/	ما هي بعض التحديات/ العقبات؟ كيف يمكننا التغلب
obstacles? How can we overcome them?	
	عليها؟
What is the vision of the Institute with	ما هي رؤية المعهد فيما يتعلق بإعداد المعلمين
regard to preparing newly qualified	
teachers in terms of ICT use?	المؤهلين حديثًا من حيث استخدام تكنولوجيا
	الإتصالات والمعلومات؟
what are your ambitions for using ICT in	ما هي طموحاتك لاستخدام تكنولوجيا المعلومات
the Institute?	Pro-11 6 - 11 - 121 -
	والالصالات في المعهد:

Appendix 9: Interview Schedule - Mr. Kamal Al Ekhnawy Head of the CALL Unit

Kamal contributed to this study, both as an Arabic language teacher and as the Head of the CALL Unit. Like several other teachers in the ALI, he filled out the questionnaire and provided his Technological Reflections. Several short and long interviews were conducted with him, either in relation to his own cognitions (as reflected in the Technological Reflections, for example), or in association with specific issues raised by the particular informants. He also showcased some of the latest material developed in the CALL Unit for ALI teacher use.

The following were the main issues addressed in the first interview with him.

هل يمكنك أن تحدثني قليلا عن خلفيتك؟
ما الذى يولد الحافز لديك لتعلم واستخدام
, , , , <u>,</u>
تكنولوجيا الاتصالات والمعلومات؟
ما الذي يضفيه الحاسوب إلى التدريس؟
هل تعتقد أن من يستخدم تكنولوجيا المعلومات
'
والاتصالات عليه أن يتمتع بتراء داخلي؟ بنوع من
القدرة على الإبداع والتغيير، أم أن هذا ليس
شرطاً؟
فى ضوء استخدامك المستمر للحاسوب، هل
واجهتك أيا من الفرص أو القيود المتصلة
باستخدام هذه الأداة مع اللغة العربية كلغة؟
هل يمكن أن تصف لي طبيعة وظيفتك هنا؟

In your opinion, what are the biggest	في رأيك، ما هي أكبر التغيرات التي حدثت في
changes that have been introduced to the	
CALL Unit since September (his arrival)?	لوحده مند شهر سبتمبر (وصوله)؟
From your contact with the teachers here,	من خلال تواصلك مع المدرسين هنا، ما هي طبيعة
what is the nature of their ICT use?	استخدام تكنولوجيا المعلومات والاتصالات؟
What are some barriers to teacher ICT	ما هي بعض العقبات أمام استخدام المدرسين
use?	لتكنولوجيا المعلومات والاتصالات؟
Does the Unit play a role in overcoming	هل للوحدة دور في التغلب على هذه العقبات؟
these obstacles?	
Do we need a change in the structure of	هل نحتاج إلى تغيير في نظام المعهد نفسه لتشجيع
the Institute itself to encourage more ICT use?	استخدام تكنولوجيا المعلومات والاتصالات؟
Do we need more communication?	هل نحتاج إلى المزيد من التواصل؟
How do you envisage the future of this	ما هو تصورك لمستقبل هذه الوحدة؟
Unit?	
Is there a question that you expected me	هل هناك سؤال كنت تتوقع أن أسأله لك ولم أفعل؟
to ask you, but I didn't?	

Appendix 10: Interview Schedule - Mr. Ayman Mostafa, Computer Specialist, CALL Unit, ALI

Could you please tell us a little about	هلاً أخبرتنا القليل عن خلفيتك؟
your background?	
How did you come to the ALI and when?	كيف جئت إلى معهد اللغة العربية؟ ومتى؟
What made you apply for this job?	ما الذي جعلك تتقدم لهذه الوظيفة؟
Could you please describe to us the	هلاً وصفت لنا طبيعة عملك هنا؟
nature of your work here?	
What are some of the advantages to your	ما هي بعض المميزات لعملك هنا؟ وما هي بعض
work here? And what are some	
challenges?	التحديات؟
Are you satisfied with your job here?	هل أنت راضٍ عن عملك هنا؟
What is it that you would like to change	ما الذي ترغب في تغييره في هذه الوحدة؟
about this Unit?	
In your opinion, what are some attitudes	حسب رأيك، ما هي اتجاهات مدرسي المعهد حول
held by teachers in this Institute about	07 N 744N
using ICT in teaching Arabic?	استحدام التكنولوجيا في تدريس اللغة العربية؟
Based on your experience in dealing with	بناء على خبرتك في التعامل مع المدرسين، ما
the teachers what is the rate of	e(1, , , , , , , , , , , , , , , , , , ,
technology-using teachers in the Institute	سبه مسحدمي التصويوجي في المعهد (تعريب):
(approximately)?	
Specifically, what is the most widely-	ما الوسائل التقنية الأكثر استخداماً في المعهد على
used computer-based material in the	
Institute?	وجه التحديد؟
In your opinion, what is the reason for the	حسب رأيك، ما سبب قلة مستخدمي التكنولوجيا
minimal technology use despite the	, <u>, , , , , , , , , , , , , , , , , , </u>
presence of the CALL Unit and other	بين المدرسين رعم وجود الوحده وعيرها من
facilities?	الإمكانيات الأخرى؟

In your opinion, what does ICT add to	حسب رأيك، ما الذي تضيفه تكنولوجيا المعلومات
teaching?	
	والاتصالات إلى التدريس؟
What role can the CALL Unit play to	ما الدور الذي يمكن أن تلعبه الوحدة لتشحيع
promote more ICT use?	
F	استخدام المزيد من تكنولوجيا المعلومات
	والأتصالات ؟
In your opinion, what motivates some	حسب رأيك، ما الذي يجعل بعض المدرسين
teachers to use ICT and others not to use	
it although they may work under the	يستخدمون التكنولوجيا والبعض الآخر لايستخدمها
similar conditions?	Q t _ 11 . 5 16 . 1 5 46 .
	رعم تسابه طروف (تعمل:
Some say that that role of the Unit is	البعض يقول بأن دور الوحدة تقنى أكثر منه
more technical than pedagogical, in other	
words that you offer technical services	تربوي، أي انكم تقدمون الخدمات التقنية فقط ولا
only, and no more than that. Do you	شيء غير ذلك. هل تتفق مع هذه المقولة؟
agree with this?	
How do you view the future of the	Install from the new official the state of the
Institute in terms of ICT use?	حيف تنظر إلى مستغيل المعهد من حيث استخدام
Institute in terms of IC 1 use?	تكنولوجيا المعلومات والاتصالات؟
Is there something you would like to add	هل هناك شيء تود إضافته ولم أسألك عنه خلال
that I haven't asked you about?	
	المقابلة؟

Appendix 11: Interview Schedule - Mrs. Marwa Mansour, Senior Programmer and Analyst, AUC

Marwa is a senior programmer and analyst at the Academic Computing Services (now University Academic Computing Technologies) at AUC. At the time of the study, she was in charge of supporting and maintaining the university's WebCT (now Blackboard) accounts and faculty training in technology.

The following were the main questions addressed to her.

<u>a</u> : <u>1</u> <u>1</u> <u>1</u>	
Given your experience in working with	نظرًا لخبرتك في العمل مع مدرسينا، وبخاصة في
our teachers, particularly in the area of	
training, how would you describe their	مجال التدريب ، كيف تصفين مستوى فبولهم
level of acceptance of the use of digital	لاستخدام الوسائط الرقمية في التعليم؟
media in teaching?	
What about their beliefs about the use of	ماذا عن قناعاتهم حول استخدام التكنولوجيا بشكل
technology in general? Have you noticed	
any specific ones?	عام؟ هل لاحظت أيَّه قناعات معينه؟
Could you please tell us about some of	هلاً أخبرتنا عن بعض قناعات أو اتجاهات مدرسي
the beliefs and attitudes of the ALI	· · · · · · · · · · · · · · · · · · ·
teachers with regards to the use of ICT?	المعهد المتعلقة باستخدام تكنولوجيا المعلومات
	ه الاتصالات؟
Based on your experience in training,	بناءً على خبرتك في التدريب، ما هو معدل استخدام
Based on your experience in training, what is the rate of ICT use in the Institute	بناءً على خبرتك في التدريب، ما هو معدل استخدام
Based on your experience in training, what is the rate of ICT use in the Institute (approximately)?	وريت يك في التدريب، ما هو معدل استخدام تكنولوجيا المعلومات والاتصالات (تقريبًا) من قِبل
Based on your experience in training, what is the rate of ICT use in the Institute (approximately)?	وبويا وبيا المعلومات والاتصالات (تقريبًا) من قبل معلمي المعهد ؟
Based on your experience in training, what is the rate of ICT use in the Institute (approximately)? In your opinion, what are some of the	وروسيوسر بين في التدريب، ما هو معدل استخدام تكنولوجيا المعلومات والاتصالات (تقريبًا) من قِبل معلمي المعهد ؟ حسب رأيك، ما هي بعض الأدوات الرقمية
Based on your experience in training, what is the rate of ICT use in the Institute (approximately)? In your opinion, what are some of the digital tools and resources that the	وبوكولي في التدريب، ما هو معدل استخدام بناءً على خبرتك في التدريب، ما هو معدل استخدام تكنولوجيا المعلومات والاتصالات (تقريبًا) من قبل معلمي المعهد ؟ حسب رأيك، ما هي بعض الأدوات الرقمية
Based on your experience in training, what is the rate of ICT use in the Institute (approximately)? In your opinion, what are some of the digital tools and resources that the teachers prefer?	وبوسيوير في التدريب، ما هو معدل استخدام بناءً على خبرتك في التدريب، ما هو معدل استخدام تكنولوجيا المعلومات والاتصالات (تقريبًا) من قِبل معلمي المعهد ؟ حسب رأيك، ما هي بعض الأدوات الرقمية والموارد التي يفضلها مدرسو المعهد؟
Based on your experience in training, what is the rate of ICT use in the Institute (approximately)? In your opinion, what are some of the digital tools and resources that the teachers prefer?	وبركريك، بناءً على خبرتك في التدريب، ما هو معدل استخدام تكنولوجيا المعلومات والاتصالات (تقريبًا) من قِبل معلمي المعهد ؟ حسب رأيك، ما هي بعض الأدوات الرقمية والموارد التي يفضلها مدرسو المعهد؟
Based on your experience in training, what is the rate of ICT use in the Institute (approximately)? In your opinion, what are some of the digital tools and resources that the teachers prefer?	وروسيا ورسيد في التدريب، ما هو معدل استخدام بناءً على خبرتك في التدريب، ما هو معدل استخدام تكنولوجيا المعلومات والاتصالات (تقريبًا) من قِبل معلمي المعهد ؟ معلمي المعهد ؟ والموارد التي يفضلها مدرسو المعهد؟
Based on your experience in training, what is the rate of ICT use in the Institute (approximately)? In your opinion, what are some of the digital tools and resources that the teachers prefer? Based on your experience in training,	وروسياريا بناءً على خبرتك في التدريب، ما هو معدل استخدام تكنولوجيا المعلومات والاتصالات (تقريبًا) من قبل معلمي المعهد ؟ حسب رأيك، ما هي بعض الأدوات الرقمية والموارد التي يفضلها مدرسو المعهد؟ بناءً على خبرتك في التدريب، هل لاحظت تبايناً

the ALI and the ELI teachers in terms of	بين مدرسي معهد اللغة العربية ومدرسي معهد
technology use or perceptions of ICT?	اللغة الإنجليزية من ناحية استخدام التكنولوجيا أو
	النظرة إليها؟
Do you have anything to add around the	هل لديك أية إضافات حول استخدام التكنولوجيا في
use of technology in the Institute?	المعهد ؟

Appendix 12: Interview Schedule - Dr. Aziza Ellozy,

Founding Director of the Center for Learning and Teaching (CLT) (and currently also Associate Dean for Learning Technologies at AUC)

Established in 2002, the CLT aims to enhance the quality of teaching and promote the use of educational technologies at AUC. Among other services, the center provides lectures, workshops, professional consultations, and one-to-one training to faculty members at the university.

The following were the main questions addressed to her.

- Initially, I wanted to ask you about your experience in the CLT. How did the whole center start out?
- To what extent is the AUC faculty involved in your program?
- In your opinion, what causes differences between faculty members within the same university in terms of ICT use?
- Based on your experience in dealing with faculty members from different departments at AUC what are some of the beliefs that these teachers hold about technology?
- Talking about the writing program, do you see a difference between the English Language Institute and the Arabic Language Institute in terms of implementing technology? If so, what do you think accounts of this difference?
- How do you think we can familiarize teachers with the pedagogical benefits of technology?
- Do you think there has to be certain changes in the structure of AUC itself to accommodate more technology use among the faculty?
- Are there certain barriers that hinder faculty learning in ICT?

- What is it that might hinder a faculty member from using technology even if he/ she attends your sessions?
- Do you think the fact that faculty members do not use technology outside classrooms in their daily life plays a role?
- From your experience in dealing with teachers from the ALI, have you noticed any points or aspects that are specific to the Arabic language? e.g., this cannot be applied because it is Arabic, or this can be perfectly applied because of it is Arabic?
- What about ICT based educational material for Arabic language learning?
- I sense that there is a need for some kind of collaboration between faculty members from different departments... for some kind of exchange of ideas... a platform for more technology use, particularly with respect to departments with similar interests or similar activities. What do you think about that?
- What are your plans for the future?
- Educational technologies are ever-changing. How do you keep up with this?
- It seems that some faculty members are inclined to use a behaviorist approach to ICT use (stimulus-response activities). Is this observation correct? Do you promote certain approaches?
- Is there something that I haven't asked you about that you would have wished to discuss?

Appendix 13

CONSENT FOR PARTICIPATION

Dear ALI student,

Thank you for taking part in my PhD project on teacher cognition and the use of ICT in teaching Arabic. By signing your name below, you give your permission to include the video files developed during the months of May and June 2008, in my PhD research in addition to making them available for future educational purposes (e.g. the teacher education program within the ALI).

Name (in print)	Signature

Thank you,

Mariam Attia PhD Candidate, Manchester, UK

Appendix 14: Example of Interview Construction and Interaction

Follow-up Interview - Technological Reflections Commentary (Translated) 16.03.2008

The following is an excerpt from an interview session with Laila, in which I probed further into the Technological Reflections she had provided⁵.

Mariam: You mentioned the issue of visualization. Students watch a PowerPoint presentation, and that affects teaching. Could you comment on this point, please? Do you consider this one of the pluses of using ICT?

Laila: Yes. Of course. Of course. Well, when I took Psychology 201 way back (smiles), the lecturer always emphasized that the more senses we bring into the learning process the more this helps in the... the material being retained, well. So, [he used] to tell us, if you read with your eyes, this is a sense or a way [of learning], if you read out loud, then you see... and listen as well... So, [this way] we have introduced another sense. If you write, you introduce a third sense, and so on. Of course, he would never have imagined, and neither would I, that there would be other things to be introduced into the [learning process]. Therefore, certainly, when students see things moving in front of them in a *planned manner* (emphasis) of course, not just movements, this helps them to learn more... and they told me... Some of them told me (serious tone): "That's it. I will not forget [what] I have seen... Done. I will remember this [grammatical] rule for I have seen it move [...]". So, this is, of course, a big achievement.

Mariam: What makes a successful class in your opinion? A technologically successful class?

⁵ This excerpt is added with the consent of the teacher.

Laila: Technologically? I will tell you about the successful class, in general. [It is] one in which the teacher talks less than the students. This is the first rule, and I would be a liar if I told you that I apply this rule in all classes. For example, in the colloquial elementary or semi-elementary classes, I find myself having to talk a lot, and exert a lot of effort, or if the class is, as you have seen, sleepy or absent-minded for any reason (laugh)... By the way, it turned out that they [specific students in her morning class] had stayed up partying [in the home of] one of the[ir] colleagues (laugh).

Mariam: Really?

Laila: ... and that's why they were extra unresponsive [today].

Mariam: Exactly (laugh).

Laila: So, if you find the students not interacting or not talking, you will find yourself forced to do the talking; not necessarily more... but you talk a lot. I don't consider this total success... A technologically successful class is one in which I utilize the means that I have in the class, or the technological means that I ... know... smoothly and without obstacles. Obstacles occur a lot. For example, with sound files from the main computer to the students' computers. Sometimes there are problems that prevent the transfer process. However, when I, smoothly, transfer the assignment or the thing that is to be done in class, the students put the head phones on, the sound is immediately connected, and we listen and work... no technical obstacles occur. Of course, this is considered very successful. I insert the Power Point, it is displayed... it doesn't freeze, it doesn't stop... Because in the older version of Office it stopped a lot. The PowerPoint would close in the middle [of the presentation] and I found myself having to click 'close', close the whole thing down and re-open it again. If all these things progress smoothly according to the plan that I have set for myself, then this is a successful class, of course.

Mariam: Right. Let's move to a point we addressed this morning, which is that of *Technology and Colleagues*... and this appeared not just with you... but with other people I had interviewed.

Laila: Yes.

Mariam: I highlighted the point [in your Technological Reflections] about exchanging experiences

Laila: Yes.

Mariam: and how this is an important point, and so. Could you please elaborate more on *Technology and Colleagues*?

Laila: Yes... When I first started recording from the Internet, we didn't exactly know. Well, we knew we could record directly from the Internet, from the live broadcast of the BBC or the latest news. But how to record? That took time... for us to sit down and talk to one another... There was a program... [we discovered] through verbal exchanges... Oh, yes, there is a program called Audacity we could install. First, we installed Jet Audio, and we used to work with that. Then Kamal told us it [the sound file produced] is large; instead there is this Audacity. The sound file is possibly smaller and more condensed.

Mariam: How can we encourage more exchange of ideas? What do we need?

Laila: I think... well, even a small portion of the weekly meeting... I know that we are all busy... I wouldn't like to [suggest] a second weekly meeting. Perhaps there could be some kind of session, even just once a month. Everyone could [present] something they did in class that was successful. It does not have to be technology-based. 'I developed a game...' 'I used this new technique.' 'I did something that worked in my class or was successful.'

Mariam: In your opinion, are there any specific criteria as to which teachers you interact with, or let's say cooperate with?

Laila: Emmm. Those who are like me. Those who try to develop their technological abilities. There are people who cannot deal with this subject *at all* (emphasis)... They don't even type on the computer... still hand things to the secretaries to have them typed. I would not discuss things like this with those teachers. So, certainly I would choose someone who is at the same level of experience, or who exhibits a desire to develop his/ her technological abilities. I won't talk to just anyone.

Mariam: Regarding teacher collaboration as a factor [for adoption], to what extent does it affect your own process of ICT learning and use?

Laila: [It has] a big influence, as I told you before. In other words, I learn many things. For example, after we had this recording episode, I wanted to send the file to the students, but it never went across. So, ... again through talking... Shahira told me that Heba has a Gmail account that it is large, and I don't know what. So, I opened a Gmail so I could send things from it... and so on. In other words, it [cooperation] helps in many areas. It facilitates many things. Now, I know that Heba is trying to record directly to the laptop, and that Kamal is installing something for her, or has tried several kinds of software or such... So, I am waiting to see what he does, and after that I will record like she does. Well, I don't have to go through all the stages she went through.

Mariam: Exactly. Re-inventing the wheel.

Laila: Yes. I am waiting to see what they arrive at... What she arrives at with Kamal, and then I'll do as she did.

Mariam: Do you think that seniority, *'ishra*, and history, play a role?

Laila: Yes, of course. Of course. Certainly. In fact, I am not able to talk to everyone with the same feeling of comfort... or tell [them] that I did something dumb, for

example (smiles) or that it didn't work, and so on. I would not be able to say that to just anyone, especially 'the emerging generation' (laugh).

Mariam: Naturally.

Laila: (Laugh).

Mariam: That's right.

Laila: Yes. [I may tell them] "I did this and it didn't work" or "I did…" (in a high tone, imitating some younger teachers): "But why Ustaza Laila didn't you do, I don't know what…?"

Mariam: (Laugh)

Laila: "Which is what?" [I think to myself]. Nor do I want to place myself in such a situation (laugh).